

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

Fresh Water Aquatic Invertebrates

INVERTEBRATES



Photo: Chris Raithel

~See map disclaimer in profiles introduction

Description

The freshwater mollusks (mussels, clams, and gastropods) of this group, can live in rivers, streams, ditches, canals, lakes, and ponds. Unfortunately, freshwater mollusks are one of the most imperiled group of animals in the United States. A thorough 2006 survey of shallow freshwater areas in Rhode Island found eight mussel species present in the state (Raithel and Hartenstine, 2006). The Eastern Pearlshell, a state-listed endangered species, was found only in very healthy headwater streams in the Pawcatuck River basin. The Alewife Floater, also found in the Pawcatuck River, has recently expanded its range by traveling on host fish during herring runs (Raithel and Hartenstine, 2006). Freshwater mollusks, particularly mussels, are indicators of water quality and ecosystem health, as they are sensitive to chemicals, heavy metals, turbidity, etc.

Species

- Triangle Floater (*Alasmidonta undulata*)
- Alewife Floater (*Anodonta implicata*)
- Lampmussel (*Lampsilis radiata*)
- Eastern Pond Mussel (*Ligumia nasuta*)
- Eastern Pearlshell (*Margaritifera margaritifera*)
- Squawfoot (*Strophitus undulatus*)
- Golden Ambersnail (*Succinea wilsoni*)

Threats and Actions by Species

Triangle Floater (*Alasmidonta undulata*)

Habitat Community: Lake, Type: Shallow
 Status: IUCN Rank: LC. SRANK: SNR. GRANK: G4. RSGCN: H-H. Mussels: 1. CODES: RES. Res/B: 1. GRP: 1. PRIOR: 1. Climate Change Vulnerability: Low=2100 (Temperature change)

Threat 1 - Household sewage and urban waste water; Road runoff

- Actions:
- Site/area management; Protect habitat from chemical runoff, work with RI DOT. Rank: 3
 - Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3
 - Alliance and partnership development. Rank: 2

Threat 2 - Agricultural and forestry effluents; Pollution from farming

- Actions:
- Site/area management; Work with farmers to protect streams. Rank: 3

Threat 3 - Dams and water management/use; Water withdrawal

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- Actions:*
- *Resource and habitat protection; Protect natural hydrology. Rank: 3*
 - *Habitat and natural process restoration; Restore natural hydrology especially groundwater seepage, look for opportunities to modify culverts, work with RI DOT. Rank: 3*

Refer to the Community: Lake, Type: Shallow - Habitat Profile for additional threats to this species.

Alewife Floater (*Anodonta implicata*)

Habitat Community: River, Type: Cold Water, slower flowing stream

Status: IUCN Rank: LC. SRANK: SNR. GRANK: G5. RSGCN: H-H. Mussels: 1. CODES: RES. Res/B: 1. GRP: 3. PRIOR: 1. Climate Change Vulnerability: High=2030 (Temperature change)

Threat 1 - Dams and water management/use; Restriction and reduction of river herring

- Actions:*
- *Habitat and natural process restoration; Expand anadromous fish passage. Rank: 3*
 - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*

Threat 2 - Household sewage and urban waste water; Road runoff

- Actions:*
- *Site/area management. Rank: 2*
 - *Land/water protection; Protect habitat from chemical runoff, work with RI DOT. Rank: 3*

Threat 3 - Invasive non-native/alien species; Zebra mussels

- Actions:*
- *Awareness and communications; Need to educate the public about species loss due to zebra mussels. Rank: 3*

Refer to the Community: River, Type: Cold Water, slower flowing stream - Habitat Profile for additional threats to this species.

Lampmussel (*Lampsilis radiata*)

Habitat Community: Inland Pond and River Shore, Type: Shallow

Status: STSTAT: C. SRANK: S1. GRANK: G5. RSGCN: H-M. Mussels: 1. CODES: RES. Res/B: 1. GRP: 4. PRIOR: 1. Climate Change Vulnerability: Low=2100 (Temperature change)

Threat 1 - Household sewage and urban waste water; Road runoff

- Actions:*
- *Site/area management; Protect habitat from chemical runoff, work with RI DOT. Rank: 3*
 - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*

Threat 2 - Agricultural and forestry effluents; Pollution from farming

- Actions:*
- *Site/area management; Work with farmers to protect streams. Rank: 3*

Threat 3 - Dams and water management/use; Water withdrawal

- Actions:*
- *Resource and habitat protection; Protect natural hydrology. Rank: 3*
 - *Habitat and natural process restoration; Restore natural hydrology especially groundwater seepage, look for opportunities to modify culverts, work with RI DOT. Rank: 3*

Refer to the Community: Inland Pond and River Shore, Type: Shallow - Habitat Profile for additional threats to this species.

Eastern Pond Mussel (*Ligumia nasuta*)

Habitat Community: Lake, Type: Shallow

Status: IUCN Rank: NT. STSTAT: C. SRANK: S1. GRANK: G4G5. RSGCN: H-VH. Mussels: 1. CODES: RES. Res/B: 1. GRP: 6. PRIOR: 1. Climate Change Vulnerability: Low=2100 (Temperature change)

Threat 1 - Household sewage and urban waste water; Road runoff

- Actions:*
- *Site/area management; Protect habitat from chemical runoff, work with RI DOT. Rank: 3*
 - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*

Threat 2 - Agricultural and forestry effluents; Pollution from farming

- Actions:*
- *Site/area management; Work with farmers to protect streams. Rank: 3*

Threat 3 - Dams and water management/use; Water withdrawal

- Actions:*
- *Resource and habitat protection; Protect natural hydrology. Rank: 3*

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- *Habitat and natural process restoration; Restore natural hydrology especially groundwater seepage, look for opportunities to modify culverts, work with RI DOT. Rank: 3*

Refer to the Community: Lake, Type: Shallow - Habitat Profile for additional threats to this species.

Eastern Pearlshell (*Margaritifera margaritifera*)

Habitat Community: Lake, Type: Shallow

Status: IUCN Rank: EN. STSTAT: C. SRANK: S2. GRANK: G4. RSGCN: L-H. Mussels: 1. CODES: RES. Res/B: 1. GRP: 7. PRIOR: 1. Climate Change Vulnerability: High=2030 (Temperature change)

Threat 1 - Residential and commercial development; Nearby development negatively changes the character of the streams

- Actions:
- *Site/area protection; Protect the natural hydrology and the associated watershed. Rank: 3*
 - *Resource and habitat protection; Restore the adjacent upland habitat, maintain the brook trout population. Rank: 3*
 - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*

Threat 2 - Household sewage and urban waste water; Siltation, road salt, scarification of the streambed

- Actions:
- *Site/area management; Protect habitat from chemical runoff, work with RI DOT. Rank: 3*

Threat 3 - Recreational activities; Stepped on by fishermen

- Actions:
- *Awareness and communications; Need to educate the public about species loss due to trampling. Rank: 3*

Squawfoot (*Strophitus undulatus*)

Habitat Community: River

Status: STSTAT: C. SRANK: S1. GRANK: G5. Mussels: 1. CODES: RES. Res/B: 1. GRP: 8. PRIOR: 1. Climate Change Vulnerability: Low=2100 (Temperature change)

Threat 1 - Household sewage and urban waste water; Road runoff

- Actions:
- *Site/area management; Protect habitat from chemical runoff, work with RI DOT. Rank: 3*
 - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*

Threat 2 - Agricultural and forestry effluents; Pollution from farming

- Actions:
- *Site/area management; Work with farmers to protect streams. Rank: 3*

Threat 3 - Dams and water management/use; Water withdrawal

- Actions:
- *Resource and habitat protection; Protect natural hydrology. Rank: 3*
 - *Habitat and natural process restoration; Restore natural hydrology especially groundwater seepage, look for opportunities to modify culverts, work with RI DOT. Rank: 3*

Refer to the Community: River - Habitat Profile for additional threats to this species.

Golden Ambersnail (*Succinea wilsoni*)

Habitat Community: Freshwater Emergent Marsh, Type: Freshwater Emergent Marsh

Status: Climate Change Vulnerability: Unknown

Refer to the Community: Freshwater Emergent Marsh, Type: Freshwater Emergent Marsh - Habitat Profile for additional threats to this species.

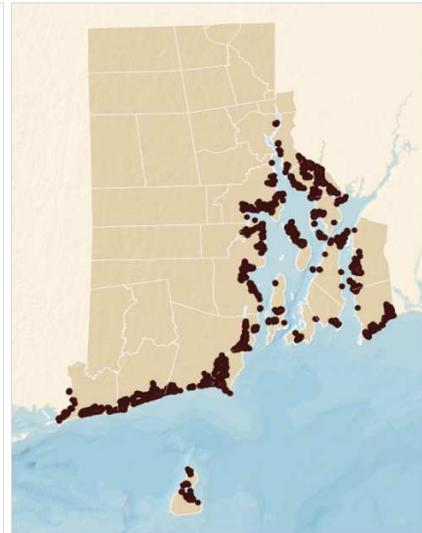
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Salt Marsh Marine Invertebrates

INVERTEBRATES



Photo: TNC



~See map disclaimer in profiles introduction

Description

Salt marshes provide a unique habitat for macroinvertebrates. Blue crabs (*Callinectes sapidus*) are common seasonally in tidal creeks and ditches of salt marshes. The eastern oyster (*Crassostrea virginica*) is found in subtidal and intertidal waters of brackish marshes. The eastern melampus snail (*Melampus bidentatus*), mouse ear snail (*Ovatella myositis*), and the golden amber (*Succinea wilsoni*) snail are facultative air breathers that are found in the upper edges (i.e., high marsh zone) of salt marshes and brackish marshes. They graze on microscopic periphyton that coats the mud surface between vegetation. Increased sea level will shift and impact the distribution of these obligate high marsh species. Marsh detritus in the upper marsh supports large populations of scavenging amphipods (*Hyle plumulosa*, *Haustorius canadensi*, *Gammarus tigrinus*, and *Gammarus lawrencianus*) and isopods (*Philoscia vittata*). Atlantic marsh fiddler crabs (*Uca pugnax* and *U. minax*) burrow into the banks of marshes, and in conjunction with the flushing of action of rising and falling tides, help aerate roots of marsh grass and promote root penetration. Atlantic sand fiddler crabs (*Uca pugilator*) replace marsh fiddler crabs in marshes with predominantly sandy sediments. Ribbed mussels (*Geukensia demissa*) attach to the bases of marsh plants along tidal channels. They help stabilize marsh banks and trap sediments. The purple marsh crab (*Sesarma reticulatum*) has been shown to increase bank erosion and sediment loss. With the loss of top predators such as striped bass, the abundance of purple marsh crab has increased resulting in the rapid loss of marsh banks and supporting sediments. Salt marshes became established in New England over the last 3,000 to 4,000 years, especially within the past 2,000 years. Like marsh vegetation, inhabiting organisms vary by position along the salinity gradient and location within the marsh. Continued rapid sea-level rise in Rhode Island will likely cause impacts in the distribution and abundance of marsh species.

Species

- Modest Alderia (*Alderia modesta*)
- Atlantic Mud Piddock (*Barnea truncata*)
- Eastern Emerald Elysia (*Elysia chlorotica*)
- Amphipod (*Gammarus faciatius*)
- Amphipod (*Gammarus lawrencianus*)
- Ribbed Mussel (*Geukensia demissa*)
- Amphipod (*Hyle plumulosa*)
- Northern Lacuna (*Lacuna vincta*)
- Marsh Snail (*Melampus bidentatus*)
- American Marsh Hopper (*Ochestia grillus*)
- Mouse Ear Marsh Snail (*Ovatella myosotis*)
- False Angelwing (*Petricolaria pholadiformis*)

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Purple Marsh Crab (*Sesarma reticulatum*)
Red-jointed Fiddler Crab (*Uca minax*)
Atlantic Sand Fiddler Crab (*Uca pugilator*)
Atlantic Marsh Fiddler Crab (*Uca pugnax*)
Banded Marsh Hopper (*Uholorchestia uhleri*)

Threats and Actions by Species

Modest Alderia (*Alderia modesta*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- Resource and habitat protection; Prevent development of marsh habitats.
 - Habitat and natural process restoration.

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- Conservation finance; Create grants to promote research to study population impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- Site/area protection; Ensure opportunities for inland migration with sea level rise.
 - Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.
 - Site/area management; Ensure opportunities for inland migration with sea level rise.
 - Habitat and natural process restoration.

Refer to the Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub - Habitat Profile for additional threats to this species.

Atlantic Mud Piddock (*Barnea truncata*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- Resource and habitat protection; Prevent development of marsh habitats.
 - Habitat and natural process restoration.

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- Conservation finance; Create grants to promote research to study population impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- Site/area protection; Ensure opportunities for inland migration with sea level rise.
 - Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.
 - Site/area management; Ensure opportunities for inland migration with sea level rise.
 - Habitat and natural process restoration.

Eastern Emerald Elysia (*Elysia chlorotica*)

Habitat Community: Brackish Marsh, Type: Brackish Marsh
Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- Resource and habitat protection; Prevent development of marsh habitats.
 - Habitat and natural process restoration.

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Threat 2 - Pollution; Water quality impacts to habitat

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:*
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Refer to the Community: Brackish Marsh, Type: Brackish Marsh - Habitat Profile for additional threats to this species.

Amphipod (*Gammarus faciatius*)

Habitat Community: Brackish Marsh, Type: Brackish Marsh

Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:*
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:*
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Amphipod (*Gammarus lawrencianus*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub

Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:*
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:*
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Refer to the Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub - Habitat Profile for additional threats to this species.

Ribbed Mussel (*Geukensia demissa*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub

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Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- Resource and habitat protection; Prevent development of marsh habitats.
 - Habitat and natural process restoration.

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- Conservation finance; Create grants to promote research to study population impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- Site/area protection; Ensure opportunities for inland migration with sea level rise.
 - Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.
 - Site/area management; Ensure opportunities for inland migration with sea level rise.
 - Habitat and natural process restoration.

Amphipod (*Hyale plumulosa*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub

Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- Resource and habitat protection; Prevent development of marsh habitats.
 - Habitat and natural process restoration.

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- Conservation finance; Create grants to promote research to study population impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- Site/area protection; Ensure opportunities for inland migration with sea level rise.
 - Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.
 - Site/area management; Ensure opportunities for inland migration with sea level rise.
 - Habitat and natural process restoration.

Northern Lacuna (*Lacuna vincta*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub

Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- Resource and habitat protection; Prevent development of marsh habitats.
 - Habitat and natural process restoration.

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- Conservation finance; Create grants to promote research to study population impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- Site/area protection; Ensure opportunities for inland migration with sea level rise.
 - Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.
 - Site/area management; Ensure opportunities for inland migration with sea level rise.
 - Habitat and natural process restoration.

Marsh Snail (*Melampus bidentatus*)

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Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

American Marsh Hopper (*Ochestia grillus*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Mouse Ear Marsh Snail (*Ovatella myosotis*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

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False Angelwing (*Petricolaria pholadiformis*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Purple Marsh Crab (*Sesarma reticulatum*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Red-jointed Fiddler Crab (*Uca minax*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*

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- *Habitat and natural process restoration.*

Atlantic Sand Fiddler Crab (*Uca pugilator*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Atlantic Marsh Fiddler Crab (*Uca pugnax*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Banded Marsh Hopper (*Uholorchestia uhleri*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts to habitat

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 3 - Climate change and severe weather; Highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and*

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easement.

- *Site/area management; Ensure opportunities for inland migration with sea level rise.*
- *Habitat and natural process restoration.*

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Invertebrates of Aquatic Bed and Coastal Salt Pond

INVERTEBRATES



Photo: Rachael Norris and Marina Freudzon; Mayscallop



~See map disclaimer in profiles introduction

Description

Eelgrass beds provide food, refuge, favorable attachment, and critical nursery habitat for a diverse assemblage of marine organisms, including attached sponges, hydroids, anemones, ento- and ecto-procts, limpets, polychaetes, bay scallops, and tunicates to mobile worms, snails, isopods, amphipods, crabs, shrimps, fishes, and other species, many of which support sport and commercial fisheries. Certain species of nudibranchs are only found in eelgrass beds including the dwarf balloon (*Eubranchus exigus*), Aeolis painted (*Eubranchus pallidus*), striped (*Cratena pilata*), and tiger (*Tergipes tergipes*) nudibranch. Grazing snails including the northern lacuna (*Lacuna vincta*), eastern emerald snail (*Elysia chlorotica*), and the modest alderia (*Alderia modesta*) help regulate excessive growth of algae and hydroids on eelgrass stems which improves light-dependent eelgrass productivity. The green sea urchin (*Strongylocentrotus droebachiensis*), hairy sea cucumber (*Sclerodactyla briareus*), and short spined brittle star (*Ophioderma brevispinum*) are also common inhabitants and macro-grazers in eelgrass meadows. Larvae of the bay scallop (*Argopecten irradians*) are commonly found affixed to eelgrass blades. Eelgrass communities are best developed in coastal salt ponds such as Quonochontaug Pond and Ninigret Pond, and protected coves in Narragansett Bay.

Species

- Bay Scallop (*Argopecten irradians*)
- Amphipod (*Gammarus tigrinus*)
- Red Gilled Worm (*Marphysa belli*)
- Nudibranch (*Tergipes tergipes*)

Threats and Actions by Species

Bay Scallop (*Argopecten irradians*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment
Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Pollution; Deteriorating water quality

- Actions:
- Land/water management; Enhance habitats. Rank: 3
 - Species management; Brood stock enhancement. Rank: 3

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

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Refer to the Community: Marine Soft Sediment, Type: Nearshore Soft Sediment - Habitat Profile for additional threats to this species.

Amphipod (*Gammarus tigrinus*)

Habitat Community: Brackish Tidal Aquatic Vegetation, Type: Brackish Subtidal Aquatic Bed

Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development and dredging

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on eelgrass, aquatic beds and coastal pond habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts on habitat, eutrophication and excessive macroalgal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fisheries related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Brackish Tidal Aquatic Vegetation, Type: Brackish Subtidal Aquatic Bed - Habitat Profile for additional threats to this species.

Red Gilled Worm (*Marphysa belli*)

Habitat Community: Brackish Tidal Aquatic Vegetation, Type: Brackish Subtidal Aquatic Bed

Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development and dredging

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on eelgrass, aquatic beds and coastal pond habitats .*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts on habitat, eutrophication and excessive macroalgal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fisheries related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Nudibranch (*Tergipes tergipes*)

Habitat Community: Brackish Tidal Aquatic Vegetation, Type: Brackish Subtidal Aquatic Bed

Status: Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Coastal development and dredging

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on eelgrass, aquatic beds and coastal pond habitats .*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Pollution; Water quality impacts on habitat, eutrophication and excessive macroalgal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fisheries related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

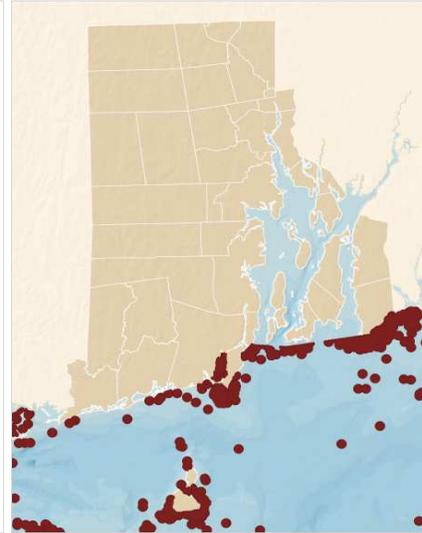
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Marine Rocky Reef Invertebrates

INVERTEBRATES



Photo: UCONN



~See map disclaimer in profiles introduction

Description

Intertidal and subtidal rocky reefs support dense populations of sessile (i.e., attached) organisms. Filter feeders dominate the intertidal zones while macro-algae and grazing organisms dominate the subtidal zones. Common or important inhabiting species that make up this community includes the blue mussel (*Mytilus edulis*), marine seaweeds, kelp, tunicates, anemones, barnacles, and sponges. Marine nearshore reefs provide refuge and important foraging areas for marine invertebrates, including the American lobster (*Homarus americanus*), the long nose and portly spider crab (*Libinia dubia* and *L. emarginata*, respectfully), lady crab (*Ovalipes ocellatus*), rock crab (*Cancer irroriatus*), green sea urchin (*Asterias forbesi*), and the common sea star (*Asterias forbesi*). Encrusting epifauna create favorable habitat and food sources for other marine species. Resident and transient finfish including the sea bass (*Centropristis striata*), cunner (*Tautogolabrus adspersus*), and tautog (*Tautoga onitis*) utilize marine nearshore reef habitats.

Species

- Common Sea Star (*Asterias forbesi*)
- Northern Star Coral (*Astrangia poculata*)
- Jonah Crab (*Cancer borealis*)
- Rock Crab (*Cancer irroriatus*)
- Coral Worm (*Dodecaceria coralii*)
- American Lobster (*Homarus americanus*)
- Longnose Spider Crab (*Libinia dubia*)
- Portly Spider Crab (*Libinia emarginata*)
- Northern Horse Mussel (*Modiolus modiolus*)
- Short Spined Brittle Star (*Ophioderma brevispinum*)
- Green Sea Urchin (*Strongylocentrotus droebachiensis*)

Threats and Actions by Species

Common Sea Star (*Asterias forbesi*)

Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:
- Policies and regulations.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

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Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:*
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Rocky Reef, Type: Hard, Rocky Bottom - Habitat Profile for additional threats to this species.

Northern Star Coral (*Astrangia poculata*)

Habitat Community: Marine Rocky Reef, Type: Offshore Rocky Reef

Status: CITES: II. IUCN Rank: LC. Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:*
- *Policies and regulations.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:*
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Rocky Reef, Type: Offshore Rocky Reef - Habitat Profile for additional threats to this species.

Jonah Crab (*Cancer borealis*)

Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:*
- *Policies and regulations.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:*
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Rocky Reef, Type: Hard, Rocky Bottom - Habitat Profile for additional threats to this species.

Rock Crab (*Cancer irroiatatus*)

Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:*
- *Policies and regulations.*

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- *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Coral Worm (*Dodecaceria corallii*)

Habitat Community: Marine Rocky Reef, Type: Offshore Rocky Reef

Status: Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:
- *Policies and regulations.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Rocky Reef, Type: Offshore Rocky Reef - Habitat Profile for additional threats to this species.

American Lobster (*Homarus americanus*)

Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: IUCN Rank: LC. SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Over-exploited fishery

- Actions:
- *Compliance and enforcement; Greater management of fisheries. Rank: 3*
 - *Policies and regulations; Private sector standards and codes. Rank: 3*
 - *Alliance and partnership development; Co-management and private sector incentives to reduce exploitation. Rank: 2*
 - *Livelihood, economic and other incentives. Rank: 3*
 - *Compliance and enforcement; License or vessel acquisition. Rank: 2*

Threat 2 - Problematic native species; Striped Bass, Black Sea Bass, Tautog predation

- Actions:
- *Ex situ conservation.*
 - *Habitat and natural process restoration; Population and juvenile habitat enhancement.*
 - *Education and awareness; V-notching program.*
 - *Compliance and enforcement.*

Threat 3 - Climate change and severe weather; Population at southern-most extent. Increased shell disease and immunological stress.

- Actions:
- *Law and policy; More restrictive fisheries management measures/regulations.*
 - *Education and awareness.*

Refer to the Community: Marine Rocky Reef, Type: Hard, Rocky Bottom - Habitat Profile for additional threats to this species.

Longnose Spider Crab (*Libinia dubia*)

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Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:
- *Policies and regulations.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits*

Portly Spider Crab (*Libinia emarginata*)

Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:
- *Policies and regulations.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits*

Northern Horse Mussel (*Modiolus modiolus*)

Habitat Community: Marine Rocky Reef, Type: Offshore Rocky Reef

Status: Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:
- *Policies and regulations.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Rocky Reef, Type: Offshore Rocky Reef - Habitat Profile for additional threats to this species.

Short-spined Brittle Star (*Ophioderma brevispinum*)

Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: Climate Change Vulnerability: Unknown

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Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:*
- *Policies and regulations.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:*
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Rocky Reef, Type: Hard, Rocky Bottom - Habitat Profile for additional threats to this species.

Green Sea Urchin (*Strongylocentrotus droebachiensis*)

Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; increased warming of coastal and marine waters

- Actions:*
- *Policies and regulations.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 2 - Fishing and harvesting aquatic resources; Overharvesting or depletion of associated fauna (e.g., American Lobster)

- Actions:*
- *Species management.*
 - *Compliance and enforcement.*
 - *Resource and habitat protection.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote watershed based restoration and conservation.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

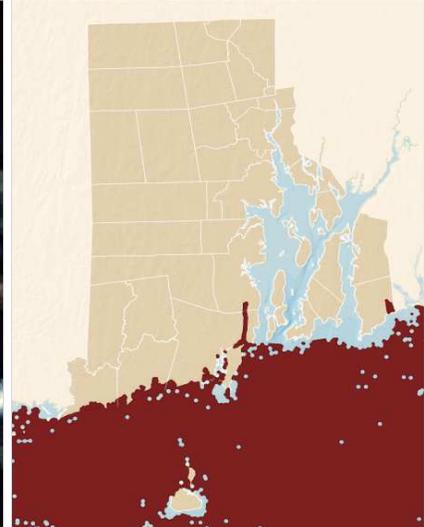
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Soft Sediment Marine Invertebrates

INVERTEBRATES



Photo: NOAA Photo Library



~See map disclaimer in profiles introduction

Description

Soft-sediment communities vary with both water depth and salinity. The following information focuses on nearshore intertidal and shallow subtidal communities. Estuarine soft-sediments such as tidal flats may look barren, and unproductive, but these habitats harbor a surprising diversity and abundance of macroinvertebrates, ranging from burrowing clams and polychaetes to grazing snails and crabs. In tidal flats, the polychaete (*Dioptera cuprea*) forms dense tubes which trap detritus and promote nutrient exchange. The mantis shrimp (*Squilla empusa*) forms deep burrows and actively predate on finfish and macroinvertebrates. Tidal flats provide habitat to important shellfish such as the quahog (*Mercenaria mercenaria*), soft shell clam (*Mya arenaria*), and the razor clam (*Ensis directus*). The clam worm (*Alitta virens*) is highly sought after by fishermen for bait. Offshore, burrowing anemones (*Edwardsia elegans* and *Actinotheroe modesta*) and the tube-forming anemone (*Ceriantheopsis americana*) are found in dense aggregations in soft sediments. On soft bottoms with high organic content, such as those in urban harbors, four-eyed amphipods (*Ampelisca* spp.) are abundant epifaunal filter feeders forming dense tube mats, and burrowing, deposit-feeding (e.g., *Mediomastus ambiseta*), and tube-dwelling polychaetes (e.g., *Clymenella torquata*, *Chaetopterus variopedatus*, and *Spiochaetopterus costarum oculatus*) are common. Deposit feeders such as the cone worm (*Pectinaria gouldnii*) actively resort and sift sediments. The burrowing and feeding activity of marine macroinvertebrates facilitates nutrient exchange between sediments and water. Some burrowers such as the hard clam (*Mercenaria mercenaria*), pump huge volumes of water through their systems, removing plankton and other organic matter, and release nutrient-rich wastes in sediments thereby improving water quality and productivity of the benthos. Many species of macroinvertebrates such as the horseshoe crab (*Limulus polyphemus*), the blue crab (*Callinectes sapidus*), and the American lobster (*Homarus americanus*) rely on heavily on soft sediments for foraging and spawning areas. Mud and sand sediments dominate the seafloor of Narragansett Bay. Soft-sediment tidal flats are found in protected coves and salt ponds, and along or at the mouths of tidal rivers, such as Narrow River.

Species

- Burrowing Anemone (*Actinotheroe modesta*)
- Clam Worm (*Alitta virens*)
- Tube Dwelling Amphipod (*Ampelisca* spp.)
- Sand Burrower (*Ampiporeia virginiana*)
- Ocean Quahog (*Arctica islandica*)
- Channeled Whelk (*Busycon canaliculatus*)
- Knobbed Whelk (*Busycon carica*)
- Blue Crab (*Callinectes sapidus*)

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American Tube Dwelling Anemone	<i>(Ceriantheopsis americana)</i>
Parchment Worm	<i>(Chaetopterus variopedatus)</i>
Bamboo Worm	<i>(Clymenella torquata)</i>
Sevenspine Bay Shrimp	<i>(Crangon septemspinosus)</i>
Striped Nudibranch	<i>(Cratena pilata)</i>
Tube Worm	<i>(Diopatra cuprea)</i>
Common Sand Dollar	<i>(Echinarachnius parma)</i>
Burrowing Anemone	<i>(Edwardsia elegans)</i>
Nudibranch	<i>(Elysia catulus)</i>
Razor Clam (atlantic Jackknife)	<i>(Ensis directus)</i>
Dwarf Balloon Aeolis	<i>(Eubranchus exigus)</i>
Painted Ballon Worm	<i>(Eubranchus pallidus)</i>
Blood Worm	<i>(Glycera dibranchiata)</i>
Digging Amphipod	<i>(Haustorius canadensis)</i>
Morton's Eggcockle	<i>(Laevicardium mortoni)</i>
Atlantic Horseshore Crab	<i>(Limulus polyphemus)</i>
Bay Quahog	<i>(Mercenaria mercenaria)</i>
Soft-shell Clam	<i>(Mya arenaria)</i>
Lady Crab	<i>(Ovalipes ocellatus)</i>
Cone Worm	<i>(Pectinaria gouldii)</i>
Sea Scallop	<i>(Placopecten magellanicus)</i>
Hairy Sea Cucumber	<i>(Sclerodactyla briareus)</i>
Parchment Tube Worm	<i>(Spiochaetopterus costarum oculatus)</i>
Atlantic Surf Clam	<i>(Spisula solida)</i>
Mantis Shrimp	<i>(Squilla empusa)</i>
Coastal Mud Shrimp	<i>(Upogebia affinis)</i>

Threats and Actions by Species

Burrowing Anemone (*Actinothoe modesta*)

Habitat Community: Marine Soft Sediment, Type: Offshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration.

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Refer to the Community: Marine Soft Sediment, Type: Offshore Soft Sediment - Habitat Profile for additional threats to this species.

Clam Worm (*Alitta virens*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

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- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Soft Sediment, Type: Nearshore Soft Sediment - Habitat Profile for additional threats to this species.

Tube-dwelling Amphipod (*Ampelisca spp.*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Sand Burrower (*Amphiporeia virginiana*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Ocean Quahog (*Arctica islandica*)

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Habitat Community: Marine Soft Sediment, Type: Offshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Soft Sediment, Type: Offshore Soft Sediment - Habitat Profile for additional threats to this species.

Channeled Whelk (*Busycon canaliculatus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Potential over-exploitation. Limited or few management controls.

- Actions:
- *Law and policy. Rank: 2*
 - *Policies and regulations. Rank: 2*
 - *Compliance and enforcement. Rank: 3*

Threat 2 - Fishing and harvesting aquatic resources; Potential over-exploitation. Limited or few management controls.

- Actions:
- *Law and policy; Promulgation of new management regulations under statutory authorities (Title 20). Rank: 2*
 - *Policies and regulations. Rank: 2*
 - *Compliance and enforcement. Rank: 3*

Threat 3 - Biological resource use; By-catch and indirect fishing threats

- Actions:
- *Species management; Development of minimum size regulations, possession limits, and catch reduction standards. Rank: 3*
 - *Species recovery; Limit or control by-catch or direct fisheries. Rank: 3*
 - *Compliance and enforcement. Rank: 3*

Refer to the Community: Marine Soft Sediment, Type: Nearshore Soft Sediment - Habitat Profile for additional threats to this species.

Knobbed Whelk (*Busycon carica*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Potential over-exploitation. Limited or few management controls.

- Actions:
- *Law and policy; Promulgation of new management regulations under statutory authorities (Title 20). Rank: 2*
 - *Policies and regulations. Rank: 2*
 - *Compliance and enforcement. Rank: 3*

Threat 2 - Biological resource use; By-catch and indirect fishing threats.

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- Actions:*
- *Species management; Development of minimum size regulations, possession limits, and catch reduction standards. Rank: 3*
 - *Species recovery; Limit or control by-catch or direct fisheries. Rank: 3*
 - *Compliance and enforcement. Rank: 3*

Threat 3 - Biological resource use; By-catch and indirect fishing threats

- Actions:*
- *Species management; Development of minimum size regulations, possession limits, and catch reduction standards. Rank: 3*
 - *Species recovery; Limit or control by-catch or direct fisheries. Rank: 3*
 - *Compliance and enforcement. Rank: 3*

Blue Crab (*Callinectes sapidus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

American Tube-dwelling Anemone (*Ceriantheopsis americana*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Parchment Worm (*Chaetopterus variopedatus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*

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- *Policies and regulations.*
- *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Bamboo Worm (*Clymenella torquata*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Sevenspine Bay Shrimp (*Crangon septemspinosa*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Striped Nudibranch (*Cratena pilata*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

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Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration.

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Tube Worm (*Diopatra cuprea*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration.

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Common Sand Dollar (*Echinarachnius parma*)

Habitat Community: Marine Soft Sediment, Type: Offshore Soft Sediment

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration.

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Refer to the Community: Marine Soft Sediment, Type: Offshore Soft Sediment - Habitat Profile for additional threats to this species.

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Burrowing Anemone (*Edwardsia elegans*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Soft Sediment, Type: Nearshore Soft Sediment - Habitat Profile for additional threats to this species.

Nudibranch (*Elysia catulus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Razor Clam (Atlantic Jackknife) (*Ensis directus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Unregulated species

- Actions:
- *Species management. Rank: 3*
 - *Data collection and analysis; Need baseline data. Rank: 3*
 - *Policies and regulations; Implement minimum size and possession limits. Rank: 3*
 - *Planning; Habitat impacts to harvest methods for unregulated species on regulated species. Rank: 3*

Threat 2 - Pollution; Eutrophication

- Actions:
- *Land/water management; Reduction in nitrogen. Rank: 3*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond*

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fishing related impacts.

- *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Dwarf Balloon Aeolis (*Eubranchus exigus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Painted Balloon Worm (*Eubranchus pallidus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Blood Worm (*Glycera dibranchiata*)

Habitat Community: Intertidal Shore, Type: Mud Flat/Sand Flat

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

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Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Intertidal Shore, Type: Mud Flat/Sand Flat - Habitat Profile for additional threats to this species.

Digging Amphipod (*Haustorius canadensis*)

Habitat Community: Intertidal Shore, Type: Mud Flat/Sand Flat

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Morton's Eggcockle (*Laevicardium mortonii*)

Habitat Community: Marine Soft Sediment, Type: Offshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Soft Sediment, Type: Offshore Soft Sediment - Habitat Profile for additional threats to this species.

Atlantic Horseshore Crab (*Limulus polyphemus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: IUCN Rank: NT. SRANK: SNR. GRANK: G5. NALCC: X (B). Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Over-exploitation as bait fishery

- Actions:*
- *Species management. Rank: 3*
 - *Site/area management. Rank: 3*
 - *Resource and habitat protection. Rank: 3*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

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- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Soft Sediment, Type: Nearshore Soft Sediment - Habitat Profile for additional threats to this species.

Bay Quahog (*Mercenaria mercenaria*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Localized depletion

- Actions:*
- *Species management; Area specific management controls. Rank: 3*
 - *Compliance and enforcement. Rank: 2*
 - *Policies and regulations. Rank: 3*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Soft-shell Clam (*Mya arenaria*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Over-exploitation, no baseline data

- Actions:*
- *Compliance and enforcement; Poorly managed. Rank: 3*
 - *Species management. Rank: 2*
 - *Policies and regulations; Limit licenses and lower possession limits. Rank: 3*

Threat 2 - Climate change and severe weather; Changes in precipitation and reduced salinity

- Actions:*
- *Law and policy. Rank: 2*
 - *Species management; More restrictive management. Rank: 2*
 - *Awareness and communications. Rank: 3*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Lady Crab (*Ovalipes ocellatus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:*
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:*
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

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Cone Worm (*Pectinaria gouldii*)

Habitat Community: Intertidal Shore, Type: Mud Flat/Sand Flat

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration.

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Refer to the Community: Intertidal Shore, Type: Mud Flat/Sand Flat - Habitat Profile for additional threats to this species.

Sea Scallop (*Placopecten magellanicus*)

Habitat Community: Marine Soft Sediment, Type: Offshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration.

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.
 - Nonmonetary values; Promote education to inform public of ecosystem benefits.

Refer to the Community: Marine Soft Sediment, Type: Offshore Soft Sediment - Habitat Profile for additional threats to this species.

Hairy Sea Cucumber (*Sclerodactyla briareus*)

Habitat Community: Marine Soft Sediment, Type: Offshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration.

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.
 - Policies and regulations.
 - Habitat and natural process restoration; Close areas to allow for natural recolonization and

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succession of soft and sediment communities.

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Parchment Tube Worm (*Spiochaetopterus costarum oculatus*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Soft Sediment, Type: Nearshore Soft Sediment - Habitat Profile for additional threats to this species.

Atlantic Surf Clam (*Spisula solida*)

Habitat Community: Marine Soft Sediment, Type: Offshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Soft Sediment, Type: Offshore Soft Sediment - Habitat Profile for additional threats to this species.

Mantis Shrimp (*Squilla empusa*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Unregulated fishery

- Actions:
- *Law and policy. Rank: 3*
 - *Compliance and enforcement. Rank: 3*

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- *Data collection and analysis. Rank: 3*
- *Education and awareness. Rank: 3*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Marine Soft Sediment, Type: Nearshore Soft Sediment - Habitat Profile for additional threats to this species.

Coastal Mud Shrimp (*Upogebia affinis*)

Habitat Community: Marine Soft Sediment, Type: Nearshore Soft Sediment

Status: Climate Change Vulnerability: Unknown

Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration.*

Threat 2 - Fishing and harvesting aquatic resources; Impacts of mobile fishing gear (trawls, nets)

- Actions:
- *Resource and habitat protection; Prevent fishing impacts on vulnerable soft sediment habitats.*
 - *Policies and regulations.*
 - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fishing related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

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Shellfish Reef Invertebrates

INVERTEBRATES



Photo: TNC

~See map disclaimer in profiles introduction

Description

Shellfish reefs are formed by bivalves (mollusks having two hinged shells). In Rhode Island, reef formations are found at or below tide level on soft sediments (tidal flats) or on cobble, rocky sediments. Common or important inhabiting species that make up this community include the eastern oyster (*Crassostrea virginica*), ribbed mussel (*Geukensia demissa*), blue mussel (*Mytilus edulis*), estuarine tunicates, and sponges. Shellfish reefs formed by the eastern oyster are important foraging areas for mud crabs (*Panopeus herbstii*, and *Rhithropanopeus harrisi*), blue crabs (*Callinectes sapidus*), and early life stages of marine finfish including sea bass (*Centropristis striata*), cunner (*Tautoglabrus adspersus*), and winter flounder (*Pseudopleuronectes americanus*). Rhode Island's Narragansett Bay and coastal salt ponds were well known for its oyster industry from the 19th to the early 20th century. The filter feeding capacity of oyster shellfish can help keep near shore waters clean by controlling phytoplankton abundance. A resurgence in oyster populations and reef formations has been observed in Rhode Island waters as result of increased effort to restore oyster reefs and the expansion of the oyster aquaculture industry. Includes topographically varied bottom habitats including cobble, gravel, rock, and mollusk reef in estuarine nearshore waters (salinity: 5 to 25 ppt). Globally imperiled, over 85% of oyster reefs have been lost or degraded and 97% lost in Rhode Island. Remnant populations of the eastern oyster are found in Little Narragansett Bay, Green Hill Pond, Narrow River, Kickmuit River, Seekonk River, and Quicksand Pond. The Nature Conservancy has mapped oyster reef habitat in South County, Rhode Island.

Species

- Eastern Oyster (*Crassostrea virginica*)
- Flatback Mud Crab (*Eurypanopeus depressus*)
- Blue Mussel (*Mytilus edulis*)
- Atlantic Mud Crab (*Panopeus herbstii*)
- Harris Mud Crab (*Rhithropanopeus harrisi*)

Threats and Actions by Species

Eastern Oyster (*Crassostrea virginica*)

Habitat Community: Molluscan Shellfish Reef, Type: Nearshore Rocky Reef
Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Problematic native species; Temperature warming has made MSX and dermo diseases more prevalent

Actions: • *Species recovery; Introduce disease resistant strains of oyster. Rank: 3*

Threat 2 - Fishing and harvesting aquatic resources; More restrictive management controls based upon

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observed population

Actions: • *Habitat and natural process restoration; Habitat manipulation and improvement. Rank: 3*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:* • *Conservation finance; Create grants to promote research to study population impacts beyond fisheries related impacts.*
- *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Mulluscan Shellfish Reef, Type: Nearshore Rocky Reef - Habitat Profile for additional threats to this species.

Flatback Mud Crab (*Eurypanopeus depressus*)

Habitat Community: Mulluscan Shellfish Reef, Type: Nearshore Rocky Reef

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Overharvesting or depletion of oyster populations resulting in loss of shell substrate

- Actions:* • *Habitat and natural process restoration; Such as shell substrate or population enhancement.*
- *Species reintroduction.*
 - *Policies and regulations; Particularly for the protection of oyster reef habitat.*
 - *Compliance and enforcement.*

Threat 2 - Residential and commercial development; Coastal development and shoreline modifications; Breakwaters, groins, and sea walls have been erected in an attempt to protect shorelines and stop local erosion, but these structures have led to increased erosion and loss of natural habitats such as saltmarshes and oyster reefs

- Actions:* • *Policies and regulations; Prevent the use of destructive shoreline protection practices in Type I and II waters.*
- *Resource and habitat protection; Protect vulnerable areas from coastal development.*
 - *Private sector standards and codes; Provide incentives to coastal landowners to use "living shoreline" or soft erosion control in practices that use biodegradable materials.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:* • *Conservation finance; Create grants to promote research to study population impacts beyond fisheries related impacts.*
- *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Blue Mussel (*Mytilus edulis*)

Habitat Community: Marine Rocky Reef, Type: Hard, Rocky Bottom

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Problematic native species; Temperature warming has made MSX and dermo diseases more prevalent

- Actions:* • *Species recovery; Introduce disease resistant strains of oyster. Rank: 3*

Threat 2 - Fishing and harvesting aquatic resources; More restrictive management controls based upon observed population

- Actions:* • *Habitat and natural process restoration; Habitat manipulation and improvement. Rank: 3*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:* • *Conservation finance; Create grants to promote research to study population impacts beyond fisheries related impacts.*
- *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Threat 4 - Invasive and other problematic species and genes; Byssal thread disease

- Actions:* • *Data collection and analysis.*
- *Species management.*

Refer to the Community: Marine Rocky Reef, Type: Hard, Rocky Bottom - Habitat Profile for additional threats to this species.

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Atlantic Mud Crab (*Panopeus herbstii*)

Habitat Community: Mulluscan Shellfish Reef, Type: Nearshore Rocky Reef

Status: Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Overharvesting or depletion of oyster populations resulting in loss of shell substrate

- Actions:
- *Habitat and natural process restoration; Such as shell substrate or population enhancement.*
 - *Species reintroduction.*
 - *Policies and regulations; Particularly for the protection of oyster reef habitat.*
 - *Compliance and enforcement.*

Threat 2 - Residential and commercial development; Coastal development and shoreline modifications; Breakwaters, groins, and sea walls have been erected in an attempt to protect shorelines and stop local erosion, but these structures have led to increased erosion and loss of natural habitats such as saltmarshes and oyster reefs

- Actions:
- *Policies and regulations; Prevent the use of destructive shoreline protection practices in Type I and II waters.*
 - *Resource and habitat protection; Protect vulnerable areas from coastal development.*
 - *Private sector standards and codes; Provide incentives to coastal landowners to use "living shoreline" or soft erosion control in practices that use biodegradable materials.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fisheries related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

Refer to the Community: Mulluscan Shellfish Reef, Type: Nearshore Rocky Reef - Habitat Profile for additional threats to this species.

Harris Mud Crab (*Rhithropanopeus harrisi*)

Habitat Community: Mulluscan Shellfish Reef, Type: Nearshore Rocky Reef

Status: Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Overharvesting or depletion of oyster populations resulting in loss of shell substrate

- Actions:
- *Habitat and natural process restoration; Such as shell substrate or population enhancement.*
 - *Species reintroduction.*
 - *Policies and regulations; Particularly for the protection of oyster reef habitat.*
 - *Compliance and enforcement.*

Threat 2 - Residential and commercial development; Coastal development and shoreline modifications; Breakwaters, groins, and sea walls have been erected in an attempt to protect shorelines and stop local erosion, but these structures have led to increased erosion and loss of natural habitats such as saltmarshes and oyster reefs

- Actions:
- *Policies and regulations; Prevent the use of destructive shoreline protection practices in Type I and II waters.*
 - *Resource and habitat protection; Protect vulnerable areas from coastal development.*
 - *Private sector standards and codes; Provide incentives to coastal landowners to use "living shoreline" or soft erosion control in practices that use biodegradable materials.*

Threat 3 - Pollution; Water quality impacts to habitat, eutrophication leading to excessive algal blooms

- Actions:
- *Conservation finance; Create grants to promote research to study population impacts beyond fisheries related impacts.*
 - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

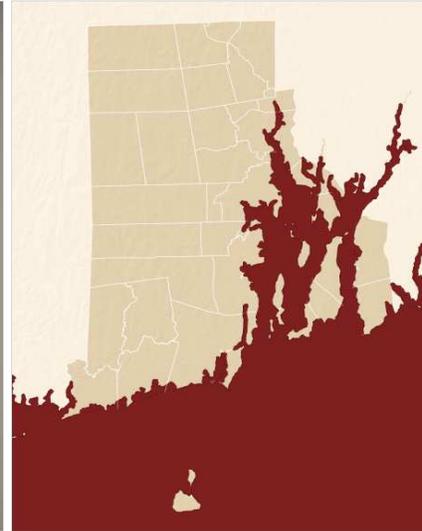
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Pelagic Invertebrates

INVERTEBRATES



Photo: SEFSC Pascagoula Laboratory; Collection of Brandi Noble, NOAA/NMFS/SEFSC



~See map disclaimer in profiles introduction

Description

The marine pelagic zone of the sea is neither close to the bottom or near to the surface. It is the largest of aquatic habitats, as it encompasses the over 300 cubic miles. Marine pelagic animals must be adapted to a low-oxygen environment, able to survive high salt levels, and able to regulate their body temperature (either by internal thermoregulation or through movement or migration).

Species

Longfin Inshore Squid (*Loligo pealeii*)

Threats and Actions by Species

Longfin Inshore Squid (*Loligo pealeii*)

Habitat Community: Pelagic, Type: Coastal Pelagic

Status: Climate Change Vulnerability: Unknown

Threat 1 - Fishing and harvesting aquatic resources; Overharvesting and loss of adult stock

- Actions:
- *Species management; Create management plans and prevent harvest of critical life stages (gravid females), reduce by-catch species such as the Butter Fish (a depleted stock that shares the same habitat as Longfin Squid). Rank: 3*
 - *Livelihood and economic incentives; Co-management and private sector incentives to reduce exploitation.*

Threat 2 - Climate change and severe weather; Population at southern most extent

- Actions:
- *Law and policy.*
 - *Education and awareness.*

Refer to the Community: Pelagic, Type: Coastal Pelagic - Habitat Profile for additional threats to this species.

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Beetles of Deciduous Forests

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

The distribution and status of certain beetles (Coleoptera) associated with deciduous forests are not well understood in Rhode Island and the listing of species identified as SGCN is primarily based on status assessments conducted elsewhere within their respective known distributions. Most of the beetles identified in this group are associated with mature forests. For example, *Carabus sylvosus* has been termed a “forest specialist” that was found in only old growth stands in a Wisconsin study, and *Bembidion semicinctum* and *Calathus ingratus* are believed to primarily occur in mature stands of northern hardwoods. The caterpillar hunter, *Calosoma wilcoxi*, is a forest generalist that climbs trees to actively hunt caterpillars and may have importance in control of forest caterpillar outbreaks. It is suspected that populations of these species are vulnerable to decline due to the reduction of mature forests, especially the northern hardwood type, in Rhode Island but more inventory and research is needed to accurately assess the status of these species.

Species

- Ground Beetle (*Bembidion semicinctum*)
- Ground Beetle (*Calathus ingratus*)
- Caterpillar Hunter (*Calosoma wilcoxi*)
- Serrate Shoulder Slug Hunter (*Carabus serratus*)
- Sylvan Worm & Slug Hunter (*Carabus sylvosus*)
- Round Worm & Slug Hunter (*Carabus vinctus*)
- Goldsmith Beetle (*Cotalpa lanigera*)

Threats and Actions by Species

Ground Beetle (*Bembidion semicinctum*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: GNR. GRP: 6. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

- Actions:*
- *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Refer to the Community: Oak Forest, Type: Oak Forest - Habitat Profile for additional threats to this species.

Ground Beetle (*Calathus ingratus*)

Habitat Community: Oak Forest, Type: Oak Forest

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Status: SRANK: SNR. GRANK: GNR. GRP: 8. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Caterpillar Hunter (*Calosoma wilcoxi*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: GNR. GRP: 9. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Serrate Shoulder Slug Hunter (*Carabus serratus*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: GNR. GRP: 12. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Sylvan Worm & Slug Hunter (*Carabus sylvosus*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: GNR. GRP: 13. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Round Worm & Slug Hunter (*Carabus vinctus*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: GNR. GRP: 14. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Goldsmith Beetle (*Cotalpa lanigera*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: GNR. GRP: 31. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

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Beetles of Maritime Beach Strands

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

The Flea Beetle is a small beetle that feeds on Sea Rocket (*Cakile edentula*), a characteristic plant of the maritime beach strand community. In Rhode Island, this species was easily found on Block Island during surveys in the 1990's (Sikes 2002), but it was not found on any mainland populations of Sea Rocket. Instead, an introduced species (*Phyllotreta cruciferae*) has been found on mainland populations. In New England, the only other record for the Flea Beetle is for Nantucket circa 1930.

Apparently not collected since before the 1950's, the Hister Beetle (*Spilodiscus arcuatus*) was collected on Block Island in 1994 and is in need of further study from a conservation perspective. There are specimen records from mainland RI from Providence (1907), Warwick (1900) and Kingston, and also Watch Hill (1909). It is apparently restricted to sandy riparian or coastal beach and dune habitats, and is included in this habitat grouping based on its discovery under a piece of driftwood in the beach strand community. Although apparently mostly subterranean, this beetle may form associations with burrowing rodents and perhaps nesting birds as well as utilize carrion and rotting vegetation. *S. arcuatus* has been documented as once occurring along the Atlantic coast from Nova Scotia to Virginia, with a few records from lakeshore dunes in Indiana, Illinois and Iowa, but is thought to have disappeared from most of its former range. Sikes (2002) postulated the species may now only be found on Block Island and is an ideal choice for more focused study.

Species

- Flea Beetle (*Phyllotreta chalybeipennis*)
- Hister Beetle (*Spilodiscus arcuatus*)

Threats and Actions by Species

Flea Beetle (*Phyllotreta chalybeipennis*)

Habitat Community: Coastal Beach and Dune, Type: Maritime Beach Strand
Status: SRANK: SNR. GRANK: GNR. Res/B: 1. GRP: 39. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Unknown impacts due to competition from introduced *P. cruciferae*

- Actions:*
- *Data collection and analysis; Conduct research.*

Threat 2 - Climate change and severe weather; Habitat shifting and alteration, storms and flooding, rapid sea level rise reduces habitats and limits reestablishment

- Actions:*
- *Site/area protection; Ensure opportunities for inland migration with sea level rise. Rank: 3*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and*

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easement. Rank: 3

- *Site/area management; Ensure opportunities for inland migration with sea level rise. Rank: 3*

Refer to the Community: Coastal Beach and Dune, Type: Maritime Beach Strand - Habitat Profile for additional threats to this species.

Hister Beetle (*Spilodiscus arcuatus*)

Habitat Community: Coastal Beach and Dune, Type: Maritime Beach Strand

Status: SRANK: SNR. GRANK: GNR. Res/B: 1. GRP: 36. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; Habitat shifting and alteration, storms and flooding, rapid sea level rise reduces habitats and limits reestablishment

- Actions:
- *Site/area protection; Ensure opportunities for inland migration with sea level rise. Rank: 3*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement. Rank: 3*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise. Rank: 3*

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Species of Greatest Conservation Need

Beetles of Pitch Pine Barrens/Inland Sand Barrens

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

The distribution and status of certain beetles (Coleoptera) associated with pitch pine barrens and inland sand barrens are not well understood in Rhode Island and the listing of species identified as SGCN is primarily based on status assessments conducted elsewhere within their respective known distributions. The ground beetle *Geopinus incrassatus* has been identified as an index species of sandy regions. The other three species are indicative of sparsely vegetated, sandy and gravelly habitats, or associated with the trunks of downed pine trees. It has been suspected that populations of these species are vulnerable to decline due to the reduction of pitch pine habitats in Rhode Island.

Species

- False Mealworm Beetle (*Alobates morio*)
- Seed-eating Ground Beetle (*Amara chalcea*)
- Lagriid Beetle (*Anaedus brunneus*)
- Ground Beetle (*Geopinus incrassatus*)

Threats and Actions by Species

False Mealworm Beetle (*Alobates morio*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland
Status: SRANK: SNR. GRANK: GNR. GRP: 2. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

- Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Refer to the Community: *Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland - Habitat Profile for additional threats to this species.*

Seed-eating Ground Beetle (*Amara chalcea*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland
Status: SRANK: SNR. GRANK: GNR. GRP: 3. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

- Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

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Lagriid Beetle (*Anaedus brunneus*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: SNR. GRANK: GNR. GRP: 4. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Ground Beetle (*Geopinus incrassatus*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status: SRANK: SNR. GRANK: GNR. GRP: 35. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Dung Beetles

INVERTEBRATES



Photo: Dung Beetles: Chris Raithel. Tumblebugs: Richard Enser

~See map disclaimer in profiles introduction

Description

Dung beetles (Scarabaeidae) are an important group of insects associated with the decomposition of animal manure. They consume large amounts of dung as adults and larvae, and have been credited in reducing pasture fouling and improving soil quality through aeration and adding nutrients. In Rhode Island, several species of dung beetles are recognized as SGCN.

Copris fricator and Dichotomius carolinus are large dung beetles, the second being the largest dung beetle in New England at 1 1/4 inches. Copris is easily captured and surprisingly was not found on the mainland of Rhode Island during five years of sampling in the early 2000's, apparently the last mainland specimen was collected in Elmwood in 1913. The second species is not easily captured and has also not been seen on the mainland of RI since 1914 in East Providence. Both species have been recorded on Block Island in recent years (Sikes, D. 2002.).

Two additional SGCN dung beetles, Canthon pilularius and C. vigilans, also known as tumblebugs, are dung rolling beetles based on their habit of breaking manure piles into small brood balls that are rolled to a suitable site and buried. The current distribution of these two species on the mainland of Rhode Island is not known; viable populations are present on Block Island.

Declines in dung beetle populations have been attributed to the use of a variety of pesticides for the management of cattle parasites (horn flies and face flies). Various chemicals used to control these pests, including ivermectin, imidacloprid, and pyrethroids, have been shown to be toxic to dung beetles, and current research is focused on identifying fly control strategies that have minimal impact on dung beetle populations.

Species

- Tumblebug (*Canthon pilularius*)
- Tumblebug (*Canthon vigilans*)
- Dung Beetle (*Copris fricator*)
- Dung Beetle (*Dichotomius carolinus*)

Threats and Actions by Species

Tumblebug (*Canthon pilularius*)

Habitat Community: Agricultural Lands, Type: Pasture

Status: SRANK: SNR. GRANK: GNR. EXT: 1. GRP: 10. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Pesticides used for control of parasites

- Actions: • *Data collection and analysis; Research into alternative pesticides.*

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Refer to the Community: Agricultural Lands, Type: Pasture - Habitat Profile for additional threats to this species.

Tumblebug (*Canthon vigilans*)

Habitat Community: Agricultural Lands, Type: Pasture

Status: SRANK: SNR. GRANK: GNR. EXT: 1. GRP: 11. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Pesticides used for control of parasites

Actions: • *Data collection and analysis; Research into alternative pesticides.*

Dung Beetle (*Copris fricator*)

Habitat Community: Agricultural Lands, Type: Pasture

Status: SRANK: SNR. GRANK: GNR. Res/B: 1. GRP: 30. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Pesticides used for control of parasites

Actions: • *Data collection and analysis; Research into alternative pesticides.*

Dung Beetle (*Dichotomius carolinus*)

Habitat Community: Agricultural Lands, Type: Pasture

Status: SRANK: SNR. GRANK: GNR. Res/B: 1. GRP: 34. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Pesticides used for control of parasites

Actions: • *Data collection and analysis; Research into alternative pesticides.*
• *Research an appropriate wormer or education about organic farming practices.*

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Tiger Beetles

INVERTEBRATES

Description

Fourteen species of tiger beetles (Coleoptera: Cicindelidae) have been documented in Rhode Island, all of which are in the Genus *Cicindela*. Adult tiger beetles are active diurnal predators that tend to occupy open habitats such as sandy flats and ledges. Larvae are also predatory but occupy tunnels in the soil. Many species of tiger beetles are vulnerable to extinction and there is a long history of loss and decline in Rhode Island and elsewhere in New England. Of the 14 species, two (*Cicindela patruela* and *C. dorsalis dorsalis*) are extirpated. Only three or four species (*C. sexguttata*, *repanda*, *scutellaris*, and *punctulata*) could be considered secure. The remaining species are either very localized in limited habitat areas or have suffered long-term declines in this area. Tiger beetles depend on disturbed habitats but these might be characterized by long-cycle disturbance. That is, openings of bare soil or sand must be produced or maintained, but excessive or chronic disturbance such as uncontrolled vehicle use or other forms of trampling kill the larvae and render the habitat useless. Two conservation priorities (including the extirpated species *C. patruela*) are confined to inland sand dunes and barrens habitats. These habitats tend to occur where soils are deep and sandy, especially in the glacial deposits within Washington and Kent Counties. The open sandy flats were formerly created by fires or other scarification processes, but are now severely at risk because of ongoing fire suppression and concomitant revegetation. Inland sand dunes are also favored by ORV users and many sites are at risk or have already been lost through illegal vehicle use. Another cluster of conservation priorities occurs in the coastal zone. *Cicindela d. dorsalis* is presently listed by the FWS as a threatened species, but has not been seen in Rhode Island since the 1960's. Barrier beaches face many of the same threats as inland sand communities, except that coastal beaches are much more common and have associated endangered species such as Piping Plovers, which ensures that they get more conservation attention. Nevertheless, whereas Piping Plovers leave the beaches and migrate for the winter, tiger beetles spend their entire lives in that habitat, and so are vulnerable from vehicular use at all seasons. Rising ocean level will eventually overwhelm many sites.

Species

Northeast Beach Tiger Beetle	<i>(Cicindela dorsalis dorsalis)</i>
Big Sand Tiger Beetle	<i>(Cicindela formosa generosa)</i>
Hairy-necked Tiger Beetle	<i>(Cicindela hirticollis rhodensis)</i>
Common Claybank Tiger Beetle	<i>(Cicindela limbalis)</i>
Margined Tiger Beetle	<i>(Cicindela marginata)</i>
Cow Path Tiger Beetle	<i>(Cicindela purpurea purpurea)</i>
Eastern Red-bellied Tiger Beetle	<i>(Cicindela rufiventris rufiventris)</i>
Oblique-lined Tiger Beetle	<i>(Cicindela tranquebarica tranquebarica)</i>
Festive Tiger Beetle	<i>(Cicindela scutellaris rugifrons)</i>

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Northeast Beach Tiger Beetle

INVERTEBRATES

Tiger Beetles

Cicindela dorsalis dorsalis



Photo: M. W. Nelson



~See map disclaimer in profiles introduction

Distribution & Abundance

The Northeast Beach Tiger Beetle is extirpated from the majority of the northern Atlantic Coast, however, with habitat restoration and management, there is hope that its range could once again include coastal Rhode Island.

Habitat Community: Coastal Beach and Dune, Type: Maritime Beach Strand

Status

FEDSTAT: FT. Climate Change Vulnerability: Unknown

Threats and Actions

Refer to the Community: Coastal Beach and Dune, Type: Maritime Beach Strand - Habitat Profile for additional threats to this species.

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Big Sand Tiger Beetle

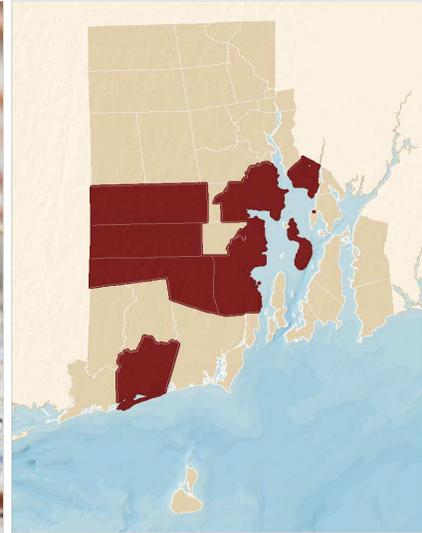
Cicindela formosa generosa

INVERTEBRATES

Tiger Beetles



Photo: Chris Raithe



~See map disclaimer in profiles introduction

Distribution & Abundance

Cicindela formosa generosa occurs exclusively in inland sand flats and barrens. Although this species has been known from about 10 recent sites in Rhode Island, some populations have disappeared or are extremely threatened. Except for one large population in the Big River Management Area, sites tend to contain only a few individuals. Most of the recent localities for this species occur on state managed lands and other preserves. However, many of these sites have been degraded or lost because of trampling by illegal ORV usage or revegetation of the habitat. There are very few places where this species could be considered secure. One is the Nockum Hill area of Barrington, where the habitat is maintained for the benefit of nesting turtles and vehicular traffic is prohibited. A TNC preserve in North Kingstown has an intact inland sand flat that is not often visited by vehicles or pedestrians.

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status

STSTAT: C. SRANK: S1. GRANK: G5T5. Res/B: 1. FORM: 1. GRP: 17. PRIOR: 1. Climate Change Vulnerability: Low=2100

Threats and Actions

Threat 1 - Natural system modifications; Succession of sand patches, anything that fills sand patch (grass, trees, asphalt)

- Actions:
- *Site/area management.*
 - *Manage for sand patches.*

Threat 2 - Residential and commercial development; Development of sand patches

- Actions:
- *Land/water protection.*
 - *Protect sand patches.*

Threat 3 - Recreational activities; Impacts from human disturbance of habitats

- Actions:
- *Land/water protection.*
 - *Protect habitats.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Hairy-necked Tiger Beetle

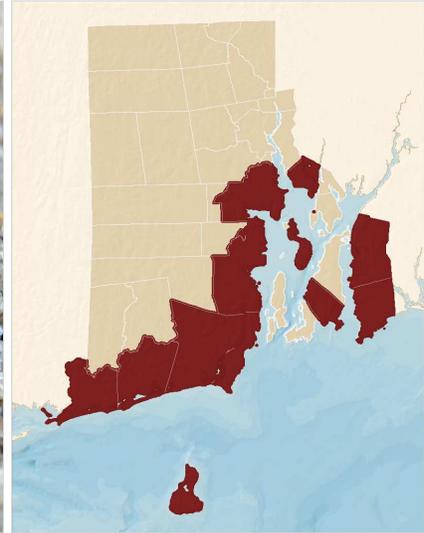
INVERTEBRATES

Tiger Beetles

Cicindela hirticollis rhodensis



Photo: Chris Raithe



~See map disclaimer in profiles introduction

Distribution & Abundance

Cicindela hirticollis rhodensis is one of two extant species that occur exclusively in coastal habitats. *C. hirticollis* requires sandy beaches without much disturbance. There is a long history of loss of this species from beaches, especially those in upper Narragansett Bay and Aquidneck Island. This species is found now primarily along the outer beaches of the south coast, including Block Island. It is vulnerable especially to vehicular use of beaches but even foot trampling can degrade the habitat if it is chronic and extensive enough. The largest *C. hirticollis* populations presently occur in the Napatree/Sandy Point area of Westerly, the Trustum/Cards Pond complex, and at Briggs and Quicksand Ponds, Little Compton. This species has been lost or severely reduced from many miles of outer beach where vehicle use is rampant.

Habitat Community: Coastal Beach and Dune, Type: Maritime Beach Strand

Status

STSTAT: C. SRANK: S4. GRANK: G5. Res/B: 1. GRP: 18. PRIOR: 1. Climate Change Vulnerability: High=2030

Threats and Actions

Threat 1 - Human intrusions and disturbance; Disturbance from recreation

- Actions:
- Land/water protection.
 - Protect habitats.

Refer to the Community: Coastal Beach and Dune, Type: Maritime Beach Strand - Habitat Profile for additional threats to this species.

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

Common Claybank Tiger Beetle

INVERTEBRATES

Tiger Beetles

Cicindela limbalis



Photo: Chris Raithe



~See map disclaimer in profiles introduction

Distribution & Abundance

Cicindela limbalis occupies a very specialized habitat, exposed clay banks, and is presently known from only a few sites in New England. In Rhode Island it is found only on Block Island, where it occurs in moderate numbers along the southern bluffs and elsewhere. The habitat is essentially not threatened, as long as Block Island exists, but there may be some collection pressure on the population because this species is uncommon regionally.

Habitat Community: Sparsely Vegetated Rock, Type: Maritime Bluff

Status

STSTAT: C. SRANK: S1. GRANK: G5. Res/B: 1. GRP: 19. PRIOR: 1. Climate Change Vulnerability: Medium=2050

Threats and Actions

Threat 1 - Recreational activities; Impacts from human disturbance of estuarine bluff clay habitats

- Actions:*
- *Land/water protection.*
 - *Protect estuarine bluff clay habitats.*

Refer to the Community: Sparsely Vegetated Rock, Type: Maritime Bluff - Habitat Profile for additional threats to this species.

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

Margined Tiger Beetle

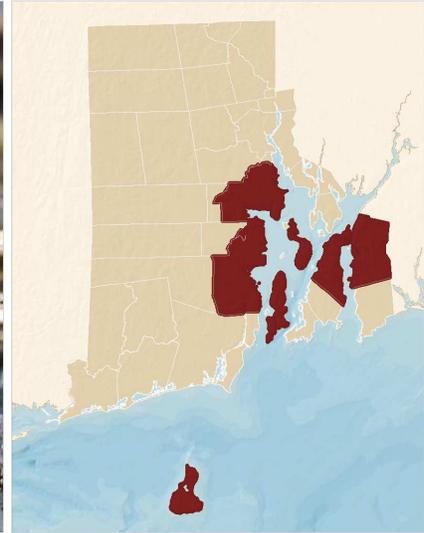
Cicindela marginata

INVERTEBRATES

Tiger Beetles



Photo: Chris Raithe



~See map disclaimer in profiles introduction

Distribution & Abundance

Cicindela marginata is another coastal species and is presently known from about 10 sites in Rhode Island. *C. marginata* favors pebbly mud flats and occurs only within Narragansett Bay and Block Island. This species tends to occur in relatively low numbers and is often found near outwash fans and flats near tidal creeks. Such sites often feature sparse growth of maritime plants such as Sea Lavender and *Salicornia*. Because of regulations intended to protect such coastal features and because many sites are in inaccessible areas, this species is probably not presently at risk from habitat loss or trampling. However, future sea level rise is problematic for *C. marginata* populations here and elsewhere.

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub

Status

STSTAT: C. SRANK: S1. GRANK: G5. CODES: RES. Res/B: 1. GRP: 20. PRIOR: 1. Climate Change Vulnerability: High=2030

Threats and Actions

Threat 1 - Climate change and severe weather; Salt marsh species

Actions: • *Other climate change actions.*

Threat 2 - Invasive non-native/alien species; Phragmites

Actions: • *Invasive/problematic species control.*

Refer to the Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Cow Path Tiger Beetle

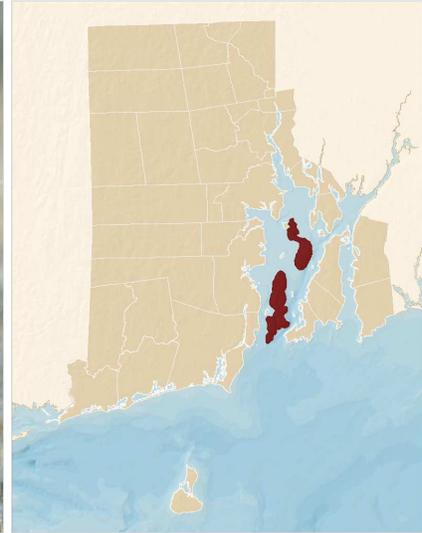
INVERTEBRATES

Tiger Beetles

Cicindela purpurea purpurea



Photo: Chris Raithe



~See map disclaimer in profiles introduction

Distribution & Abundance

Cicindela purpurea has undergone one of the most dramatic declines of any species in New England. Formerly widespread in Rhode Island and adjacent areas, this species has disappeared from large areas of its former range for reasons that are not completely understood. The physical habitat does not seem particularly unusual; dry or moist soil with scattered stones, but this species has nonetheless undergone a severe range retraction, with population loss first noted on mainland sites and a pattern of increasing localization on large marine islands and Cape Cod. This species is extremely uncommon in Rhode Island and confined to two sites, both of which reside within preserve areas on large marine islands. Neither trampling nor over collection seem to be affecting populations at this time. However, active habitat management, including the reintroduction of fire, must occur to retain populations, and expansion of management efforts around core populations is

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status

STSTAT: C. SRANK: S1. GRANK: G5. Res/B: 1. GRP: 23. PRIOR: 1. Climate Change Vulnerability: Low=2100

Threats and Actions

Threat 1 - Human intrusions and disturbance; Disturbance of inland dune cobble and sands, and cow paths

- Actions:
- Land/water protection.
 - Protect habitats.

Threat 2 - Natural system modifications; Succession

- Actions:
- Site/area management.
 - Manage for habitat.
 - Habitat and natural process restoration.
 - Prescribed burns to keep vegetation down.

Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Eastern Red-bellied Tiger Beetle

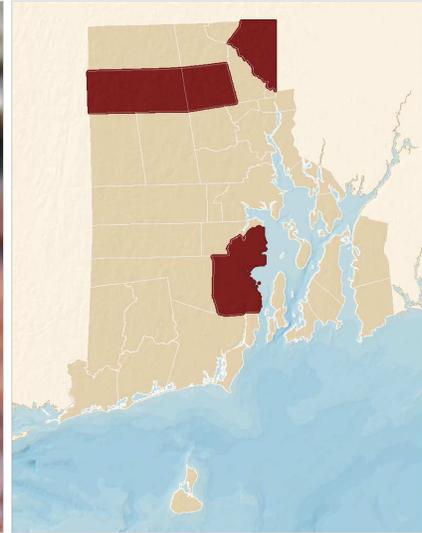
INVERTEBRATES

Tiger Beetles

Cicindela rufiventris rufiventris



Photo: Chris Raithe



~See map disclaimer in profiles introduction

Distribution & Abundance

This species is extremely localized and is known to occupy only a few exposed granitic ledges within northeastern Rhode Island, primarily within the town of Cumberland. Most of the known habitat lies within existing conservation lands, including Diamond Hill State park, but populations are quite small. Trampling of the habitat is not a problem at present. The biggest threat to these sites is probably forest regeneration, which could eventually overtop and shade the ledges where they reside.

Habitat Community: Sparsely Vegetated Rock, Type: Inland Rocky Outcrop

Status

STSTAT: C. SRANK: S1. GRANK: G5. Res/B: 1. FORM: 1. GRP: 25. PRIOR: 1. Climate Change Vulnerability: Low=2100

Threats and Actions

Threat 1 - Human intrusions and disturbance; Disturbance of rock outcrop

- Actions:
- Land/water protection.
 - Protect habitats.

Threat 2 - Natural system modifications; Succession

- Actions:
- Site/area management.
 - Manage for habitat.

Refer to the Community: Sparsely Vegetated Rock, Type: Inland Rocky Outcrop - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Oblique-lined Tiger Beetle

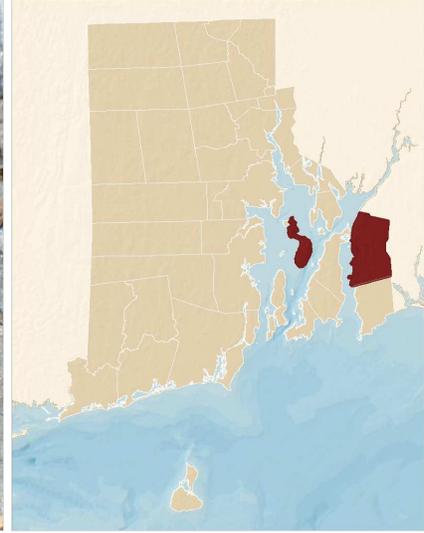
INVERTEBRATES

Tiger Beetles

Cicindela tranquebarica tranquebarica



Photo: Chris Raithe



~See map disclaimer in profiles introduction

Distribution & Abundance

Cicindela tranquebarica mirrors the status of *C. purpurea* except that it is still extant at a few mainland sites in southern New England. In Rhode Island, remaining populations are known only from Prudence Island and Tiverton, where the species resides on protected managed lands. As with *Cicindela purpurea*, trampling and over-collection do not seem to be affecting populations at this time. However, active habitat management, including the reintroduction of fire, must occur to retain populations.

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status

SRANK: S1. GRANK: G5. Res/B: 1. GRP: 28. PRIOR: 1. Climate Change Vulnerability: Low=2100

Threats and Actions

Threat 1 - Human intrusions and disturbance; Disturbance from recreation

- Actions:*
- *Land/water protection.*
 - *Protect habitats.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Festive Tiger Beetle

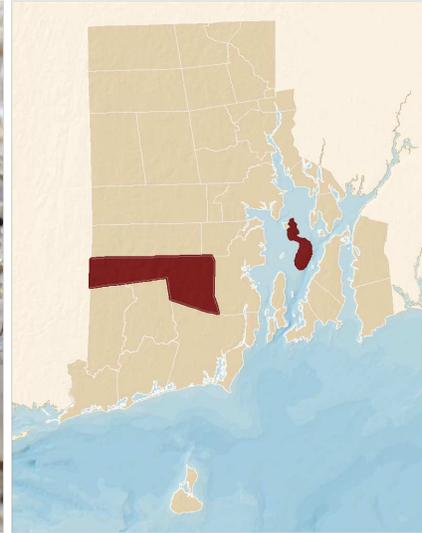
INVERTEBRATES

Tiger Beetles

Cicindela scutellaris rugifrons



Photo: Chris Raithe



~See map disclaimer in profiles introduction

Distribution & Abundance

Although the nominate subspecies *scutellaris* is not locally threatened and can be found widely in habitats such as abandoned gravel pits, the green form, *rugifrons*, occurs only in a few inland sand flat habitats and has disappeared from others because of habitat succession. There are presently two locations where this taxon occurs, both of which are on conservation lands. Management is occurring in these areas but ORV traffic is still a threat to populations.

Habitat Community: Inland Sand Barren

Status

SRANK: S5. GRANK: G5. Climate Change Vulnerability: Low=2100

Threats and Actions

Threat 1 - Natural system modifications; Succession of sand patches, anything that fills sand patch (grass, trees, asphalt)

- Actions:
- *Site/area management.*
 - *Manage for sand patches.*

Threat 2 - Residential and commercial development; Development of sand patches

- Actions:
- *Land/water protection.*
 - *Protect sand patches.*
 - *Habitat and natural process restoration.*
 - *Prescribed burns to keep vegetation down.*

Threat 3 - Recreational activities; Impacts from human disturbance of habitats

- Actions:
- *Land/water protection.*
 - *Protect habitats.*

Refer to the Community: Inland Sand Barren - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Other Beetles

INVERTEBRATES



Photo: Richard Enser (7 beetles); Chris Raithel (N. americanus)

~See map disclaimer in profiles introduction

Description

This group of beetles is composed of species that are unique or do not fit easily into one of the five beetle groups. Their habitats, primary food source, and other characteristics vary, often making their threats and actions different.

Species

- Ground Beetle (*Agonum darlingtoni*)
- Ground Beetle (*Bembidion confusum*)
- Bambarrier Beetle (*Brachinus cyanipennis*)
- 9-spotted Lady Beetle/ladybug (*Coccinella novemnotata*)
- Predaceous Diving Beetle (*Cybister fimbriolatus*)
- Elderberry Borer (*Desmocerus palliatus*)
- American Burying Beetle (*Nicrophorus americanus*)
- Round Sand Beetle (*Omophron tessellatum*)
- Eastern Snail Eater (*Scaphinotus elevatus*)

Threats and Actions by Species

Ground Beetle (*Agonum darlingtoni*)

Habitat Community: Northern Peatlands, Type: Dwarf Shrub Fen/Bog
 Status: OTSTAT: CT-C (KD). SRANK: SNR. GRANK: GNR. GRP: 1. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Refer to the Community: Northern Peatlands, Type: Dwarf Shrub Fen/Bog - Habitat Profile for additional threats to this species.

Ground Beetle (*Bembidion confusum*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub
 Status: SRANK: SNR. GRANK: GNR. Res/B: 1. GRP: 5. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; Sea level rise

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Species of Greatest Conservation Need

- Actions:**
- *Land/water protection; Conserve lands to allow for migration of salt marsh. Rank: 3*
 - *Site/area management. Rank: 3*
 - *Law and policy; Need to address climate change. Rank: 3*

Refer to the Community: *Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub - Habitat Profile for additional threats to this species.*

Bambardier Beetle (*Brachinus cyanipennis*)

Habitat Community: Floodplain Forest, Type: Silver Maple/Sycamore Floodplain Forest; Red Maple/Pin Oak Floodplain Forest

Status: SRANK: SNR. GRANK: GNR. GRP: 7. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Historically, floodplains heavily developed for industrial and commercial uses, landfills, low income housing, recreational fields, etc.

- Actions:**
- *Site/area protection; Identify and acquire habitats as needed. Rank: 2*
 - *Resource and habitat protection; Identify potential restoration sites. Rank: 3*
 - *Site/area management; Conduct restoration projects. Rank: 3*
 - *Habitat and natural process restoration; allow natural flooding regimes to function. Rank: 3*

Threat 2 - Industrial and military effluents; Situated along major rivers, sediments may contain variable levels of pollutants

- Actions:**
- *Site/area management; Identify potential cleanup sites. Rank: 3*
 - *Habitat and natural process restoration; Let some areas remain undisturbed to prevent release of pollutants from sediments. Rank: 2*

Threat 3 - Garbage and solid waste; These areas are often used for illegal dumping, and also capture large amounts of trash during flood events.

- Actions:**
- *Site/area management; Control public access by vehicles. Rank: 3*
 - *Policies and regulations; Support increases in fines for illegal dumping. Rank: 2*

Threat 4 - Habitat shifting and alteration; Increased flooding may alter habitat

- Actions:**
- *Site/area protection; Identify upland areas that may support this habitat type in future years. Rank: 2*
 - *Data collection and analysis; Monitor changes in habitat that may be caused by climate change. Rank: 3*

Threat 5 - Storms and flooding; Increased flooding may alter habitat

- Actions:**
- *Site/area protection; Identify upland areas that may support this habitat type in future years.*
 - *Data collection and analysis; Monitor changes in habitat that may be caused by climate change.*

Refer to the Community: *Floodplain Forest, Type: Silver Maple/Sycamore Floodplain Forest; Red Maple/Pin Oak Floodplain Forest - Habitat Profile for additional threats to this species.*

9-Spotted Lady Beetle/Ladybug (*Coccinella novemnotata*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: SRANK: SNR. GRANK: G2. EXT: 1. GRP: 29. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information; Possibly competing with invasive ladybug *Hippademia converges*

- Actions:**
- *Data collection and analysis; Research fish and wildlife populations; Research possible competition with invasive ladybug *Hippademia converges*.*
 - *Species recovery, captive breeding, reintroduction.*

Refer to the Community: *Ruderal Grassland/Shrubland, Type: Old Field - Habitat Profile for additional threats to this species.*

Predaceous Diving Beetle (*Cybister fimbriolatus*)

Habitat Community: Lake, Type: Shallow

Status: SRANK: SNR. GRANK: GNR. Res/B: 1. GRP: 32. PRIOR: 1. Climate Change Vulnerability: Unknown

Refer to the Community: *Lake, Type: Shallow - Habitat Profile for additional threats to this species.*

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

Elderberry Borer (*Desmocerus palliatus*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: GNR. GRP: 33. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

American Burying Beetle (*Nicrophorus americanus*)

Habitat Community: Agricultural Lands, Type: Pasture

Status: IUCN Rank: CR. FEDSTAT: FE. FED: FWS. STSTAT: SE. SRANK: S1. GRANK: G2G3. Res/B: 1. GRP: 37. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Problematic native species; Too many scavenger

Actions: • *Invasive/problematic species control.*

Threat 2 - Other; Reduction in special food availability

Actions: • *Species management.*

Refer to the Community: Agricultural Lands, Type: Pasture - Habitat Profile for additional threats to this species.

Round Sand Beetle (*Omophron tessellatum*)

Habitat Community: Inland Pond and River Shore, Type: Shallow

Status: SRANK: SNR. GRANK: GNR. Res/B: 1. GRP: 38. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Refer to the Community: Inland Pond and River Shore, Type: Shallow - Habitat Profile for additional threats to this

Eastern Snail Eater (*Scaphinotus elevatus*)

Habitat Community: Agricultural Lands, Type: Hayfields

Status: SRANK: SNR. GRANK: GNR. GRP: 40. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information

Actions: • *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island.*

Refer to the Community: Agricultural Lands, Type: Hayfields - Habitat Profile for additional threats to this species.

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

Lepidoptera of Atlantic White Cedar Swamps

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

Hessel's Hairstreak occurs as disjunct populations along the Atlantic coastal plain from southern Maine to South Carolina, Georgia, and on the Gulf Coast of the Florida panhandle in swamps wherever Atlantic white cedar grows, the sole food plant for the larvae of this small butterfly. In southern New Jersey, Hessel's Hairstreak appears to be fairly abundant, but outside of this area it is rare. As an obligate feeder on Atlantic White Cedar, Hessel's Hairstreak is an indicator species for this habitat and is currently found in 10-12 of Rhode Island's best cedar swamps. Hessel's Hairstreak is listed on the Xerces Society Red List of Pollinator Insects; listed as an Endangered Species in Connecticut, Maine, New York, and Delaware; and, as a Species of Concern in Massachusetts and Rhode Island.

The Pale Green and Thaxter's pinion moths do not necessarily rely on larval food plants that are specific to Atlantic white cedar swamps; however, the occurrence of these species in Rhode Island have consistently been documented from this habitat type. Butterflies and moths are also vulnerable to pesticides used for control of mosquitoes and other widespread problem insects, as well as homeowner use of over-the-counter pesticides for control of aggravating insects.

Species

Hessel's Hairstreak (*Callophrys hesseli*)

Thaxter's Pinion Moth (*Lithophane thaxteri*)

Pale Green Pinion Moth (*Lithophane viridipallens*)

Threats and Actions by Species

Hessel's Hairstreak (*Callophrys hesseli*)

Habitat Community: White Cedar-Hardwood Swamp, Type: White Cedar Swamp

Status: STSTAT: C. SRANK: S2S3. GRANK: G3G4. GRP: 6. PRIOR: 1. Xerces: imperiled. Climate Change Vulnerability: Unknown

Threat 1 - Hunting and collecting terrestrial animals; Pesticide application from mosquito pesticide spraying

- Actions:
- Policies and regulations.
 - Limit spraying. And work with DEM to have them make sure permittees are aware of rare species in the habitat when they are spraying (applies also to mosquito sprayers).
 - Survey/monitor.

Threat 2 - Natural system modifications; Limited habitat

- Actions:
- Resource and habitat protection.

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Species of Greatest Conservation Need

Threat 3 - Dams and water management/use; Water manipulation affects their habitat- white cedar bogs and swamps are globally rare.

- Actions:*
- *Land/water protection.*
 - *Limit water withdrawals on multiple levels (private, community, utility, municipality).*

Refer to the Community: White Cedar-Hardwood Swamp, Type: White Cedar Swamp - Habitat Profile for additional threats to this species.

Thaxter's Pinon Moth (*Lithophane thaxteri*)

Habitat Community: White Cedar-Hardwood Swamp, Type: White Cedar Swamp

Status: SRANK: SU. GRANK: G4. GRP: 22. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Pale Green Pinion Moth (*Lithophane viridipallens*)

Habitat Community: White Cedar-Hardwood Swamp, Type: White Cedar Swamp

Status: STSTAT: C. SRANK: S2S3. GRANK: G4. GRP: 23. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

Lepidoptera of Deciduous Forests

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

Butterflies and moths of deciduous forested habitats are primarily limited by the availability of larval food plants found in these habitats. In particular are several species dependant on American Holly (*Ilex opaca*), an uncommon understory shrub and small tree of oak forests in southern Rhode Island. Butterflies and moths are also vulnerable to pesticides used for control of mosquitoes and other widespread problem insets, as well as homeowner use of over-the-counter pesticides for control of aggravating insects.

Species

- Fragile Dagger Moth (*Acronicta fragilis*)
- Henry's Elfin (*Callophrys henrici*)
- Charming Underwing (*Catocala blandula*)
- Angus's Datana (*Datana angusii*)
- Black-dotted Ruddy Moth (*Ilexia intractata*)
- Holly Sallow (*Metaxaglaea violacea*)
- Hanham's Owlet (*Phalaenostola hanhami*)
- Purple Plagodis Moth (*Plagodis kuetzingi*)
- Noctuid Moth (*Psaphida thaxterianus*)
- Hickory Hairstreak (*Satyrium caryaevorum*)

Threats and Actions by Species

Fragile Dagger Moth (*Acronicta fragilis*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Oak Forest, Type: Oak Forest - Habitat Profile for additional threats to this species.

Henry's Elfin (*Callophrys henrici*)

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Species of Greatest Conservation Need

Habitat Community: Oak Forest, Type: Mixed Oak – American Holly Forest

Status: STSTAT: C. SRANK: S1S2. GRANK: G5. GRP: 5. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Threat 3 - Logging and wood harvesting; Conversion of forest to grasslands

Actions: • *Land/water protection.*
• *Conservation and acquisition of forests.*

Refer to the Community: Oak Forest, Type: Mixed Oak – American Holly Forest - Habitat Profile for additional threats to this species.

Charming Underwing (*Catocala blandula*)

Habitat Community: Ruderal Forest, Type: Ruderal Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Forest, Type: Ruderal Forest - Habitat Profile for additional threats to this species.

Angus's Datana (*Datana angusii*)

Habitat Community: Oak Forest, Type: Mixed Oak/Hickory Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Oak Forest, Type: Mixed Oak/Hickory Forest - Habitat Profile for additional threats to this species.

Black-dotted Ruddy Moth (*Ilexia intractata*)

Habitat Community: Oak Forest, Type: Mixed Oak – American Holly Forest

Status: SRANK: SNR. GRANK: GNR. GRP: 36. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Oak Forest, Type: Mixed Oak – American Holly Forest - Habitat Profile for additional threats to this species.

Holly Sallow (*Metaxaglaea violacea*)

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Species of Greatest Conservation Need

Habitat Community: Oak Forest, Type: Mixed Oak – American Holly Forest

Status: SRANK: S2S4. GRANK: G5. GRP: 27. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Hanham's Owlet (*Phalaenostola hanhami*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Oak Forest, Type: Oak Forest - Habitat Profile for additional threats to this species.

Purple Plagodis Moth (*Plagodis kuetzingi*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: G5. GRP: 32. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Noctuid Moth (*Psaphida thaxterianus*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: G4. GRP: 33. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Hickory Hairstreak (*Satyrrium caryaeorum*)

Habitat Community: Oak Forest, Type: Mixed Oak/Hickory Forest

Status: STSTAT: C. SRANK: S1. GRANK: G4. GRP: 23. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Oak Forest, Type: Mixed Oak/Hickory Forest - Habitat Profile for additional threats to this

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Species of Greatest Conservation Need

species.

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Species of Greatest Conservation Need

Lepidoptera of Dwarf Shrub Bog/Fen

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

Butterflies and moths of open peatlands are identified with this community based on the larval food preferences of plants found in these habitats. In particular, the Pitcher Plant Borer, Pitcher Plant Moth, and Venus flytrap Cutworm are dependant on insectivorous plants (Pitcher Plant and Sundew) that are exclusively found in Dwarf Shrub Bogs and Fens. As well, larvae of the Bog Copper Butterfly feed solely on Wild Cranberry, a signature plant of sphagnum bogs.

In general, butterflies and moths of bogs and fens are primarily limited by the availability of these habitats. In Rhode Island, sphagnum bogs and fens are typically small in size (>5 acres) and widely distributed so that most of the GCN species are limited in number and size of populations. Butterflies and moths are also vulnerable to pesticides used for control of mosquitoes and other widespread problem insects, as well as homeowner use of over-the-counter pesticides for control of aggravating insects.

Species

- Sharp-lined Powder Moth (*Eufidonia discospilata*)
- Pitcher Plant Moth (*Exyra fax*)
- Bog Tiger Moth (*Grammia speciosa*)
- Venus Flytrap Cutworm (*Hemipachnobia subporphyrea*)
- Tufted Sedge Moth (*Hypocoena inquinata*)
- American Brindle Moth (*Lithomoia germana*)
- Bog Copper (*Lycaena epixanthe*)
- Coastal Swamp Metarranthis (*Metarranthis pilosaria*)
- Bog Oligia (*Oligia minuscula*)
- Pitcher Plant Borer (*Papaipema appassionata*)
- Chalky Wave Moth (*Scopula purata*)
- Sulphur Angle Moth (*Speranza sulphurea*)

Threats and Actions by Species

Sharp-lined Powder Moth (*Eufidonia discospilata*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: S3. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

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Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Pitcher Plant Moth (*Exyra fax*)

Habitat Community: Northern Peatlands, Type: Dwarf Shrub Fen/Bog

Status: SRANK: SNR. GRANK: G4. GRP: 14. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Northern Peatlands, Type: Dwarf Shrub Fen/Bog - Habitat Profile for additional threats to this species.

Bog Tiger Moth (*Grammia speciosa*)

Habitat Community: Northern Peatlands, Type: Dwarf Shrub Fen/Bog

Status: STSTAT: C. SRANK: S1. GRANK: G4G5. GRP: 17. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Venus Flytrap Cutworm (*Hemipachnobia subporphyrea*)

Habitat Community: Northern Peatlands, Type: Black Spruce Bog

Status: SRANK: SNR. GRANK: G1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Northern Peatlands, Type: Black Spruce Bog - Habitat Profile for additional threats to this species.

Tufted Sedge Moth (*Hypocoena inquinata*)

Habitat Community: Sparsely Vegetated Rock

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Refer to the Community: Sparsely Vegetated Rock - Habitat Profile for additional threats to this species.

American Brindle Moth (*Lithomoia germana*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Bog Copper (*Lycaena epixanthe*)

Habitat Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore

Status: STSTAT: C. SRANK: S3. GRANK: G4G5. GRP: 17. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore - Habitat Profile for additional threats to this species.

Coastal Swamp Metarranthis (*Metarranthis pilosaria*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: STSTAT: C. SRANK: S1S3. GRANK: G3G4. GRP: 26. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Bog Oligia (*Oligia minuscula*)

Habitat Community: Northern Peatlands, Type: Dwarf Shrub Fen/Bog

Status: SRANK: SNR. GRANK: G4. GRP: 29. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Northern Peatlands, Type: Dwarf Shrub Fen/Bog - Habitat Profile for additional threats to this species.

Pitcher Plant Borer (*Papaipema appassionata*)

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Habitat Community: Northern Peatlands, Type: Dwarf Shrub Fen/Bog

Status: STSTAT: C. SRANK: S1. GRANK: G4. GRP: 31. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Chalky Wave Moth (*Scopula purata*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G4. GRP: 34. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Sulphur Angle Moth (*Speranza sulphurea*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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**Lepidoptera of Open Freshwater Wetlands
 (Emergent Marshes, Shrub Swamps, and Wet
 Meadows)**

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

Butterflies and moths of open (non-forested) freshwater wetlands are primarily limited by the availability of larval food plants found in these habitats. In general, identified larval food plants have not been determined to be particularly rare, however open freshwater wetlands are sporadically distributed and small in size so that some food plants have small populations and reduced benefit for targeted species. Butterflies and moths are also vulnerable to pesticides used for control of mosquitoes (a threat that is particularly problematic for wetland species) and other widespread problem insects, as well as homeowner use of over-the-counter pesticides for control of aggravating insects.

Species

- Drunk Apamea Moth (*Apamea inebriata*)
- Meadow Fritillary (*Boloria bellona*)
- Silver-bordered Fritillary (*Boloria selene*)
- Curved Halter Moth (*Capis curvata*)
- Sharp Angle Shades Moth (*Conservula anodonta*)
- Black Dash (*Euphyes conspicua*)
- Lost Sallow Moth (*Eupsilia devia*)
- Little Virgin Tiger Moth (*Grammia virguncula*)
- Bronze Copper (*Lycaena hyllus*)
- Twin-dotted Macrochilo Moth (*Macrochilo hypocritalis*)
- Louisiana Owlet Moth (*Macrochilo louisiana*)
- Bridgham's Brocade (*Oligia bridghami*)
- Chain Fern Borer Moth (*Papaipema stenocelis*)
- Included Cordgrass Borer Moth (*Photodes includens*)
- Acadian Hairstreak (*Satyrium acadicum*)

Threats and Actions by Species

Drunk Apamea Moth (*Apamea inebriata*)

Habitat Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore
 Status: SRANK: SNR. GRANK: G3G4. Climate Change Vulnerability: Unknown

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Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore - Habitat Profile for additional threats to this species.

Meadow Fritillary (*Boloria bellona*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: STSTAT: C. SRANK: SNR. GRANK: G5. GRP: 2. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Silver-bordered Fritillary (*Boloria selene*)

Habitat Community: Coastal Plain Peatlands, Type: Graminoid Fen

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Coastal Plain Peatlands, Type: Graminoid Fen - Habitat Profile for additional threats to this species.

Curved Halter Moth (*Capis curvata*)

Status: SRANK: SNR. GRANK: G4. GRP: 5. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Sharp Angle Shades Moth (*Conservula anodonta*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G4. GRP: 10. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Species of Greatest Conservation Need

pesticides on non-target organisms.

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Black Dash (*Euphyes conspicua*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: S2?. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Lost Sallow Moth (*Eupsilia devia*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Little Virgin Tiger Moth (*Grammia virguncula*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Bronze Copper (*Lycaena hyllus*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SU. GRANK: G5. GRP: 18. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Twin-dotted Macrochilo Moth (*Macrochilo hypocriticalis*)

Habitat Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

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Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Tidal Salt Marsh, Type: Low Salt Marsh; High Salt Marsh; Salt Panne; Salt Scrub - Habitat Profile for additional threats to this species.

Louisiana Owlet Moth (*Macrochilo louisiana*)

Habitat Community: Freshwater Emergent Marsh, Type: Freshwater Emergent Marsh

Status: SRANK: SNR. GRANK: G4. GRP: 24. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Freshwater Emergent Marsh, Type: Freshwater Emergent Marsh - Habitat Profile for additional threats to this species.

Bridgham's Brocade (*Oligia bridghami*)

Habitat Community: Coastal Plain Peatlands, Type: Coastal Plain Quagmire and Graminoid Fen

Status: SRANK: SU. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Coastal Plain Peatlands, Type: Coastal Plain Quagmire and Graminoid Fen - Habitat Profile for additional threats to this species.

Chain Fern Borer Moth (*Papaipema stenocelis*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Included Cordgrass Borer Moth (*Photodes includens*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Acadian Hairstreak (*Satyrium acadicum*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: STSTAT: C. SRANK: S2S3. GRANK: G5. GRP: 22. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Species of Greatest Conservation Need

Lepidoptera of Ruderal Grasslands/Shrublands

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

Butterflies and moths of ruderal grasslands and shrublands are primarily limited by the availability of larval food plants found in these habitats. In general, identified larval food plants in these habitats have not been determined to be particularly rare; however, there have been reductions in the amount of these habitats in recent years. More importantly, butterflies and moths are also vulnerable to pesticides used for control of mosquitoes and other widespread problem insects, as well as homeowner use of over-the-counter pesticides for control of aggravating insects.

Species

- Triton Daggermoth (*Acronicta tritona*)
- Dusted Skipper (*Atrytonopsis hianna*)
- Olive Hairstreak (*Callophrys gryneus*)
- Chokeberry Underwing (*Catocala crataegi*)
- Pink Streak Moth (*Dargida rubripennis*)
- Spotted Datana (*Datana perspicua*)
- Polished Dart Moth (*Euxoa perpolita*)
- Cobweb Skipper (*Hesperia metea*)
- Scarlet-winged Lichen Moth (*Hypoprepia miniata*)
- Pink-border Yellow (*Phytometra rhodarialis*)
- Four-spotted Speranza Moth (*Speranza coortaria*)
- Aphrodite Fritillary (*Speyeria aphrodite*)

Threats and Actions by Species

Triton Daggermoth (*Acronicta tritona*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Refer to the Community: Oak Forest, Type: Oak Forest - Habitat Profile for additional threats to this species.

Dusted Skipper (*Atrytonopsis hianna*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: STSTAT: C. SRANK: S3. GRANK: G4G5. GRP: 1. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Grassland/Shrubland, Type: Old Field - Habitat Profile for additional threats to this species.

Olive Hairstreak (*Callophrys gryneus*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: SRANK: S3. GRANK: G5. GRP: 4. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Chokeberry Underwing (*Catocala crataegi*)

Habitat Community: Ruderal Forest, Type: Ruderal Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Forest, Type: Ruderal Forest - Habitat Profile for additional threats to this species.

Pink Streak Moth (*Dargida rubripennis*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: SRANK: SNR. GRANK: G3G4. GRP: 16. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Grassland/Shrubland, Type: Old Field - Habitat Profile for additional threats to this species.

Spotted Datana (*Datana perspicua*)

Habitat Community: Ruderal Grassland/Shrubland

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

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Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Grassland/Shrubland - Habitat Profile for additional threats to this species.

Polished Dart Moth (*Euxoa perpolita*)

Habitat Community: Agricultural Lands, Type: Vegetables; Turf; Nursery; Orchard; Vineyard; Christmas Trees

Status: SRANK: SNR. GRANK: GNR. GRP: 30. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Agricultural Lands, Type: Vegetables; Turf; Nursery; Orchard; Vineyard; Christmas Trees - Habitat Profile for additional threats to this species.

Cobweb Skipper (*Hesperia metea*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: SRANK: S4. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Grassland/Shrubland, Type: Old Field - Habitat Profile for additional threats to this species.

Scarlet-winged Lichen Moth (*Hypoprepia miniata*)

Habitat Community: Mixed Oak/White Pine Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Mixed Oak/White Pine Forest - Habitat Profile for additional threats to this species.

Pink-Border Yellow (*Phytometra rhodarialis*)

Habitat Community: Ruderal Grassland/Shrubland

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

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Species of Greatest Conservation Need

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Grassland/Shrubland - Habitat Profile for additional threats to this species.

Four-spotted Speranza Moth (*Speranza coortaria*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Grassland/Shrubland, Type: Old Field - Habitat Profile for additional threats to this species.

Aphrodite Fritillary (*Speyeria aphrodite*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: S4. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

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Moths of Maritime Grasslands/Shrublands

INVERTEBRATES

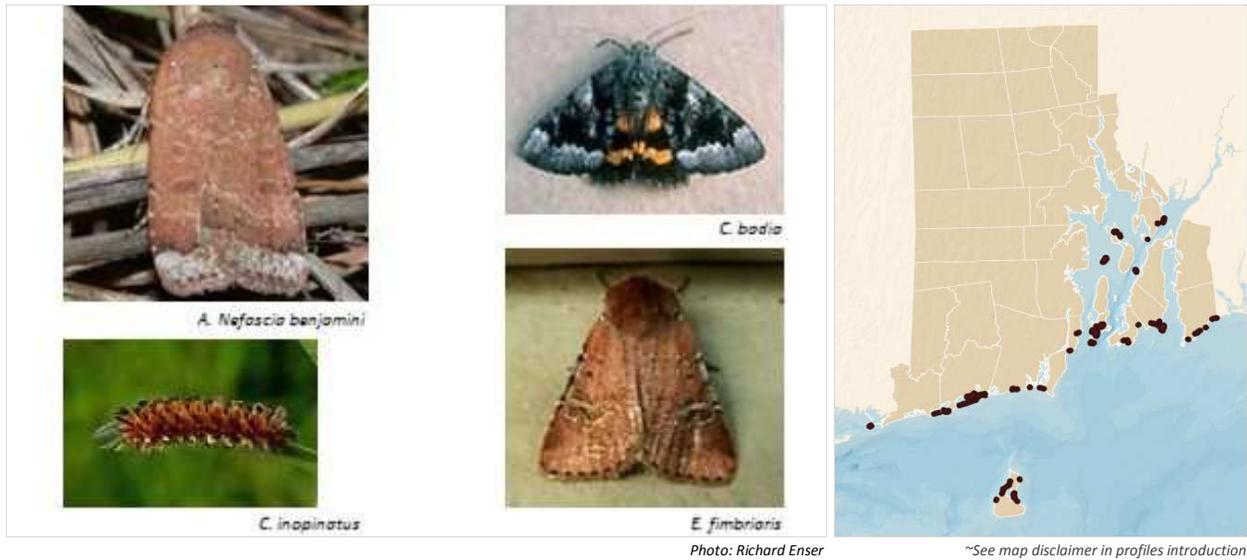


Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

Moths associated with maritime grassland and shrubland habitats are limited by the occurrence of larval food plants that are primarily found in these habitats. In particular, bayberry and butterfly weed have been identified as the primary food plants for two SGCN moths; the food plants for additional species that occur in open maritime habitats have not been identified. The distribution of maritime grasslands and shrublands is relatively localized on the Rhode Island shore where residential, commercial, and other development has fragmented and reduced these habitats. Butterflies and moths are also vulnerable to pesticides used for control of mosquitoes and other widespread problem insects, as well as homeowner use for control of aggravating insects.

Species

- Benjamin's Abagrotis (*Abagrotis nefascia benjamini*)
- Bay Underwing (*Catocala badia*)
- Unexpected Cynia (*Cynia inopinatus*)
- Fringed Dart (*Eucoptocnemis fimbriaris*)
- Violet Dart Moth (*Euxoa violaris*)
- Dune Noctuid Moth (*Sympistis riparia*)

Threats and Actions by Species

Benjamin's Abagrotis (*Abagrotis nefascia benjamini*)

Habitat Community: Coastal Shrubland and Grassland, Type: Maritime Grassland
 Status: STSTAT: C. SRANK: S1S2. GRANK: G4T3. PELAG: FORM. GRP: 1. PRIOR: 1. Climate Change
 Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Unregulated use of non-specific pesticides and bug zappers for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Coastal Shrubland and Grassland, Type: Maritime Grassland - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Bay Underwing (*Catocala badia*)

Habitat Community: Coastal Shrubland and Grassland, Type: Maritime Shrubland

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Unregulated use of non-specific pesticides and bug zappers for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Coastal Shrubland and Grassland, Type: Maritime Shrubland - Habitat Profile for additional threats to this species.

Unexpected Cynia (*Cynia inopinatus*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G4. GRP: 12. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Unregulated use of non-specific pesticides and bug zappers for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Fringed Dart (*Eucoptocnemis fimbriaris*)

Habitat Community: Coastal Shrubland and Grassland, Type: Maritime Grassland

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Unregulated use of non-specific pesticides and bug zappers for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Coastal Shrubland and Grassland, Type: Maritime Grassland - Habitat Profile for additional threats to this species.

Violet Dart Moth (*Euxoa violaris*)

Habitat Community: Coastal Shrubland and Grassland, Type: Maritime Grassland

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Unregulated use of non-specific pesticides and bug zappers for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Dune Noctuid Moth (*Sympistis riparia*)

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Habitat Community: Coastal Beach and Dune, Type: Maritime Herbaceous Dune

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Unregulated use of non-specific pesticides and bug zappers for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Coastal Beach and Dune, Type: Maritime Herbaceous Dune - Habitat Profile for additional threats to this species.

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Species of Greatest Conservation Need

Moths of Pitch Pine Woodlands/Barrens

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

Pitch pine woodlands and barrens are important habitats for a unique suite of rare moths in southern New England. The importance of these habitats results from unique soil conditions and temperature regimes, as well as the structure, species composition, and phenology of the plant community. Many species of moths characteristic of pitch pine barrens utilize scrub oak as a larval food plant. This shrub favors the dry conditions and periodic fire that governs these habitats. Butterflies and moths are also vulnerable to pesticides used for control of mosquitoes and other widespread problem insects, as well as homeowner use of over-the-counter pesticides for control of aggravating insects.

Species

- Spotted Dart Moth (*Agrotis stigmosa*)
- Short-lined Chocolate (*Argyrostroma anilis*)
- Underwing Moth (*Catocala n. sp.*)
- Barrens Chaetagnaea (*Chaetagnaea tremula*)
- Contracted Datana (*Datana contracta*)
- Pink Star Moth (*Derrima stellata*)
- Scrub Euchlaena Moth (*Euchlaena madusaria*)
- Eastern Buck Moth (*Hemileuca maia*)
- Noctuid Moth (*Hyperstrotia flaviguttata*)
- Dart Moth (*Leucania extincta*)
- German Cousin (*Sideridis congermana*)
- Marooning Moth (*Sideridis maryx*)
- Blueberry Sallow (*Sympistis dentata*)
- Joyful Holomelina Moth (*Virbia laeta*)
- Barrens Xylotype (*Xylotype capax*)
- Black-eyed Zale (*Zale curema*)
- Pine Barrens Zale (*Zale lunifera*)
- Gray Spring Zale (*Zale submediana*)
- Pine Barrens Zanclognatha (*Zanclognatha martha*)

Threats and Actions by Species

Spotted Dart Moth (*Agrotis stigmosa*)

Habitat Community: Mixed Oak/Pitch Pine Forest

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Species of Greatest Conservation Need

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Mixed Oak/Pitch Pine Forest - Habitat Profile for additional threats to this species.

Short-lined Chocolate (*Argyrostroma anilis*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: SNR. GRANK: G5. GRP: 4. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland - Habitat Profile for additional threats to this species.

Underwing Moth (*Catocala n. sp.*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

Barrens Chaetagnaea (*Chaetagnaea tremula*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status: SRANK: S4. GRANK: G5. GRP: 9. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Contracted Datana (*Datana contracta*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Species of Greatest Conservation Need

pesticides on non-target organisms.

Pink Star Moth (*Derrima stellata*)

Habitat Community: Mixed Oak/Pitch Pine Forest, Type: Mixed Oak/Pitch Pine Forest

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Mixed Oak/Pitch Pine Forest, Type: Mixed Oak/Pitch Pine Forest - Habitat Profile for additional threats to this species.

Scrub Euchlaena Moth (*Euchlaena madusaria*)

Habitat Community: Mixed Oak/Pitch Pine Forest

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Mixed Oak/Pitch Pine Forest - Habitat Profile for additional threats to this species.

Eastern Buck Moth (*Hemileuca maia*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: SNR. GRANK: G5. GRP: 18. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland - Habitat Profile for additional threats to this species.

Noctuid Moth (*Hyperstrotia flaviguttata*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Dart Moth (*Leucania extincta*)

Habitat Community: Mixed Oak/Pitch Pine Forest

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

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Species of Greatest Conservation Need

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Mixed Oak/Pitch Pine Forest - Habitat Profile for additional threats to this species.

German Cousin (*Sideridis congermana*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: SNR. GRANK: GNR. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland - Habitat Profile for additional threats to this species.

Marooning Moth (*Sideridis maryx*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: SNR. GRANK: G4. GRP: 35. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Blueberry Sallow (*Sympistis dentata*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: STSTAT: C. SRANK: S1S2. GRANK: G4. GRP: 2. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Joyful Holomelina Moth (*Virbia laeta*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: SU. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Barrens Xylotype (*Xylotype capax*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: S2S4. GRANK: G4. GRP: 37. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Black-eyed Zale (*Zale curema*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: S?. GRANK: G3G4. GRP: 38. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Pine Barrens Zale (*Zale lunifera*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: STSTAT: C. SRANK: S1. GRANK: G3Q. GRP: 39. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Gray Spring Zale (*Zale submediana*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: STSTAT: C. SRANK: S2. GRANK: G4. GRP: 40. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Pine Barrens Zanclognatha (*Zanclognatha martha*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: S?. GRANK: G4. GRP: 41. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Agriculture and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 2 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Species of Greatest Conservation Need

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

Butterflies of Pitch Pine Woodlands/Barrens

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

The Frosted Elfin ranges widely throughout the eastern U.S. from western Maine to Florida and west to central Wisconsin and eastern Texas, but it is extremely local and usually scarce throughout this area. In Rhode Island, it is limited to only 2-3 sites where the largest populations of wild lupine or wild indigo are found. The Xerces Society has included the Frosted Elfin on its Red List of Pollinator Insects; it is listed as an Endangered Species in Delaware, Maryland, and New Hampshire, as a Threatened Species in Connecticut, New Jersey, and New York, and a Species of Concern in Massachusetts and Rhode Island.

Species

Frosted Elfin (*Callophrys (Decid.) irus (Baptisia type)* AND *Callophrys (Decid.) irus (Lupine type)*)

Hoary Elfin (*Callophrys polios*)

Sleepy Duskywing (*Erynnis brizo*)

Persius Duskywing (*Erynnis persius*)

Edward's Hairstreak (*Satyrrium edwardsii*)

Threats and Actions by Species

Frosted Elfin (*Callophrys (Decid.) irus (Baptisia type)* AND *Callophrys (Decid.) irus (Lupine type)*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status: STSTAT: C. SRANK: S1. GRANK: G3. GRP: 7. PRIOR: 1. Xerces: imperiled. Climate Change Vulnerability: Unknown

Threat 1 - Other ecosystem modifications; Reduction in larval food plants, especially wild lupine and wild indigo

- Actions:
- *Species recovery; Enhancing/augmenting populations of larval food plants.*
 - *Species reintroduction; Establish new populations of larval food plants.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:
- *Data collection and analysis; Research into alternative specific pesticides.*
 - *Planning.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Awareness and communications; Public education concerning the effects of non-specific*

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

pesticides on non-target organisms.

Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

Hoary Elfin (*Callophrys polios*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status: STSTAT: C. SRANK: S1. GRANK: G5. GRP: 9. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Other ecosystem modifications; Reduction in larval food plants, especially wild lupine and wild indigo

- Actions:
- *Species recovery; Enhancing/augmenting populations of larval food plants.*
 - *Species reintroduction; Establish new populations of larval food plants.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:
- *Data collection and analysis; Research into alternative specific pesticides.*
 - *Planning.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Sleepy Duskywing (*Erynnis brizo*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: STSTAT: C. SRANK: S2. GRANK: G5. GRP: 11. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Other ecosystem modifications; Reduction in larval food plants, especially wild lupine and wild indigo

- Actions:
- *Species recovery; Enhancing/augmenting populations of larval food plants.*
 - *Species reintroduction; Establish new populations of larval food plants.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:
- *Data collection and analysis; Research into alternative specific pesticides.*
 - *Planning.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland - Habitat Profile for additional threats to this species.

Persius Duskywing (*Erynnis persius*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status: STSTAT: SH. OTSTAT: MA-E (KD). SRANK: SH. GRANK: G5. GRP: 13. PRIOR: 1. Xerces: imperiled.

Climate Change Vulnerability: Unknown

Threat 1 - Other ecosystem modifications; Reduction in larval food plants, especially wild lupine and wild indigo

- Actions:
- *Species recovery; Enhancing/augmenting populations of larval food plants.*
 - *Species reintroduction; Establish new populations of larval food plants.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:
- *Data collection and analysis; Research into alternative specific pesticides.*
 - *Planning.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

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Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

Edward's Hairstreak (*Satyrium edwardsii*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: SRANK: S5. GRANK: G4. GRP: 24. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Other ecosystem modifications; Reduction in larval food plants, especially wild lupine and wild indigo

- Actions:*
- *Species recovery; Enhancing/augmenting populations of larval food plants.*
 - *Species reintroduction; Establish new populations of larval food plants.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

- Actions:*
- *Data collection and analysis; Research into alternative specific pesticides.*
 - *Planning.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland - Habitat Profile for additional threats to this species.

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**Odonates of Springs, Graminoid Fen, Wetlands,
 Coastal Plain Quagmire and Pondshore, Eutrophic
 and Oligotrophic Ponds, and Brackish Habitats**

INVERTEBRATES



Photo: Michael C. Moore

~See map disclaimer in profiles introduction

Description

Dragonflies (Ephemeroptera) and damselflies (Zygoptera) in this group are of high diversity. Odonates of the coastal plain peatlands occupy dwarf and shrub bogs that develop in acidic, tannic water most often formed groundwater. These areas include graminoid fens, coastal plain quagmires, and sea level fens, among other unique communities which can vary greatly in characteristics. Odonates of ponds and lakes also vary greatly, as these water bodies can provide very different habitats dependent upon the size, geology, elevation, shoreline, and connectivity to streams and other water bodies. A few additional species of that utilize this group of habitat types are the Dusky Clubtail (*Gomphus spicatus*), Canada Darner (*Aeshna canadensis*), Spatterdock Darner (*Aeshna mutata*), Racket-tailed Emerald (*Dorocordulia libera*), Spiny Baskettail (*Epithica spinigera*), American Emerald (*Cordulia shurtleffi*), Blue Corporal Dragonfly (*Libellula axilena*), Blue Corporal Dragonfly (*L. deplanata*), Chalk-fronted Corporal (*L. julia*), Needham's Skimmer (*L. needhami*), Belted Whiteface (*Leucorrhinia proxima*), Emerald Spreadwing (*Lestes dryas*), Big Bluet (*Enallagma durum*), and Rambler's Forktail (*Ischnura ramburii*).

Species

- Comet Darner (*Anax longipes*)
- Arrowhead Spiketail (*Cordulegaster obliqua*)
- Scarlet Bluet (*Enallagma pictum*)
- Pine Barrens Bluet (*Enallagma recurvatum*)
- Taper-tailed Darner (*Gomphaeschna antilope*)
- Lyre-tipped Spreadwing (*Lestes unguiculatus*)
- Crimson-ringed Whiteface (*Leucorrhinia glacialis*)
- Southern Sprite (*Nehalennia integricollis*)
- Umber Shadowdragon (*Neurocordulia obsoleta*)
- Common Sanddragon (*Progomphus obscurus*)
- Ringed Boghaunter (*Williamsonia lintneri*)

Threats and Actions by Species

Comet Darner (*Anax longipes*)

Habitat Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore
 Status: IUCN Rank: LC. OTSTAT: MA-C (KD). SRANK: S2. GRANK: G5. GRP: 2. PRIOR: 1. Climate Change

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Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions:

- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions:

- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

Actions:

- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions:

- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions:

- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions:

- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions:

- *Land/water management.*
- *Law and policy.*
- *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

Actions:

- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
- *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Refer to the Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore - Habitat Profile for additional threats to this species.

Arrowhead Spiketail (*Cordulegaster obliqua*)

Habitat Community: Seeps, Springs, Vernal Pools, Type: Seeps, Springs, Vernal Pools

Status: IUCN Rank: LC. STSTAT: C. SRANK: SNR. GRANK: G4. CODES: RES. GRP: 5. PRIOR: 1. Climate Change

Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions:

- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions:

- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in*

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development projects.

- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

- Actions:*
- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
 - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Refer to the Community: Seeps, Springs, Vernal Pools, Type: Seeps, Springs, Vernal Pools - Habitat Profile for additional threats to this species.

Scarlet Bluet (*Enallagma pictum*)

Habitat Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore

Status: IUCN Rank: NT. STSTAT: C. OTSTAT: MA/NY-T (KD). SRANK: S2. GRANK: G3. GRP: 1. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:*
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

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Actions: • *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions: • *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions: • *Land/water management.*
• *Law and policy.*
• *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

Actions: • *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
• *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Refer to the Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore - Habitat Profile for additional threats to this species.

Pine Barrens Bluet (*Enallagma recurvatum*)

Habitat Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore

Status: IUCN Rank: NT. STSTAT: C. OTSTAT: MA/NY-T; CT-C (KD). SRANK: S2. GRANK: G3. GRP: 2. PRIOR: 1.

Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions: • *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions: • *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions: • *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant

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communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

- Actions:*
- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
 - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Taper-tailed Darner (*Gomphaeschna antilope*)

Habitat Community: Coastal Plain Peatlands, Type: Graminoid Fen

Status: SRANK: S1. GRANK: G4. GRP: 6. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:*
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

- Actions:*
- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
 - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Refer to the Community: Coastal Plain Peatlands, Type: Graminoid Fen - Habitat Profile for additional threats to this species.

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Lyre-tipped Spreadwing (*Lestes unguiculatus*)

Habitat Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore

Status: SRANK: S1. GRANK: G5. CODES: RES. GRP: 5. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions:

- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions:

- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

Actions:

- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions:

- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions:

- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions:

- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions:

- *Land/water management.*
- *Law and policy.*
- *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

Actions:

- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
- *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Refer to the Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore - Habitat Profile for additional threats to this species.

Crimson-ringed Whiteface (*Leucorrhinia glacialis*)

Habitat Community: Coastal Plain Peatlands, Type: Coastal Plain Quagmire and Graminoid Fen

Status: IUCN Rank: LC. OTSTAT: CT-T (KD). SRANK: S1. GRANK: G5. GRP: 10. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions:

- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt,

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toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

- Actions:*
- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
 - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Refer to the Community: Coastal Plain Peatlands, Type: Coastal Plain Quagmire and Graminoid Fen - Habitat Profile for additional threats to this species.

Southern Sprite (*Nehalennia integricollis*)

Habitat Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore

Status: OTSTAT: NY-C (KD). SRANK: S1. GRANK: G5. CODES: RES. GRP: 6. PRIOR: 1. Climate Change

Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:*
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*

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- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

- Actions:*
- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
 - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Refer to the Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore - Habitat Profile for additional threats to this species.

Umber Shadowdragon (*Neurocordulia obsoleta*)

Habitat Community: Freshwater Emergent Marsh, Type: Freshwater Emergent Marsh

Status: IUCN Rank: LC. SRANK: S1. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:*
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

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Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

- Actions:*
- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
 - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Refer to the Community: Freshwater Emergent Marsh, Type: Freshwater Emergent Marsh - Habitat Profile for additional threats to this species.

Common Sanddragon (*Progomphus obscurus*)

Habitat Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore

Status: SRANK: SNR. GRANK: G5. GRP: 13. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:*
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

- Actions:*
- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
 - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

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Refer to the Community: Coastal Plain Pond/Pondshore, Type: Coastal Plain Pond/Pondshore - Habitat Profile for additional threats to this species.

Ringed Boghaunter (*Williamsonia lintneri*)

Habitat Community: Coastal Plain Peatlands, Type: Coastal Plain Quagmire and Graminoid Fen

Status: IUCN Rank: VU. STSTAT: C. OTSTAT: CT-E; MA/ME-T (KD). SRANK: S2. GRANK: G3. GRP: 17. PRIOR: 1.

Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions:

- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions:

- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

Actions:

- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions:

- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions:

- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions:

- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions:

- *Land/water management.*
- *Law and policy.*
- *Planning.*

Threat 8 - Other ecosystem modifications; Alteration of hydrology due to water withdrawal

Actions:

- *Site/area protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*
- *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*

Threat 9 - Hunting and collecting terrestrial animals

Actions:

- *Policies and regulations; Limit collecting permits.*
- *Compliance and enforcement; Monitor results.*

Threat 10 - Problematic native species; Introduction of beaver to habitat

Actions:

- *Data collection and analysis.*
- *Species management.*

Refer to the Community: Coastal Plain Peatlands, Type: Coastal Plain Quagmire and Graminoid Fen - Habitat Profile for additional threats to this species.

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

Odonates of the Lower Perennial River

INVERTEBRATES



Photo: Michael C. Moore

~See map disclaimer in profiles introduction

Description

Dragonflies (Eiprocta) and damselflies (Zygoptera) of the lower perennial river prefer the low gradient, slow velocity, and well developed floodplain these habitats provide. There is no tidal influence here and some water flows throughout the year, although sometimes oxygen deficits may occur, fauna here strives in still water and true planktonic organisms are common. The substrate is primarily composed of sand and mud, an important factor for the aquatic or semi-aquatic juvenile stages. A few additional Odonate species that utilize upper perennial systems are Beaverpond Baskettail (*Epitheca canis*), Spiny Baskettail (*Epitheca spinigera*), and Brush-tipped Emerald (*Somatochlora walshii*).

Species

- Blackwater Bluet (*Enallagma weewa*)
- Coppery Emerald (*Somatochlora georgiana*)
- Arrow Clubtail (*Stylurus spiniceps*)

Threats and Actions by Species

Blackwater Bluet (*Enallagma weewa*)

Habitat Community: Forested Swamp

Status: STSTAT: C. SRANK: SNR. GRANK: G5. GRP: 3. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:
- Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:
- Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.
 - Outreach.
 - Site/area management; Limit access and development of pond shores/river banks for recreation.

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:
- Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.

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Species of Greatest Conservation Need

- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions: • *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions: • *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions: • *Land/water management.*
• *Law and policy.*
• *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

Actions: • *Data collection and analysis; Monitor dam release schedule.*

Refer to the Community: Forested Swamp - Habitat Profile for additional threats to this species.

Coppery Emerald (*Somatochlora georgiana*)

Habitat Community: River

Status: IUCN Rank: DD. STSTAT: C. OTSTAT: MA-E (KD). SRANK: SU. GRANK: G3G4. GRP: 14. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions: • *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions: • *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions: • *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

DRAFT Rhode Island Wildlife Action Plan Species Profiles
Species of Greatest Conservation Need

- Actions:
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*

Refer to the Community: River - Habitat Profile for additional threats to this species.

Arrow Clubtail (*Stylurus spiniceps*)

Habitat Community: River

Status: IUCN Rank: LC. SRANK: S1. GRANK: G5. GRP: 16. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*

Threat 9 - Lack of information

- Actions:
- *Data collection and analysis; Additional inventory should focus on the larger rivers in the lower Pawcatuck system.*

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Species of Greatest Conservation Need

Odonates of the Upper Perennial River

INVERTEBRATES



Photo: Michael C. Moore

~See map disclaimer in profiles introduction

Description

Dragonflies (Eiprocta) and damselflies (Zygoptera) of the upper perennial river prefer the higher gradient and faster velocity of the upper perennial river in comparison to the lower perennial river. There is no tidal influence here and some water flows throughout the year, and naturally high dissolved oxygen concentrations are the norm. The fauna here prefer running water and there are few or no planktonic organisms. The substrate is composed of rock, cobbles, or gravel with occasional patches of sand, an important factor for the aquatic or semi-aquatic juvenile stages.

Species

- Delta-spotted Spiketail (*Cordulegaster diastatops*)
- Twin-spotted Spiketail (*Cordulegaster maculata*)
- Spine-crowned Clubtail (*Gomphus abbreviatus*)
- Mustached Clubtail (*Gomphus adelphus*)
- American Rubyspot (*Hetaerina americana*)
- Southern Pygmy Clubtail (*Lanthus vernalis*)
- Brook Snaketail (*Ophiogomphus aspersus*)
- Maine Snaketail (*Ophiogomphus mainensis*)
- Zebra Clubtail (*Stylurus scudderii*)

Threats and Actions by Species

Delta-spotted Spiketail (*Cordulegaster diastatops*)

Habitat Community: River

Status: SRANK: SNR. GRANK: G5. GRP: 3. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions: • *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*

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Species of Greatest Conservation Need

- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

- Actions:*
- *Data collection and analysis; Monitor dam release schedule.*

Refer to the Community: River - Habitat Profile for additional threats to this species.

Twin-spotted Spiketail (*Cordulegaster maculata*)

Habitat Community: River

Status: SRANK: SNR. GRANK: G5. GRP: 4. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:*
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

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Species of Greatest Conservation Need

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions: • *Land/water management.*
• *Law and policy.*
• *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

Actions: • *Data collection and analysis; Monitor dam release schedule.*

Spine-crowned Clubtail (*Gomphus abbreviatus*)

Habitat Community: River

Status: IUCN Rank: LC. OTSTAT: MA-C (KD). SRANK: S1. GRANK: G3G4. CODES: RES. GRP: 7. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions: • *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions: • *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions: • *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions: • *Land/water management.*
• *Law and policy.*
• *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

Actions: • *Data collection and analysis; Monitor dam release schedule.*

Mustached Clubtail (*Gomphus adelphus*)

Habitat Community: River

Status: OTSTAT: CT-T (KD). SRANK: SNR. GRANK: G4. CODES: RES. GRP: 8. PRIOR: 1. Climate Change Vulnerability: Unknown

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Species of Greatest Conservation Need

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:*
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:*
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

- Actions:*
- *Data collection and analysis; Monitor dam release schedule.*

American Rubyspot (*Hetaerina americana*)

Habitat Community: River

Status: OTSTAT: CT-T (KD). SRANK: SNR. GRANK: G5. CODES: RES. GRP: 4. PRIOR: 1. Climate Change

Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:*
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*

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- *Outreach.*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions: • *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions: • *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions: • *Land/water management.*
• *Law and policy.*
• *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

Actions: • *Data collection and analysis; Monitor dam release schedule.*

Southern Pygmy Clubtail (*Lanthus vernalis*)

Habitat Community: River

Status: SRANK: SNR. GRANK: G4. GRP: 9. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions: • *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions: • *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions: • *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions: • *Land/water management.*
• *Law and policy.*

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Species of Greatest Conservation Need

- *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

Actions: • *Data collection and analysis; Monitor dam release schedule.*

Brook Snaketail (*Ophiogomphus aspersus*)

Habitat Community: River, Type: Cold Water, swiftly flowing stream

Status: IUCN Rank: LC. STSTAT: ST. OTSTAT: MA-C (KD). SRANK: S1. GRANK: G3G4. GRP: 11. PRIOR: 1.

Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions: • *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
• *Outreach.*
• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

Actions: • *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

Actions: • *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

Actions: • *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

Actions: • *Land/water management.*
• *Law and policy.*
• *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

Actions: • *Data collection and analysis; Monitor dam release schedule.*

Refer to the Community: River, Type: Cold Water, swiftly flowing stream - Habitat Profile for additional threats to this species.

Maine Snaketail (*Ophiogomphus mainensis*)

Habitat Community: River, Type: Cold Water, swiftly flowing stream

Status: SRANK: SU. GRANK: G4. GRP: 12. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

Actions: • *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting

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Species of Greatest Conservation Need

from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*
 - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*

Zebra Clubtail (*Stylurus scudderi*)

Habitat Community: River

Status: STSTAT: ST. SRANK: S1. GRANK: G4. GRP: 15. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Residential and commercial development; Urbanization of watersheds: deforestation, development, & roads

- Actions:
- *Land/water protection; Protect aquatic habitats through purchase of surrounding uplands (via fee and conservation easements).*

Threat 2 - Pollution; Degradation of water quality due to run-off and siltation in aquatic habitat (resulting from development/disturbance in surrounding upland): fertilizers, herbicides, pesticides, road salt, sand/silt, toxins

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
 - *Outreach.*
 - *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 4 - Recreational activities; Bank destabilization, trampling of aquatic vegetative beds

- Actions:
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*

Threat 5 - Other ecosystem modifications; Introduction of fish in fishless ponds, fish stocking programs

- Actions:
- *Data collection and analysis; Monitor fishless ponds for accidental introduction of fish.*

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- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 6 - Invasive non-native/alien species; Particularly aquatic plants (e.g., Phragmites, Purple Loosestrife)

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:*
- *Land/water management.*
 - *Law and policy.*
 - *Planning.*

Threat 8 - Dams and water management/use; Water management, dam releases

- Actions:*
- *Data collection and analysis; Monitor dam release schedule.*

Refer to the Community: River - Habitat Profile for additional threats to this species.

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Pollinators - Bumble Bees

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

At least 20 species of bumble bees are known from Rhode Island. Bumble bees are among the taxa that use a process known as buzz pollination, a behavior in which bumblebees move their flight muscles rapidly so that their entire body vibrates to dislodge pollen from the anther of a flower. Some flowering plant species requiring buzz pollination for maximum pollination and fruit yields include blueberries, cranberries, and eggplant.

Some populations of bumble bees have declined in recent years due to several factors, including habitat degradation, habitat fragmentation, and loss of nesting or foraging sites. In addition, populations of several bumblebees have been severely impacted by a fungal infection introduced from Europe through the commercial bumblebee industry. Pollinators are also highly vulnerable to pesticide use, including broad-based sprayings for mosquito control, or backyard application of broad-spectrum insecticides.

Two species of bumble bees are recognized as SGCN in Rhode Island. The rusty-patched bumble bee (*Bombus affinis*) was commonly distributed throughout the east and upper Midwest of the United States, but according to the Xerces Society has declined from at least 87% of its historic range. With most of this decline occurring in recent years, the Xerces Society has petitioned the USFWS for protection of rusty-patched bumble bee under provisions of the Endangered Species Act. Listing would afford protection by addressing site-specific threats and supporting habitat enhancement.

The yellow-banded bumble bee (*Bombus terricola*), once commonly distributed throughout the east, upper Midwest, and southern Canada, has also suffered steep declines. According to the Xerces Society this bee has not been seen in most parts of its range since 1999, except for isolated sites in Wisconsin and Pennsylvania.

Commercial bumble bee rearing, an unregulated enterprise, is considered the primary threat to both rusty-patched and yellow-banded bumble bees. It is suspected that commercially-reared bumble bees of several species were infected with a virulent strain of *Nosema* fungus introduced in shipments of European bees and released into wild populations that had no prior resistance to this pathogen. As no populations of these species are currently known in Rhode Island, a primary research need is location of both rusty-patched and yellow-banded bumble bee, an effort that would be aided by a larger scale project to inventory all bumble bees in the state.

Bumble bees, and all pollinators, are also vulnerable to pesticides used for control of various problem insects, as well as homeowner use of over-the-counter pesticides for control of aggravating insects.

Species

- Rusty-patched Bumble Bee (*Bombus affinis*)
- Yellowbanded Bumblebee (*Bombus terricola*)

Threats and Actions by Species

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Rusty-patched Bumble Bee (*Bombus affinis*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: SRANK: SNR. GRANK: G1. Xerces: imperiled. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information; Population data needed (unknown pathogen)

Actions: • *Data collection and analysis; Conduct inventory and determine location of populations. Rank: 2*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides. Rank: 2*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms. Rank: 2*

Threat 4 - Invasive non-native/alien species; Fungus introduced in commercially-reared bumble bees

Actions: • *Policies and regulations. Rank: 3*

Refer to the Community: Ruderal Grassland/Shrubland, Type: Old Field - Habitat Profile for additional threats to this species.

Yellow-banded Bumblebee (*Bombus terricola*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: SRANK: SNR. GRANK: G2G4. Xerces: imperiled. Climate Change Vulnerability: Unknown

Threat 1 - Lack of information; Population data needed (unknown pathogen)

Actions: • *Data collection and analysis; Conduct inventory and determine location of populations. Rank: 2*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of invasive and other problematic insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides. Rank: 2*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms. Rank: 2*

Threat 4 - Invasive non-native/alien species; Fungus introduced in commercially-reared bumble bees

Actions: • *Policies and regulations. Rank: 3*

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Pollinators - Monarch Butterfly

INVERTEBRATES

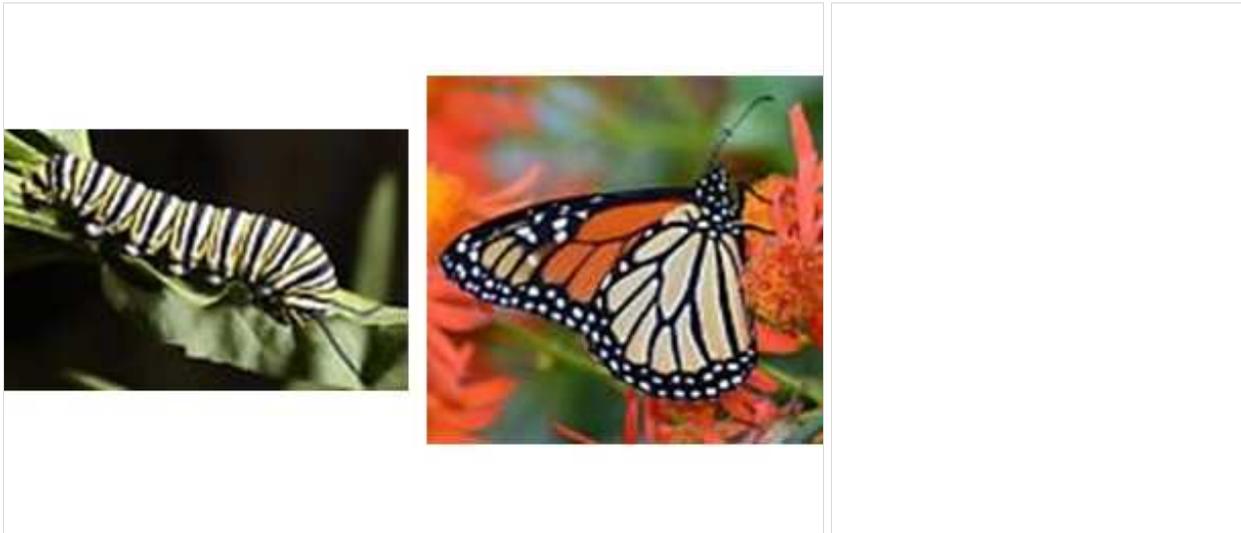


Photo: Sherri VandenAkker

~See map disclaimer in profiles introduction

Description

The Monarch Butterfly is renowned for its long distance seasonal migration and spectacular winter gatherings in the oyamel fir forests north of Mexico City, Mexico of billions of individuals. Beginning in the 1990's, researchers have documented a steady decline in monarch numbers so that today less than 33 million remain, representing more than a 90% drop throughout North America.

A primary threat to the monarch butterfly is a decline in populations of milkweed, the key plant required by caterpillars require. The decline in milkweed is partially due to the reduction of open habitats, but in the Midwest losses are mostly due to the dramatic increase in the use of the herbicide Roundup (glyphosphate) which has been made possible by the mass-planting of genetically modified herbicide resistant corn and soy. In addition, the widespread use of systemic insecticides such as neonicotinoids within the breeding range of the monarch poses a considerable threat, illegal logging of fir forests in Mexico has reduced wintering habitat, and extreme weather events in the eastern US may be negatively impacting monarchs.

In recognition of the decline in monarch butterflies, the Monarch Joint Venture (MJV) was initiated in December 2008 as a partnership of federal agencies, state agencies, non-governmental organizations, and academic programs working together to protect the monarch and its annual, long-distance migration. Guided by the North American Monarch Conservation Plan (2008), the MJV is taking a science-based approach to addressing monarch conservation issues. The MJV promotes monarchs as a flagship species whose conservation will sustain habitats for pollinators and other plants and animals. For more information about MJV:

<http://www.monarchjointventure.org/>

Actions to benefit monarchs that are being promoted by MJV include working with various landowners and land managers to restore monarch breeding habitat and increasing the supply of and demand for locally-sourced milkweed plants and seeds for garden and larger restoration projects. MJV also supports the expansion of monarch monitoring programs, data analyses to help understand monarch conservation issues, and research to help inform and improve the success of habitat restoration efforts.

Species

Monarch Butterfly (*Danaus plexippus*)

Threats and Actions by Species

Monarch Butterfly (*Danaus plexippus*)

Status: SRANK: SNR. GRANK: G4. GRP: 13. PRIOR: 1. Climate Change Vulnerability: Unknown

Threat 1 - Other ecosystem modifications; Decline in populations of milkweed

Actions: • *Habitat and natural process restoration. Rank: 2*

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- *Species recovery; Restoration of milkweed populations, including propagation of milkweed using locally-sourced seed. Rank: 3*
- *Training; Workshops and other educational forums in creating and enhancing pollinator habitats. Rank: 3*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides. Rank: 2*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms. Rank: 3*

Threat 4 - Agricultural and forestry effluents; Broad-based use of herbicides, especially RoundUp

Actions: • *Policies and regulations; Restricting the use of herbicides in situations that can impact populations of plants important to pollinators. Rank: 3*

- *Awareness and communications; Public education concerning the effects of herbicides on dependent pollinator organisms. Rank: 3*

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Pollinators - Silkworm and Sphinx Moths

INVERTEBRATES



Photo: Richard Enser

~See map disclaimer in profiles introduction

Description

Regarded by naturalists to be among the most beautiful insects, silkworm and sphinx (hawk) moths provide pollination services nocturnally to a unique group of plants with fragrant, white, tubular flowers. Moths pick up pollen on their legs and wings when they visit flowers and deposit pollen accidentally on subsequent floral visits. In many instances, these moths are named for the principle plant species that serves as the larval food supply.

Many of these moths have proven to be highly susceptible to parasitism by a tachinid fly (*Compsilura*) that was introduced to North America in the early 1900's to control gypsy moth. Exhibiting a flexible life style, *Compsilura* is capable of altering its reproductive cycle to coincide with that of a host moth, and as such has been able to parasitize more than 150 species of butterflies and moths in North America. In Rhode Island and elsewhere in southern New England, many species of silkworm and sphinx moths have declined with some populations relegated to offshore islands where *Compsilura* was not introduced for gypsy moth control. Although it is unlikely that *Compsilura* can be controlled in areas where it has already been introduced, research should be conducted to determine how this parasite can be prevented from spreading to islands where it is apparently uncommon.

Moths are also vulnerable to pesticides used for control of mosquitoes and other widespread problem insects, as well as homeowner use of over-the-counter pesticides for control of aggravating insects.

Species

- Tulip Tree Silkworm (*Callosamia angulifera*)
- Promethia Silkmoth (*Callosamia promethea*)
- Waved Sphinx (*Ceratomia undulosa*)
- Hydrangea Sphinx (*Darapsa versicolor*)
- Achemon Sphinx (*Eumorpha achemon*)
- Cecropia Moth (*Hyalophora cecropia*)
- Big Poplar Sphinx (*Pachysphinx modesta*)
- Wild Cherry Sphinx (*Sphinx drupiferarum*)
- Hermit Sphinx (*Sphinx eremitus*)
- Laurel Sphinx (*Sphinx kalmiae*)

Threats and Actions by Species

Tulip Tree Silkworm (*Callosamia angulifera*)

Habitat Community: Oak Forest, Type: Oak Forest

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Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

- Actions:
- *Data collection and analysis; Conduct research on how to control spread of this parasite.*
 - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Oak Forest, Type: Oak Forest - Habitat Profile for additional threats to this species.

Promethia Silkmoth (*Callosamia promethea*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

- Actions:
- *Data collection and analysis; Conduct research on how to control spread of this parasite.*
 - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Waved Sphinx (*Ceratomia undulosa*)

Habitat Community: Ruderal Grassland/Shrubland, Type: Old Field

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

- Actions:
- *Data collection and analysis; Conduct research on how to control spread of this parasite.*
 - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

- Actions:
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Grassland/Shrubland, Type: Old Field - Habitat Profile for additional threats to this species.

Hydrangea Sphinx (*Darapsa versicolor*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

- Actions:
- *Data collection and analysis; Conduct research on how to control spread of this parasite.*
 - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for*

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control of pest species of moths.

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Achemon Sphinx (*Eumorpha achemon*)

Habitat Community: Ruderal Grassland/Shrubland

Status: SRANK: SNR. GRANK: G4G5. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

Actions: • *Data collection and analysis; Conduct research on how to control spread of this parasite.*
• *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Grassland/Shrubland - Habitat Profile for additional threats to this species.

Cecropia Moth (*Hyalophora cecropia*)

Habitat Community: Oak Forest, Type: Oak Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

Actions: • *Data collection and analysis; Conduct research on how to control spread of this parasite.*
• *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Oak Forest, Type: Oak Forest - Habitat Profile for additional threats to this species.

Big Poplar Sphinx (*Pachysphinx modesta*)

Habitat Community: Northern Hardwood Forest, Type: Mixed Hardwood Riverside Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

Actions: • *Data collection and analysis; Conduct research on how to control spread of this parasite.*
• *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

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Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Northern Hardwood Forest, Type: Mixed Hardwood Riverside Forest - Habitat Profile for additional threats to this species.

Wild Cherry Sphinx (*Sphinx drupiferarum*)

Habitat Community: Ruderal Forest, Type: Ruderal Forest

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

Actions: • *Data collection and analysis; Conduct research on how to control spread of this parasite.*
• *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Forest, Type: Ruderal Forest - Habitat Profile for additional threats to this species.

Hermit Sphinx (*Sphinx eremitus*)

Habitat Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow

Status: SRANK: SNR. GRANK: G4G5. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

Actions: • *Data collection and analysis; Conduct research on how to control spread of this parasite.*
• *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Shrub Swamp/Wet Meadow, Type: Shrub Swamp/Wet Meadow - Habitat Profile for additional threats to this species.

Laurel Sphinx (*Sphinx kalmiae*)

Habitat Community: Ruderal Forest, Type: Ruderal Forest

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown

Threat 1 - Invasive non-native/alien species; Introduction of Compsilura; spread of this parasite to additional areas

Actions: • *Data collection and analysis; Conduct research on how to control spread of this parasite.*
• *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*

Threat 2 - Agricultural and forestry effluents; Use of non-specific pesticides for control of nuisance insects

Actions: • *Data collection and analysis; Research into alternative specific pesticides.*

Threat 3 - Housing and urban areas; Use of non-specific pesticides for control of nuisance insects

Actions: • *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*

Refer to the Community: Ruderal Forest, Type: Ruderal Forest - Habitat Profile for additional threats to this species.

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Robber Flies

INVERTEBRATES



Photo: Michael C. Thomas

~See map disclaimer in profiles introduction

Description

Robber flies (Order: Diptera; Family: Asilidae) are powerfully built, bristly flies that are named for their aggressive predatory habits, feeding mainly or exclusively on other insects, waiting in ambush to catch their prey in flight. A robber fly attacks its prey by stabbing it with its short, strong proboscis injecting the victim with saliva containing neurotoxic and proteolytic enzymes which very rapidly paralyze the victim and soon digest the insides; the fly then sucks the liquefied material through the proboscis. Robber flies generally occur in habitats that are open, sunny and dry, favoring open or scattered vegetation, and some species frequent bare ground. This group have insects has been inventoried in Rhode Island during the past several years with three species identified as uncommon and worthy of conservation attention.

Laphria champlainii typically occurs in pitch pine/scrub oak barrens and has been found at four sites in Rhode Island in Kent and Washington Counties. *Pogonosoma dorsatum* also occurs in pitch pine dominated communities, but has only been found at one site in Rhode Island in the town of Charlestown.

Stichopogon argenteus has a spotty distribution in North America in sandy habitats. In Rhode Island it has only been found on coastal beaches and dunes, primarily in New port County and in the town of Narragansett Washington County

Species

- Bee-like Robber Fly (*Laphria champlainii*)
- Robber Fly (*Pogonosoma dorsatum*)
- Robber Fly (*Stichopogon argenteus*)

Threats and Actions by Species

Bee-like Robber Fly (*Laphria champlainii*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: Climate Change Vulnerability: Unknown

Threat 1 - Human intrusions and disturbance; ATV use, trampling of habitat

- Actions:
- Site/area protection; Identify and acquire key parcels for fee purchase and easement.
 - Resource and habitat protection; Control public access to their primary habitat areas, Pitch Pine Woodlands and Barrens.
 - Site/area management; Control public access to their primary habitat areas, Pitch Pine Woodlands and Barrens.

Threat 2 - Natural system modifications; Lack of disturbance (natural and anthropogenic) to maintain

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community

- Actions:*
- *Habitat and natural process restoration; Identify methods for restoring this habitat.*
 - *Site/area management; Conduct management by methods identified.*

Threat 3 - Pollution; Use of non-specific pesticides for control of nuisance insects (including home owner and agricultural use)

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*
 - *Outreach; Research into other, species specific pesticides.*
 - *Planning.*
 - *Policies and regulations.*

Threat 4 - Invasive and other problematic species and genes; Potential for this threat is considered low

- Actions:*
- *Invasive/problematic species control; Provide control where needed.*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland - Habitat Profile for additional threats to this species.

Robber Fly (*Pogonosoma dorsatum*)

Habitat Community: Pitch Pine Woodland/Barren, Type: Pitch Pine Woodland

Status: Climate Change Vulnerability: Unknown

Threat 1 - Human intrusions and disturbance; ATV use, trampling of habitat

- Actions:*
- *Site/area protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Resource and habitat protection; Control public access to their primary habitat areas, Pitch Pine Woodlands and Barrens.*
 - *Site/area management; Control public access to their primary habitat areas, Pitch Pine Woodlands and Barrens.*

Threat 2 - Natural system modifications; Lack of disturbance (natural and anthropogenic) to maintain community

- Actions:*
- *Habitat and natural process restoration; Identify methods for restoring this habitat.*
 - *Site/area management; Conduct management by methods identified.*

Threat 3 - Pollution; Use of non-specific pesticides for control of nuisance insects (including home owner and agricultural use)

- Actions:*
- *Awareness and communications; Public education concerning the effects of non-specific pesticides on non-target organisms.*
 - *Outreach; Research into other, species specific pesticides.*
 - *Planning.*
 - *Policies and regulations.*

Threat 4 - Invasive and other problematic species and genes; Potential for this threat is considered low

- Actions:*
- *Invasive/problematic species control; Provide control where needed.*

Robber Fly (*Stichopogon argenteus*)

Habitat Community: Coastal Beach and Dune, Type: Maritime Beach Strand

Status: Climate Change Vulnerability: Unknown

Threat 1 - Climate change and severe weather; Species' primary habitat, Maritime Dunes and Beaches, highly effected by habitat shifting and alteration and storms and flooding; Rapid sea level rise reduces habitat and limits reestablishment

- Actions:*
- *Site/area protection; Ensure opportunities for inland migration with sea level rise.*
 - *Resource and habitat protection; Identify and acquire key parcels for fee purchase and easement.*
 - *Site/area management; Ensure opportunities for inland migration with sea level rise.*
 - *Habitat and natural process restoration.*

Threat 2 - Invasive non-native/alien species; Japanese Sand Sedge (*Carex kobomugi*)

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- Actions:
- *Invasive/problematic species control; Control of current populations and early detection of new incursions.*
 - *Site/area management; Control of current populations and early detection of new incursions.*

Threat 3 - Recreational activities; Visitors and dogs trampling habitat

- Actions:
- *Site/area protection; Control human access by fencing, patrols, etc.*
 - *Resource and habitat protection; Control human access by fencing, patrols, etc.*
 - *Site/area management; Control human access by fencing, patrols, etc.*
 - *Awareness and communications; Signage, brochures, public education opportunities.*

Threat 4 - Residential and commercial development; Although potential for new development is low on their primary habitat, a sizable amount is already built on

- Actions:
- *Site/area protection; Support regulations to curtail threats to their habitat.*
 - *Resource and habitat protection; Intensify clean-up actions in event of spills or pollution from development and/or developed areas.*

Refer to the Community: Coastal Beach and Dune, Type: Maritime Beach Strand - Habitat Profile for additional threats to this species.

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Stoneflies, Mayflies, and True Flies

INVERTEBRATES



Photo: Robert G. Henricks (Stoneflies and Sallfly); D. Cheesebro (Atherix)

~See map disclaimer in profiles introduction

Description

Flies, during all of their life cycles, are an important food source for many larger animals, such as fish and birds, and as such play a very important role in natural systems. Their presence typically suggests good water quality, as they are most often pollution sensitive. SGCN species in this group are usually found in small numbers and only in a few select watersheds and/or towns.

Species

- Watersnipe Flies (*Atherix spp.*)
- Giant Stonefly (*Attaneuria ruralis*)
- Yellow Stonefly (*Eccoptura xanthenes*)
- Mayflies (little Maryatts) (*Epeorus sp.*)
- Sallflies (*Haploperla sp.*)
- Small Minnow Mayflies (*Heterocloeon sp.*)
- Golden Stoneflies (*Paragnetina sp.*)

Threats and Actions by Species

Watersnipe Flies (*Atherix spp.*)

Habitat Community: River

Status: Climate Change Vulnerability: Unknown (susceptible to decreasing water quality, and quantity from climate change)

Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:
- Compliance and enforcement. Rank: 3
 - Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3
 - Planning; Manage storm water and run-off. Rank: 3
 - Land/water protection; Protect land in watershed. Rank: 2
 - Land/water management; Protect and maintain or restore water quality. Rank: 3

Threat 2 - Dams and water management/use; Changes in hydrologic regime due to dams; reservoir management or in stream water level manipulations for residential, industrial and commercial use (Taxa require running water)

- Actions:
- Planning; Coordinate water level management. Rank: 2.5
 - Land/water protection; Protect surrounding land and connected waterways. Rank: 2

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- *Policies and regulations; Management plan compliance and enforcement. Rank: 3*
- *Education and awareness; Educate public to conserve water. Rank: 3*

Threat 3 - Climate change and severe weather; Droughts, low streamflow, water temperature changes, climate change and severe weather

- Actions:*
- *Data collection and analysis; Study impact of naturally occurring drought on species. Rank: 1*
 - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*
 - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*
 - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

Refer to the Community: River - Habitat Profile for additional threats to this species.

Giant Stonefly (*Attaneuria ruralis*)

Habitat Community: River

Status: SRANK: SNR. GRANK: G4. Climate Change Vulnerability: Unknown (susceptible to decreasing water quality, and quantity from climate change)

Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:*
- *Compliance and enforcement. Rank: 3*
 - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*
 - *Planning; Manage storm water and run-off. Rank: 3*
 - *Land/water protection; Protect land in watershed. Rank: 2*
 - *Land/water management; Protect and maintain or restore water quality. Rank: 3*

Threat 2 - Dams and water management/use; Changes in hydrologic regime due to dams; reservoir management or in stream water level manipulations for residential, industrial and commercial use (Taxa require running water)

- Actions:*
- *Planning; Coordinate water level management. Rank: 2.5*
 - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*
 - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*
 - *Education and awareness; Educate public to conserve water. Rank: 3*

Threat 3 - Climate change and severe weather; Droughts, low streamflow, water temperature changes, climate change and severe weather

- Actions:*
- *Data collection and analysis; Study impact of naturally occurring drought on species. Rank: 1*
 - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*
 - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*
 - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

Yellow Stonefly (*Eccoctura xanthenes*)

Habitat Community: River, Type: Cold Water, swiftly flowing stream

Status: SRANK: SNR. GRANK: G5. Climate Change Vulnerability: Unknown (susceptible to decreasing water quality, and quantity from climate change)

Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:*
- *Compliance and enforcement. Rank: 3*
 - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*
 - *Planning; Manage storm water and run-off. Rank: 3*
 - *Land/water protection; Protect land in watershed. Rank: 2*
 - *Land/water management; Protect and maintain or restore water quality. Rank: 3*

Threat 2 - Dams and water management/use; Changes in hydrologic regime due to dams; reservoir management or in stream water level manipulations for residential, industrial and commercial use (Taxa require running water)

- Actions:*
- *Planning; Coordinate water level management. Rank: 2.5*

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- *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*
- *Policies and regulations; Management plan compliance and enforcement. Rank: 3*
- *Education and awareness; Educate public to conserve water. Rank: 3*

Threat 3 - Climate change and severe weather; Droughts, low streamflow, water temperature changes, climate change and severe weather

- Actions:*
- *Data collection and analysis; Study impact of naturally occurring drought on species. Rank: 1*
 - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*
 - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*
 - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

Refer to the Community: River, Type: Cold Water, swiftly flowing stream - Habitat Profile for additional threats to this species.

Mayflies (Little Maryatts) (*Epeorus sp.*)

Habitat Community: River, Type: Cold Water, slower flowing stream

Status: Climate Change Vulnerability: Unknown (susceptible to decreasing water quality, and quantity from climate change)

Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:*
- *Compliance and enforcement. Rank: 3*
 - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*
 - *Planning; Manage storm water and run-off. Rank: 3*
 - *Land/water protection; Protect land in watershed. Rank: 2*
 - *Land/water management; Protect and maintain or restore water quality. Rank: 3*

Threat 2 - Dams and water management/use; Changes in hydrologic regime due to dams; reservoir management or in stream water level manipulations for residential, industrial and commercial use (Taxa require running water)

- Actions:*
- *Planning; Coordinate water level management. Rank: 2.5*
 - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*
 - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*
 - *Education and awareness; Educate public to conserve water. Rank: 3*

Threat 3 - Climate change and severe weather; Droughts, low streamflow, water temperature changes, climate change and severe weather

- Actions:*
- *Data collection and analysis; Study impact of naturally occurring drought on species. Rank: 1*
 - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*
 - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*
 - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

Refer to the Community: River, Type: Cold Water, slower flowing stream - Habitat Profile for additional threats to this species.

Sallflies (*Haploperla sp.*)

Habitat Community: River, Type: Cold Water, swiftly flowing stream

Status: Climate Change Vulnerability: Unknown (susceptible to decreasing water quality, and quantity from climate change)

Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:*
- *Compliance and enforcement. Rank: 3*
 - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*
 - *Planning; Manage storm water and run-off. Rank: 3*
 - *Land/water protection; Protect land in watershed. Rank: 2*
 - *Land/water management; Protect and maintain or restore water quality. Rank: 3*

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Threat 2 - Dams and water management/use; Changes in hydrologic regime due to dams; reservoir management or in stream water level manipulations for residential, industrial and commercial use (Taxa require running water)

- Actions:*
- *Planning; Coordinate water level management. Rank: 2.5*
 - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*
 - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*
 - *Education and awareness; Educate public to conserve water. Rank: 3*

Threat 3 - Climate change and severe weather; Droughts, low streamflow, water temperature changes, climate change and severe weather

- Actions:*
- *Data collection and analysis; Study impact of naturally occurring drought on species. Rank: 1*
 - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*
 - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*
 - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

Refer to the Community: River, Type: Cold Water, swiftly flowing stream - Habitat Profile for additional threats to this species.

Small Minnow Mayflies (*Heterocloeon sp.*)

Habitat Community: River, Type: Cold Water, swiftly flowing stream

Status: Climate Change Vulnerability: Unknown (susceptible to decreasing water quality, and quantity from climate change)

Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:*
- *Compliance and enforcement. Rank: 3*
 - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*
 - *Planning; Manage storm water and run-off. Rank: 3*
 - *Land/water protection; Protect land in watershed. Rank: 2*
 - *Land/water management; Protect and maintain or restore water quality. Rank: 3*

Threat 2 - Dams and water management/use; Changes in hydrologic regime due to dams; reservoir management or in stream water level manipulations for residential, industrial and commercial use (Taxa require running water)

- Actions:*
- *Planning; Coordinate water level management. Rank: 2.5*
 - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*
 - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*
 - *Education and awareness; Educate public to conserve water. Rank: 3*

Threat 3 - Climate change and severe weather; Droughts, low streamflow, water temperature changes, climate change and severe weather

- Actions:*
- *Data collection and analysis; Study impact of naturally occurring drought on species. Rank: 1*
 - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*
 - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*
 - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

Golden Stoneflies (*Paragnetina sp.*)

Habitat Community: River, Type: Cold Water, swiftly flowing stream

Status: Climate Change Vulnerability: Unknown (susceptible to decreasing water quality, and quantity from climate change)

Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:*
- *Compliance and enforcement. Rank: 3*
 - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*
 - *Planning; Manage storm water and run-off. Rank: 3*

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- *Land/water protection; Protect land in watershed. Rank: 2*
- *Land/water management; Protect and maintain or restore water quality. Rank: 3*

Threat 2 - Dams and water management/use; Changes in hydrologic regime due to dams; reservoir management or in stream water level manipulations for residential, industrial and commercial use (Taxa require running water)

- Actions:*
- *Planning; Coordinate water level management. Rank: 3*
 - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*
 - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*
 - *Education and awareness; Educate public to conserve water. Rank: 3*

Threat 3 - Climate change and severe weather; Droughts, low streamflow, water temperature changes, climate change and severe weather

- Actions:*
- *Data collection and analysis; Study impact of naturally occurring drought on species. Rank: 1*
 - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*
 - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*
 - *Education and awareness; Educate public to conserve water and energy. Rank: 2*