

# ALL SPECIES

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## All Species

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### Pollution

- Actions:
- *Technical assistance; Outreach to appropriate landowners concerning chemical management.*

### Lack of information dissemination, outreach, education

- Actions:
- *Education and awareness; Organize workshops and technical training for staff in GIS, statistics, etc.*
  - *Education and awareness; Promote existing programs with private landowners. Rank: 3*
  - *Education and awareness; Provide technical assistance in conservation planning where required. Rank: 3*
  - *Alliance and partnership development; Develop new partnerships with private landowners. Rank: 3*
  - *Alliance and partnership development; Identify appropriate partners for coordinated conservation planning. Rank: 3*
  - *Outreach; Compile and publish research and planning results. Rank: 3*
  - *Outreach; Develop liason with towns and partners. Rank: 3*
  - *Outreach; Disseminate results. Rank: 3*
  - *Outreach; Outreach to appropriate state parks in focal area. Rank: 3*
  - *Technical assistance; Initiate contact with private landowners identified within focal areas. Rank: 3*

### Lack of Planning

- Actions:
- *Resource and habitat protection; Facilitate acquisition or easement of key parcels in focal areas. Rank: 3*
  - *Resource and habitat protection; Identify key unprotected parcels in focal areas. Rank: 3*
  - *Planning; Coordinate focal area projects with other state and regional programs. Rank: 3*
  - *Planning; Develop process to facilitate research priorities. Rank: 3*
  - *Planning; Identify focal areas or defensible populations for focal species/area approach to conservation. Rank: 3*
  - *Planning; Identify other critical habitat.*
  - *Planning; Identify priority issues specific for all parcels in focal area. Rank: 3*
  - *Planning; Create process to include conservation expertise in planning stage of all development projects. Rank: 3*
  - *Data collection and analysis; Initiate monitoring of primary resources.*

### Lack of information

- Actions:
- *Data collection and analysis; Assemble all known GCN species distribution/abundance information into digital form. Rank: 3*
  - *Data collection and analysis; Assemble all life history information into digita form. Rank: 3*
  - *Data collection and analysis; Assemble all parcel data for state in digital form. Rank: 3*
  - *Data collection and analysis; Determine lethal and non-lethal effects of chemicals.*
  - *Data collection and analysis; Determine variables suitable for measuring environmental/patch quality. Rank: 3*
  - *Data collection and analysis; Develop algorithm to measure fragmentation. Rank: 3*
  - *Data collection and analysis; Geo-reference existing taxonomic data sets.*
  - *Data collection and analysis; Obtain remote sensing data at periodic intervals. Rank: 3*
  - *Data collection and analysis; On-going assessment of threats to GCN species and key habitats.*

# BIRDS

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## Birds (taxa wide)

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### Lack of information

- Actions:
- *Data collection and analysis; Assess effects of prolonged drawdowns - protect existing sites first and coordinate with Division of water management to ID priority sites. Rank: 3*
  - *Data collection and analysis; Assess effects of sedimentation - protect existing sites first and coordinate with Division of water management to ID priority sites. Rank: 3*
  - *Data collection and analysis; Assess effects of stream bank disturbance - protect existing sites first and coordinate with Division of water management to ID priority sites. Rank: 2*
  - *Data collection and analysis; Assess effects of water releases at dams - protect existing sites first and coordinate with Division of water management to ID priority sites. Rank: 3*
  - *Data collection and analysis; Assess effects of water withdrawals - protect existing sites first and coordinate with Division of water management to ID priority sites. Rank: 3*
  - *Data collection and analysis; Assess means to mitigate road effects. Rank: 2*
  - *Data collection and analysis; Create GIS coverage of field habitats. Rank: 1*
  - *Data collection and analysis; Determine appropriate indicator species or parameters to monitor water quality for pelagic / anadromous fauna. Rank: 2*
  - *Data collection and analysis; Evaluate nutritional value of exotic fruit-bearing plants. Rank: 1*
  - *Data collection and analysis; Evaluate use of migratory stopover/winter habitat. Rank: 1*
  - *Data collection and analysis; Evaluate water quality effects on priority species - protect existing sites first and coordinate with Division of water. Rank: 2*
  - *Data collection and analysis; Facilitate detection and diagnosis of diseases outbreaks - develop and fund a coordinated program and protocol to deal with disease effectively and proactively. Rank: 3*
  - *Data collection and analysis; Identify areas of significant road effects in focal areas - high for all forest interior species- coordinate with DOT. Rank: 2*
  - *Data collection and analysis; Identify concentration areas for non-breeding populations - protect existing sites first and coordinate with Division of water management to ID priority sites. Rank: 2*
  - *Data collection and analysis; Initiate monitoring of primary resources - coordinate with ongoing waterfowl research in the region and ACJV. Rank: 2*
  - *Data collection and analysis; Initiate monitoring of species at non-breeding sites - monitor breeding (High priority) and nonbreeding (low priority) population, work with landowners, restrict public use, provide law enforcement. Rank: 2*
  - *Data collection and analysis; Research abundance and distribution of species for which status and habitat can be determined, by including additional data collection in present studies. Rank: 2*
  - *Data collection and analysis; Research invasive species management and monitoring protocols. Rank: 2*
  - *Invasive/problematic species control; Create and implement invasive species monitoring protocol. Rank: 2*
  - *Law and policy; Conduct road mitigations where required - begun coordination. Rank: 2*

### Invasive and other problematic species and genes; Habitat loss and demographic changes from invasive species (vegetation and animal)

- Actions:
- *Data collection and analysis; Evaluate nutritional value of exotic fruit-bearing plants. Rank: 1*
  - *Data collection and analysis; Research invasive species management and monitoring protocols. Rank: 2*
  - *Invasive/problematic species control; Coordinate invasive species management with other state and regional programs. Rank: 3*
  - *Invasive/problematic species control; Create and implement invasive species monitoring protocol. Rank: 2*
  - *Invasive/problematic species control; Develop and implement invasive species management program. Rank: 2*
  - *Invasive/problematic species control; Develop and provide educational information about invasive species. Rank: 3*

- *Invasive/problematic species control; Identify potential damaging exotic plants. Rank: 1*
- *Invasive/problematic species control; Identify priority areas for invasive plant management. Rank: 2*
- *Invasive/problematic species control; Develop and implement program to mitigate effect of aquatic exotics. Rank: 2*
- *Invasive/problematic species control; Develop and implement sampling protocol for aquatic exotics. Rank: 2*
- *Invasive/problematic species control; Identify potential damaging aquatic invasives and exotics. Rank: 2*

#### **Transportation and service corridors; Habitat fragmentation from road effects**

- Actions:*
- *Technical assistance; Establish discussions with state and local D.O.T. Rank: 1*
  - *Data collection and analysis; Identify areas of significant road effects in focal areas. Rank: 2*
  - *Habitat and natural process restoration; Conduct road mitigations where required. Rank: 3*
  - *Planning; Assess means to mitigate road effects. Rank: 2*

#### **Residential and commercial development**

- Actions:*
- *Land/water management; Minimize the loss of riparian habitats as much as possible. Rank: 3*
  - *Site/area management; Manage important habitats as required. Rank: 3*
  - *Planning; Develop strategies to mitigate aquatic degradation. Rank: 3*
  - *Planning; Develop strategies to mitigate aquatic degradation - protect existing sites first and coordinate with Division of water management to ID priority sites. Rank: 3*

#### **Natural system modifications; Loss of habitat from plant succession**

- Actions:*
- *Data collection and analysis; Identify priority parcels needing seral-stage management. Rank: 3*
  - *Data collection and analysis; Identify priority parcels to retain as core forest areas with minimal management. Rank: 3*
  - *Habitat and natural process restoration; Implement burn management on priority parcels. Rank: 3*

#### **Natural system modifications**

- Actions:*
- *Site/area management; Manage important habitats as required, reduce disturbance at nesting sites, and protect existing nesting sites. Rank: 3*
  - *Habitat and natural process restoration; Develop fire prescriptions for priority parcels. Rank: 3*
  - *Habitat and natural process restoration; Implement priority restoration projects. Rank: 3*

#### **Lack of Planning**

- Actions:*
- *Habitat and natural process restoration; Identify suitable restoration projects for Lepidoptera and/or Mussel habitat.*
  - *Planning; Identify priority parcels needing seral-stage management, especially for Lepidoptera habitat - add nest box management program.*
  - *Planning; Identify priority parcels to retain as core forest areas with minimal management - maintain forest interior habitat with shrub understory.*

#### **Residential and commercial development; Lack of management and restoration of degraded habitat**

- Actions:*
- *Habitat and natural process restoration; Identify suitable restoration projects. Rank: 2*
  - *Habitat and natural process restoration; Implement priority restoration projects. Rank: 2*

#### **Lack of information; Lack of information from research to address habitat and taxonomic issues**

- Actions:*
- *Data collection and analysis; Assess taxonomy/population relationships. Rank: 2*
  - *Data collection and analysis; Continue established long-term monitoring protocols. Rank: 3*

#### **Lack of information dissemination, outreach, education**

- Actions:*
- *Invasive/problematic species control; Develop and provide educational information about invasive species. Rank: 3*
  - *Outreach; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 3*

#### **Fire and fire suppression**

- Actions:*
- *Habitat and natural process restoration; Coordinate burn management with other state and regional programs - continue to ID priority areas and burn with partners develop a coordinated*

statewide management coordination to ID how to best manages state lands. Rank: 2

#### **Invasive and other problematic species and genes**

- Actions:
- *Habitat and natural process restoration; Facilitate research to identify and mitigate disease potential - develop and fund a comprehensive disease surveillance program for all taxa. Rank: 2*

#### **Pollution**

- Actions:
- *Technical assistance; Coordinate water quality protection with appropriate DOT, regional and federal programs - protect existing sites first and coordinate with Division of water management to ID priority sites.*
  - *Technical assistance; Coordinate with mosquito abatement personnel for chemical management - protect existing sites first and coordinate with Division of water management to ID priority sites.*

## **BIRDS**

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### **Marine birds**

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#### **Pollution; Habitat degradation from impairment of water quality**

- Actions:
- *Data collection and analysis; Assess effects of sedimentation.*
  - *Data collection and analysis; Develop strategies to mitigate aquatic degradation.*
  - *Data collection and analysis; Evaluate water quality effects on priority species.*

## **BIRDS**

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### **Migratory songbirds**

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#### **Biological resource use; Demographic changes from incidental take (human)**

- Actions:
- *Outreach; Develop and provide educational program/materials to reduce incidental mortality and take from humans.*

## **BIRDS**

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### **Waterbirds/SAV**

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#### **Pollution; Habitat degradation from impairment of water quality**

- Actions:
- *Data collection and analysis; Assess effects of prolonged drawdowns.*
  - *Data collection and analysis; Assess effects of sedimentation.*
  - *Data collection and analysis; Assess effects of stream bank disturbance.*
  - *Data collection and analysis; Assess effects of water releases at dams.*
  - *Data collection and analysis; Assess effects of water withdrawals.*
  - *Data collection and analysis; Evaluate water quality effects on priority species.*
  - *Planning; Develop strategies to mitigate aquatic degradation.*

# BIRDS

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## Least Tern

*Sternula antillarum*

## Beach Birds

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### Threat 1 - Residential and commercial development; Disturbance to nesting habitat and feeding areas

- Actions:
- *Land/water protection; Work with state and non profits to conserve nesting and feeding habitats. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 3*  
- Measure: Number
  - *Awareness and communications. Rank: 3*  
- Measure: Number

### Threat 2 - Problematic native species; Nest predators

- Actions:
- *Education and awareness. Rank: 3*  
- Measure: Number
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Invasives/problematic species control. Rank: 3*  
- Measure: Number

### Threat 3 - Climate change and severe weather; Sea level rise

- Actions:
- *Habitat and natural process restoration. Rank: 3*  
- Measure: Number/Plans
  - *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 2*  
- Measure: Acres/Sites/Miles

### Threat 4 - Lack of planning

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 3*  
- Measure: Number

### Threat 5 - Shipping lanes; Oil pollution

- Actions:
- *Law and policy; Double hulled barge requirement. Rank: 2*  
- Measure: Number

## Piping Plover

*Charadrius melodus*

## Beach Birds

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### Threat 1 - Residential and commercial development; Disturbance to nesting habitat and feeding areas

- Actions:
- *Land/water protection; Work with state and non profits to conserve nesting and feeding habitats. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 3*  
- Measure: Number
  - *Awareness and communications. Rank: 3*  
- Measure: Number

### Threat 2 - Problematic native species; Nest predators

- Actions:
- *Education and awareness. Rank: 3*  
- Measure: Number

- *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Invasives/problematic species control. Rank: 3*  
- Measure: Number

**Threat 3 - Climate change and severe weather; Sea level rise**

- Actions:
- *Habitat and natural process restoration. Rank: 3*  
- Measure: Number/Plans
  - *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management.*  
- Measure: Acres/Sites/Miles

**Threat 4 - Lack of planning**

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 3*  
- Measure: Number

**Threat 5 - Shipping lanes; Oil pollution**

- Actions:
- *Law and policy; Double hulled barge requirement. Rank: 2*  
- Measure: Number
  - *Site/area management.*  
- Measure: Acres/Sites/Miles

**Spotted Sandpiper**

*Actitis macularia*

**Beach Birds**

**Threat 1 - Residential and commercial development; Disturbance to nesting habitat and feeding areas**

- Actions:
- *Land/water protection; Work with state and non profits to conserve nesting and feeding habitats. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 3*  
- Measure: Number
  - *Awareness and communications. Rank: 3*  
- Measure: Number

**Threat 2 - Problematic native species; Nest predators**

- Actions:
- *Education and awareness. Rank: 3*  
- Measure: Number
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Invasives/problematic species control. Rank: 3*  
- Measure: Number

**Threat 3 - Climate change and severe weather; Sea level rise**

- Actions:
- *Habitat and natural process restoration. Rank: 3*  
- Measure: Number/Plans
  - *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management.*  
- Measure: Acres/Sites/Miles

**Threat 4 - Lack of planning**

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 3*  
- Measure: Number

**Threat 5 - Shipping lanes; Oil pollution**

- Actions:
- *Law and policy; Double hulled barge requirement. Rank: 2*  
- Measure: Number

- *Site/area management.*  
- Measure: Acres/Sites/Miles

## BIRDS

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### American Oystercatcher

*Haematopus palliatus*

### Island Birds

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#### Threat 1 - Invasive and other problematic species and genes; Introduction of predators to predator free islands

- Actions:
- *Species management; Prevent introduction of predators. Rank: 3*  
- Measure: Projects/Plans
  - *Site/area management; Maintain forest/shrub habitat on nesting islands. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Invasive/problematic species control; Control spread of phragmites in marshes and wetlands that are foraging habitat. Rank: 2*  
- Measure: Acres/Sites/Projects

#### Threat 2 - Recreational activities; Increased human disturbance of nesting habitat and foraging sites

- Actions:
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Policies and regulations; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 2*  
- Measure: Number/Plans

#### Threat 3 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3*  
- Measure: Number/Plans

#### Threat 4 - Lack of planning

- Actions:
- *Data collection and analysis. Rank: 2*  
- Measure: Number

#### Threat 5 - Other; Potential oil spills

- Actions:
- *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases
  - *Legislation. Rank: 2*  
- Measure: Number

### Black-crowned Night Heron

*Nycticorax nycticorax*

### Island Birds

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#### Threat 1 - Invasive and other problematic species and genes; Introduction of predators to predator free islands

- Actions:
- *Species management; Prevent introduction of predators. Rank: 3*  
- Measure: Projects/Plans
  - *Site/area management; Maintain forest/shrub habitat on nesting islands. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Invasive/problematic species control; Control spread of phragmites in marshes and wetlands that are foraging habitat. Rank: 2*  
- Measure: Acres/Sites/Projects

#### Threat 2 - Recreational activities; Increased human disturbance of nesting habitat and foraging sites

- Actions:
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Policies and regulations; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 2*

- Measure: Number/Plans

**Threat 3 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Lack of planning**

- Actions:
- Data collection and analysis. Rank: 2  
- Measure: Number

**Threat 5 - Other; Potential oil spills**

- Actions:
- Compliance and enforcement. Rank: 2  
- Measure: Number/Interventions/Cases
  - Legislation. Rank: 2  
- Measure: Number

**Common Tern**

*Sterna hirundo*

**Island Birds**

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**Threat 1 - Invasive and other problematic species and genes; Introduction of predators to predator free islands**

- Actions:
- Species management; Prevent introduction of predators. Rank: 3  
- Measure: Projects/Plans
  - Site/area management; Maintain forest/shrub habitat on nesting islands. Rank: 2  
- Measure: Acres/Sites/Miles
  - Invasive/problematic species control; Control spread of phragmites in marshes and wetlands that are foraging habitat. Rank: 2  
- Measure: Acres/Sites/Projects
  - Planning; Species and habitat management planning. Rank: 2  
- Measure: Number

**Threat 2 - Recreational activities; Increased human disturbance of nesting habitat and foraging sites**

- Actions:
- Awareness and communications; Educate public about disturbance factors. Rank: 2  
- Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 2  
- Measure: Number/Plans

**Threat 3 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Lack of planning**

- Actions:
- Data collection and analysis. Rank: 2  
- Measure: Number

**Threat 5 - Other; Potential oil spills**

- Actions:
- Compliance and enforcement. Rank: 2  
- Measure: Number/Interventions/Cases
  - Legislation. Rank: 2  
- Measure: Number

**Glossy Ibis**

*Plegadis falcinellus*

**Island Birds**

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**Threat 1 - Invasive and other problematic species and genes; Introduction of predators to predator free islands**

- Actions:
- *Species management; Prevent introduction of predators. Rank: 3*  
- Measure: Projects/Plans
  - *Site/area management; Maintain forest/shrub habitat on nesting islands. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Invasive/problematic species control; Control spread of phragmites in marshes and wetlands that are foraging habitat. Rank: 2*  
- Measure: Acres/Sites/Projects

**Threat 2 - Recreational activities; Increased human disturbance of nesting habitat and foraging sites**

- Actions:
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Policies and regulations; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 2*  
- Measure: Number/Plans

**Threat 3 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Lack of planning**

- Actions:
- *Data collection and analysis. Rank: 2*  
- Measure: Number

**Threat 5 - Other; Potential oil spills**

- Actions:
- *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases
  - *Legislation. Rank: 2*  
- Measure: Number

**Great Egret**

*Ardea alba*

**Island Birds**

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**Threat 1 - Invasive and other problematic species and genes; Introduction of predators to predator free islands**

- Actions:
- *Species management; Prevent introduction of predators. Rank: 3*  
- Measure: Projects/Plans
  - *Site/area management; Maintain forest/shrub habitat on nesting islands. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Invasive/problematic species control; Control spread of phragmites in marshes and wetlands that are foraging habitat. Rank: 2*  
- Measure: Acres/Sites/Projects

**Threat 2 - Recreational activities; Increased human disturbance of nesting habitat and foraging sites**

- Actions:
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Policies and regulations; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 2*  
- Measure: Number/Plans

**Threat 3 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Lack of planning**

- Actions: • *Data collection and analysis. Rank: 2*  
- Measure: Number

**Threat 5 - Other; Potential oil spills**

- Actions: • *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases
- *Legislation. Rank: 2*  
- Measure: Number

**Herring Gull**

*Larus argentatus*

**Island Birds**

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**Threat 1 - Invasive and other problematic species and genes; Introduction of predators to predator free islands**

- Actions: • *Species management; Prevent introduction of predators. Rank: 3*  
- Measure: Projects/Plans
- *Site/area management; Maintain forest/shrub habitat on nesting islands. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Invasive/problematic species control; Control spread of phragmites in marshes and wetlands that are foraging habitat. Rank: 2*  
- Measure: Acres/Sites/Projects

**Threat 2 - Recreational activities; Increased human disturbance of nesting habitat and foraging sites**

- Actions: • *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
- *Policies and regulations; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 2*  
- Measure: Number/Plans

**Threat 3 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions: • *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Lack of planning**

- Actions: • *Data collection and analysis. Rank: 2*  
- Measure: Number

**Threat 5 - Other; Potential oil spills**

- Actions: • *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases
- *Legislation. Rank: 2*  
- Measure: Number

**Snowy Egret**

*Egretta thula*

**Island Birds**

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**Threat 1 - Invasive and other problematic species and genes; Introduction of predators to predator free islands**

- Actions: • *Species management; Prevent introduction of predators. Rank: 3*  
- Measure: Projects/Plans
- *Site/area management; Maintain forest/shrub habitat on nesting islands. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Invasive/problematic species control; Control spread of phragmites in marshes and wetlands that are foraging habitat. Rank: 2*  
- Measure: Acres/Sites/Projects

**Threat 2 - Recreational activities; Increased human disturbance of nesting habitat and foraging sites**

- Actions: • *Awareness and communications; Educate public about disturbance factors. Rank: 2*

- Measure: Number
- Policies and regulations; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 2
- Measure: Number/Plans

**Threat 3 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3
  - Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3
  - Measure: Number/Plans

**Threat 4 - Lack of planning**

- Actions:
- Data collection and analysis. Rank: 2
  - Measure: Number

**Threat 5 - Other; Potential oil spills**

- Actions:
- Compliance and enforcement. Rank: 2
  - Measure: Number/Interventions/Cases
  - Legislation. Rank: 2
  - Measure: Number

**Yellow-crowned Night Heron**

**Island Birds**

*Nyctanassa violacea*

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**Threat 1 - Invasive and other problematic species and genes; Introduction of predators to predator free islands**

- Actions:
- Species management; Prevent introduction of predators. Rank: 3
  - Measure: Projects/Plans
  - Site/area management; Maintain forest/shrub habitat on nesting islands. Rank: 2
  - Measure: Acres/Sites/Miles
  - Invasive/problematic species control; Control spread of phragmites in marshes and wetlands that are foraging habitat. Rank: 2
  - Measure: Acres/Sites/Projects

**Threat 2 - Recreational activities; Increased human disturbance of nesting habitat and foraging sites**

- Actions:
- Awareness and communications; Educate public about disturbance factors. Rank: 2
  - Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 2
  - Measure: Number/Plans

**Threat 3 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3
  - Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3
  - Measure: Number/Plans

**Threat 4 - Lack of planning**

- Actions:
- Data collection and analysis. Rank: 2
  - Measure: Number

**Threat 5 - Other; Potential oil spills**

- Actions:
- Compliance and enforcement. Rank: 2
  - Measure: Number/Interventions/Cases
  - Legislation. Rank: 2
  - Measure: Number

**Threat 1 - Residential and commercial development; Fragmentation of forest habitat for key species breeding areas**

- Actions:
- *Land/water protection; Conserve forest habitat especially during key breeding season. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Manage forest habitat for breeding season. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Natural system modifications; Loss of stopover habitat during migration**

- Actions:
- *Land/water management; Manage for stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection; Conserve stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 3 - Problematic native species; Deer browsing**

- Actions:
- *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 4 - Housing and urban areas; Urbanization**

- Actions:
- *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 1 - Residential and commercial development; Fragmentation of forest habitat for key species breeding areas**

- Actions:
- *Land/water protection; Conserve forest habitat especially during key breeding season. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Manage forest habitat for breeding season. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Natural system modifications; Loss of stopover habitat during migration**

- Actions:
- *Land/water management; Manage for stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection; Conserve stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*

- Measure: Acres/Sites/Miles
- Education and awareness. Rank: 2
- Measure: Number

**Threat 3 - Problematic native species; Deer browsing**

- Actions:
- Site/area management. Rank: 3
  - Measure: Acres/Sites/Miles

**Threat 4 - Housing and urban areas; Urbanization**

- Actions:
- Site/area protection. Rank: 3
  - Measure: Acres/Sites/Miles

**Rose-breasted Grosbeak**

*Pheucticus ludovicianus*

**Forest Edge Birds**

**Threat 1 - Residential and commercial development; Fragmentation of forest habitat for key species breeding areas**

- Actions:
- Land/water protection; Conserve forest habitat especially during key breeding season. Rank: 3
  - Measure: Acres/Sites/Miles
  - Land/water management; Manage forest habitat for breeding season. Rank: 3
  - Measure: Acres/Sites/Projects
  - Resource and habitat protection. Rank: 3
  - Measure: Acres/Sites/Miles
  - Site/area management. Rank: 3
  - Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2
  - Measure: Number

**Threat 2 - Natural system modifications; Loss of stopover habitat during migration**

- Actions:
- Land/water management; Manage for stopover habitat. Rank: 3
  - Measure: Acres/Sites/Projects
  - Land/water protection; Conserve stopover habitat. Rank: 3
  - Measure: Acres/Sites/Miles
  - Resource and habitat protection. Rank: 3
  - Measure: Acres/Sites/Miles
  - Site/area management. Rank: 3
  - Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2
  - Measure: Number

**Threat 3 - Problematic native species; Deer browsing**

- Actions:
- Site/area management. Rank: 3
  - Measure: Acres/Sites/Miles

**Threat 4 - Housing and urban areas; Urbanization**

- Actions:
- Site/area protection. Rank: 3
  - Measure: Acres/Sites/Miles

**Yellow-throated Vireo**

*Vireo flavifrons*

**Forest Edge Birds**

**Threat 1 - Residential and commercial development; Fragmentation of forest habitat for key species breeding areas**

- Actions:
- Land/water protection; Conserve forest habitat especially during key breeding season. Rank: 3
  - Measure: Acres/Sites/Miles
  - Land/water management; Manage forest habitat for breeding season. Rank: 3
  - Measure: Acres/Sites/Projects
  - Resource and habitat protection. Rank: 3
  - Measure: Acres/Sites/Miles

- *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Natural system modifications; Loss of stopover habitat during migration**

- Actions:
- *Land/water management; Manage for stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection; Conserve stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 3 - Problematic native species; Deer browsing**

- Actions:
- *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 4 - Housing and urban areas; Urbanization**

- Actions:
- *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles

## BIRDS

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### Cerulean Warbler

*Setophaga cerulea*

### Mature Forest Interior Birds

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**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number
  - *Land/water protection; Need large stands of mature trees. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Need large stands of mature trees. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Education and awareness; Need large stands of mature trees. Rank: 2*  
- Measure: Number

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands; includes development and human impacts (ATV, etc.)**

- Actions:
- *Site/area protection; Work with state and local non profits and federal partners to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

### Hairy Woodpecker

*Picoides villosus*

### Mature Forest Interior Birds

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**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles

- *Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Awareness and communications; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number
- *Land/water protection; Need large stands of mature trees. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Land/water management; Need large stands of mature trees. Rank: 3*  
- Measure: Acres/Sites/Projects
- *Education and awareness; Need large stands of mature trees. Rank: 2*  
- Measure: Number

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands; includes development and human impacts (ATV, etc.)**

- Actions:
- *Site/area protection; Work with state and local non profits and federal partners to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Northern Goshawk**

*Accipiter gentilis*

**Mature Forest Interior Birds**

**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number
  - *Land/water protection; Need large stands of mature trees. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Need large stands of mature trees. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Education and awareness; Need large stands of mature trees. Rank: 2*  
- Measure: Number

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands; includes development and human impacts (ATV, etc.)**

- Actions:
- *Site/area protection; Work with state and local non profits and federal partners to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Pileated Woodpecker**

*Dryocopus pileatus*

**Mature Forest Interior Birds**

**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number
  - *Land/water management; Need large stands of mature trees. Rank: 3*

- Measure: 1
- Education and awareness; Need large stands of mature trees. Rank: 2  
- Measure: Acres/Sites/Projects

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands; Including development and human impacts**

- Actions:
- Site/area protection; Work with state and local non profits and federal partners to conserve suitable habitat; includes development and human impacts (ATV, etc.). Rank: 3  
- Measure: Acres/Sites/Miles
  - Land/water management. Rank: 2  
- Measure: Acres/Sites/Projects
  - Education and awareness. Rank: 2  
- Measure: Number

**Scarlet Tanager**

*Piranga olivacea*

**Mature Forest Interior Birds**

**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- Site/area management; Maintain mature forest stands. Rank: 3  
- Measure: Acres/Sites/Miles
  - Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles
  - Awareness and communications; Education of landowners about appropriate land management . Rank: 2  
- Measure: Number
  - Land/water protection; Need large stands of mature trees. Rank: 3  
- Measure: Acres/Sites/Miles
  - Land/water management; Need large stands of mature trees. Rank: 3  
- Measure: Acres/Sites/Projects
  - Education and awareness; Need large stands of mature trees. Rank: 2  
- Measure: Number

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands; includes development and human impacts (ATV, etc.)**

- Actions:
- Site/area protection; Work with state and local non profits and federal partners to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles

**Threat 3 - Natural system modifications; Loss of stopover habitat during migration**

- Actions:
- Land/water management; Manage for stopover habitat. Rank: 3  
- Measure: Acres/Sites/Projects
  - Land/water protection; Conserve stopover habitat. Rank: 3  
- Measure: Acres/Sites/Miles

**BIRDS**

**Acadian Flycatcher**

*Empidonax virescens*

**Forest Interior Understory Birds**

**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- Site/area management; Maintain mature forest stands. Rank: 3  
- Measure: Acres/Sites/Miles
  - Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management . Rank: 2

- Measure: Number

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

- Actions: • *Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

**Threat 3 - Human intrusions and disturbance; Loss of stopover habitat**

- Actions: • *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Black-and-white Warbler**

*Mniotilta varia*

**Forest Interior Understory Birds**

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**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions: • *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

- Actions: • *Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

**Threat 3 - Human intrusions and disturbance; Loss of stopover habitat**

- Actions: • *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Black-throated Blue Warbler**

*Setophaga caerulescens*

**Forest Interior Understory Birds**

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**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions: • *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

- Actions: • *Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

**Threat 3 - Human intrusions and disturbance; Loss of stopover habitat**

- Actions: • *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Site/area management. Rank: 3*

- Measure: Acres/Sites/Miles
- Education and awareness. Rank: 2
  - Measure: Number

## Hooded Warbler

*Setophaga citrina*

## Forest Interior Understory Birds

### Threat 1 - Natural system modifications; Loss of mature forest

- Actions:
- Site/area management; Maintain mature forest stands. Rank: 3
    - Measure: Acres/Sites/Miles
  - Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management . Rank: 2
    - Measure: Number

### Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands

- Actions:
- Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 2
    - Measure: Acres/Sites/Miles

### Threat 3 - Human intrusions and disturbance; Loss of stopover habitat

- Actions:
- Resource and habitat protection. Rank: 3
    - Measure: Acres/Sites/Miles
  - Site/area management. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2
    - Measure: Number

## Veery

*Catharus fuscescens*

## Forest Interior Understory Birds

### Threat 1 - Natural system modifications; Loss of mature forest

- Actions:
- Site/area management; Maintain mature forest stands. Rank: 3
    - Measure: Acres/Sites/Miles
  - Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management . Rank: 2
    - Measure: Number

### Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands

- Actions:
- Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 2
    - Measure: Acres/Sites/Miles

### Threat 3 - Human intrusions and disturbance; Loss of stopover habitat

- Actions:
- Resource and habitat protection. Rank: 3
    - Measure: Acres/Sites/Miles
  - Site/area management. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2
    - Measure: Number

## Wood Thrush

*Hylocichla mustelina*

## Forest Interior Understory Birds

### **Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number

### **Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

- Actions:
- *Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

### **Threat 3 - Human intrusions and disturbance; Loss of stopover habitat**

- Actions:
- *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

## **BIRDS**

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### **Blackburnian Warbler**

*Setophaga fusca*

### **Forest Interior Conifer Birds**

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#### **Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects

#### **Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

- Actions:
- *Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

#### **Threat 3 - Residential and commercial development; Loss of stopover habitat**

- Actions:
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects

### **Blue-headed Vireo**

*Vireo solitarius*

### **Forest Interior Conifer Birds**

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#### **Threat 1 - Natural system modifications; Loss of mature forest**

- Actions:
- *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Work with state and local non profits to conserve suitable*

habitat. Rank: 3  
- Measure: Acres/Sites/Miles

- Education and awareness; Education of landowners about appropriate land management . Rank: 2  
- Measure: Number
- Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles
- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

Actions: • Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles

**Threat 3 - Residential and commercial development; Loss of stopover habitat**

Actions: • Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles

- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects

**Least Flycatcher**

*Empidonax minimus*

**Forest Interior Conifer Birds**

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**Threat 1 - Natural system modifications; Loss of mature forest**

Actions: • Site/area management; Maintain mature forest stands. Rank: 3  
- Measure: Acres/Sites/Miles

- Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles
- Education and awareness; Education of landowners about appropriate land management . Rank: 2  
- Measure: Number
- Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles
- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

Actions: • Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles

**Threat 3 - Residential and commercial development; Loss of stopover habitat**

Actions: • Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles

- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects

**Purple Finch**

*Haemorhous purpureus*

**Forest Interior Conifer Birds**

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**Threat 1 - Natural system modifications; Loss of mature forest**

Actions: • Site/area management; Maintain mature forest stands. Rank: 3  
- Measure: Acres/Sites/Miles

- Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles
- Education and awareness; Education of landowners about appropriate land management . Rank: 2

- Measure: Number
- Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles
- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

- Actions: • Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles

**Threat 3 - Residential and commercial development; Loss of stopover habitat**

- Actions: • Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles
- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects

**Yellow-rumped Warbler**

*Setophaga coronata*

**Forest Interior Conifer Birds**

**Threat 1 - Natural system modifications; Loss of mature forest**

- Actions: • Site/area management; Maintain mature forest stands. Rank: 3  
- Measure: Acres/Sites/Miles
- Resource and habitat protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management . Rank: 2  
- Measure: Number
  - Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles
  - Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects

**Threat 2 - Housing and urban areas; Impacts of urbanization on mature stands**

- Actions: • Site/area protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
- Measure: Acres/Sites/Miles

**Threat 3 - Residential and commercial development; Loss of stopover habitat**

- Actions: • Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles
- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects

**BIRDS**

**Canada Warbler**

*Cardellina canadensis*

**Forest Interior Wetlands Birds**

**Threat 1 - Residential and commercial development; Loss of breeding and stopover habitats**

- Actions: • Resource and habitat protection. Rank: 3  
- Measure: Acres/Sites/Miles
- Land/water management; Manage forest habitat for breeding season. Rank: 3  
- Measure: Acres/Sites/Projects
  - Site/area management. Rank: 3  
- Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2  
- Measure: Number

**Threat 2 - Agriculture and aquaculture; Loss of breeding and stopover habitats**

- Actions:
- *Land/water protection; Manage for shrub stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Conserve stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 3 - Pollution; Habitat degradation from impairment of water quality**

- Actions:
- *Data collection and analysis; Assess effects of sedimentation. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of stream bank disturbance. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of water withdrawals. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Evaluate water quality effects on priority species. Rank: 2*  
- Measure: Number
  - *Planning; Develop strategies to mitigate aquatic degradation. Rank: 2*  
- Measure: Number

**Threat 4 - Housing and urban areas; Impacts of urbanization**

- Actions:
- *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Northern Parula**

*Setophaga americana*

**Forest Interior Wetlands Birds**

**Threat 1 - Natural system modifications; Loss of breeding and stopover habitats**

- Actions:
- *Site/area management; Maintain mature forest stands. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Work with state and local non profits and federal entities to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management . Rank: 2*  
- Measure: Number
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects

**Threat 2 - Residential and commercial development; Loss of breeding and stopover habitats**

- Actions:
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 3 - Pollution; Habitat degradation from impairment of water quality**

- Actions:
- *Data collection and analysis; Assess effects of sedimentation. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of stream bank disturbance. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of water withdrawals. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Evaluate water quality effects on priority species. Rank: 2*  
- Measure: Number

- *Planning; Develop strategies to mitigate aquatic degradation. Rank: 2*  
- Measure: Number

#### **Threat 4 - Housing and urban areas; Impacts of urbanization**

- Actions:
- *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles

### **Northern Waterthrush**

*Parkesia noveboracensis*

### **Forest Interior Wetlands Birds**

#### **Threat 1 - Residential and commercial development; Loss of breeding and stopover habitats**

- Actions:
- *Land/water protection; Conserve forest habitat especially during key breeding season. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Manage forest habitat for breeding and stopover season. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

#### **Threat 2 - Natural system modifications; Loss of shrub stopover habitat during migration and loss of breeding habitat**

- Actions:
- *Land/water management; Manage for shrub stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection; Conserve stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

#### **Threat 3 - Pollution; Habitat degradation from impairment of water quality**

- Actions:
- *Data collection and analysis; Assess effects of sedimentation. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of stream bank disturbance. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of stream bank disturbance. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of water withdrawals. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Evaluate water quality effects on priority species. Rank: 2*  
- Measure: Number
  - *Planning; Develop strategies to mitigate aquatic degradation. Rank: 2*  
- Measure: Number

#### **Threat 4 - Residential and commercial development; Impacts of urbanization**

- Actions:
- *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles

### **Prothonotary Warbler**

*Protonotaria citrea*

### **Forest Interior Wetlands Birds**

#### **Threat 1 - Natural system modifications; Fragmentation of suitable nesting and breeding habitats**

- Actions:*
- *Land/water management; Conserve wet mature forest habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Residential and commercial development; Loss of breeding and stopover habitats**

- Actions:*
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 3 - Pollution; Habitat degradation from impairment of water quality**

- Actions:*
- *Data collection and analysis; Assess effects of sedimentation. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of stream bank disturbance. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Evaluate water quality effects on priority species. Rank: 2*  
- Measure: Number
  - *Planning; Develop strategies to mitigate aquatic degradation. Rank: 2*  
- Measure: Number

**Threat 4 - Housing and urban areas; Impacts of urbanization**

- Actions:*
- *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles

## BIRDS

### American Wigeon

*Anas americana*

### Freshwater Waterfowl

**Threat 1 - Residential and commercial development; Loss and disturbance of habitat**

- Actions:*
- *Site/area management; Minimize disturbance to habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 2 - Recreational activities; Disturbance to habitat due to human activities**

- Actions:*
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Private sector standards and codes; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 1*  
- Measure: Number

**Threat 3 - Natural system modifications; Habitat degradation**

- Actions:*
- *Invasive/problematic species control; Phragmites control. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Site/area management; Water quality improvement. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Improve water quality standards. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of foraging and nesting habitat due to climate change**

- Actions:*
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank:*

- Measure: Acres/Sites/Miles

- *Habitat and natural process restoration; Restoration of foraging and nesting habitat. Rank: 3*  
- Measure: Number/Plans

#### **Threat 5 - Household sewage and urban waste water**

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

#### **Threat 6 - Lack of information**

- Actions:
- *Data collection and analysis. Rank: 3*  
- Measure: Number

## **Canada Goose - Atlantic population**

*Branta canadensis*

## **Freshwater Waterfowl**

#### **Threat 1 - Residential and commercial development; Loss and disturbance of habitat**

- Actions:
- *Site/area management; Minimize disturbance to habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

#### **Threat 2 - Recreational activities; Disturbance to habitat due to human activities**

- Actions:
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Private sector standards and codes; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 1*  
- Measure: Number

#### **Threat 3 - Natural system modifications; Habitat degradation**

- Actions:
- *Invasive/problematic species control; Phragmites control. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Site/area management; Water quality improvement. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Improve water quality standards. Rank: 3*  
- Measure: Number/Plans

#### **Threat 4 - Habitat shifting and alteration; Loss of foraging and nesting habitat due to climate change**

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of foraging and nesting habitat. Rank: 3*  
- Measure: Number/Plans

#### **Threat 5 - Household sewage and urban waste water**

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

#### **Threat 6 - Lack of information**

- Actions:
- *Data collection and analysis. Rank: 3*  
- Measure: Number

#### **Threat 7 - Hunting and collecting terrestrial animals**

- Actions:
- *Education and awareness. Rank: 3*  
- Measure: Number
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Canada Goose - North Atlantic popula

*Branta canadensis*

## Freshwater Waterfowl

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### Threat 1 - Residential and commercial development; Loss and disturbance of habitat

- Actions:
- *Site/area management; Minimize disturbance to habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 2 - Recreational activities; Disturbance to habitat due to human activities

- Actions:
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Private sector standards and codes; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 1*  
- Measure: Number

### Threat 3 - Natural system modifications; Habitat degradation

- Actions:
- *Invasive/problematic species control; Phragmites control. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Site/area management; Water quality improvement. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Improve water quality standards. Rank: 3*  
- Measure: Number/Plans

### Threat 4 - Habitat shifting and alteration; Loss of foraging and nesting habitat due to climate change

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of foraging and nesting habitat. Rank: 3*  
- Measure: Number/Plans

### Threat 5 - Household sewage and urban waste water

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 6 - Lack of information

- Actions:
- *Data collection and analysis. Rank: 3*  
- Measure: Number

### Threat 7 - Hunting and collecting terrestrial animals

- Actions:
- *Education and awareness. Rank: 3*  
- Measure: Number
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Hooded Merganser

*Lophodytes cucullatus*

## Freshwater Waterfowl

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### Threat 1 - Residential and commercial development; Loss and disturbance of habitat

- Actions:
- *Site/area management; Minimize disturbance to habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 2 - Recreational activities; Disturbance to habitat due to human activities

- Actions:
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Private sector standards and codes; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 1*  
- Measure: Number

### Threat 3 - Natural system modifications; Habitat degradation

- Actions:
- *Invasive/problematic species control; Phragmites control. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Site/area management; Water quality improvement. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Improve water quality standards. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of foraging and nesting habitat due to climate change**

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of foraging and nesting habitat. Rank: 3*  
- Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 6 - Lack of information**

- Actions:
- *Data collection and analysis. Rank: 3*  
- Measure: Number

**Northern Pintail**

*Anas acuta*

**Freshwater Waterfowl**

**Threat 1 - Residential and commercial development; Loss and disturbance of habitat**

- Actions:
- *Site/area management; Minimize disturbance to habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 2 - Recreational activities; Disturbance to habitat due to human activities**

- Actions:
- *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
  - *Private sector standards and codes; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 1*  
- Measure: Number

**Threat 3 - Natural system modifications; Habitat degradation**

- Actions:
- *Invasive/problematic species control; Phragmites control. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Site/area management; Water quality improvement. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Improve water quality standards. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of foraging and nesting habitat due to climate change**

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of foraging and nesting habitat. Rank: 3*  
- Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 6 - Lack of information

- Actions: • *Data collection and analysis. Rank: 3*  
- Measure: Number

## Ruddy Duck

*Oxyura jamaicensis*

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## Freshwater Waterfowl

### Threat 1 - Residential and commercial development; Loss and disturbance of habitat

- Actions: • *Site/area management; Minimize disturbance to habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 2 - Recreational activities; Disturbance to habitat due to human activities

- Actions: • *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
- *Private sector standards and codes; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 1*  
- Measure: Number

### Threat 3 - Natural system modifications; Habitat degradation

- Actions: • *Invasive/problematic species control; Phragmites control. Rank: 2*  
- Measure: Acres/Sites/Projects
- *Site/area management; Water quality improvement. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Improve water quality standards. Rank: 3*  
- Measure: Number/Plans

### Threat 4 - Habitat shifting and alteration; Loss of foraging and nesting habitat due to climate change

- Actions: • *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Habitat and natural process restoration; Restoration of foraging and nesting habitat. Rank: 3*  
- Measure: Number/Plans

### Threat 5 - Household sewage and urban waste water

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 6 - Lack of information

- Actions: • *Data collection and analysis. Rank: 3*  
- Measure: Number

## Wood Duck

*Aix sponsa*

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## Freshwater Waterfowl

### Threat 1 - Residential and commercial development; Loss and disturbance of habitat

- Actions: • *Site/area management; Minimize disturbance to habitat or maximize drawdown and impoundment management. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 2 - Recreational activities; Disturbance to habitat due to human activities

- Actions: • *Awareness and communications; Educate public about disturbance factors. Rank: 2*  
- Measure: Number
- *Private sector standards and codes; Policy regulations on buffer zones and land use or enforcement of existing policies including wetland buffer. Rank: 1*  
- Measure: Number

### Threat 3 - Natural system modifications; Habitat degradation

- Actions: • *Invasive/problematic species control; Phragmites control. Rank: 2*

- Measure: Acres/Sites/Projects
- Site/area management; Water quality improvement; Maximize drawdown and impoundment management. Rank: 3
  - Measure: Acres/Sites/Miles
- Policies and regulations; Improve water quality standards. Rank: 3
  - Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of foraging and nesting habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3
    - Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of foraging and nesting habitat. Rank: 3
    - Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- Policies and regulations. Rank: 3
    - Measure: Number/Plans
  - Land/water protection. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2
    - Measure: Number

**Threat 6 - Lack of information**

- Actions:
- Data collection and analysis. Rank: 3
    - Measure: Number

## BIRDS

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### Barn Owl

*Tyto alba*

### Grassland Birds

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**Threat 1 - Natural system modifications; Loss of early successional habitat**

- Actions:
- Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3
    - Measure: Number/Plans
  - Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3
    - Measure: Acres/Sites/Miles
  - Resource and habitat protection. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2
    - Measure: Number
  - Species management; Educate landowners about barns for nesting sites. Rank: 3
    - Measure: Projects/Plans

**Threat 2 - Residential and commercial development; Loss of early successional habitat due to development**

- Actions:
- Land/water protection; Conserve early successional habitat. Rank: 3
    - Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning**

- Actions:
- Data collection and analysis. Rank: 2
    - Measure: Number

### Bobolink

*Dolichonyx oryzivorus*

### Grassland Birds

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**Threat 1 - Natural system modifications; Loss of early successional habitat**

- Actions:
- Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3
    - Measure: Number/Plans

- *Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Residential and commercial development; Loss of early successional habitat due to development**

- Actions:*
- *Land/water protection; Conserve early successional habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning**

- Actions:*
- *Data collection and analysis. Rank: 2*  
- Measure: Number

**Eastern Meadowlark**

*Sturnella magna*

**Grassland Birds**

**Threat 1 - Natural system modifications; Loss of early successional habitat**

- Actions:*
- *Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Residential and commercial development; Loss of early successional habitat due to development**

- Actions:*
- *Land/water protection; Conserve early successional habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning**

- Actions:*
- *Data collection and analysis. Rank: 2*  
- Measure: Number

**Grasshopper Sparrow**

*Ammodramus savannarum*

**Grassland Birds**

**Threat 1 - Natural system modifications; Loss of early successional habitat**

- Actions:*
- *Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Residential and commercial development; Loss of early successional habitat due to development**

- Actions:*
- *Land/water protection; Conserve early successional habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning**

- Actions:*
- *Data collection and analysis. Rank: 2*

## Horned Lark

*Eremophila alpestris*

## Grassland Birds

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### Threat 1 - Natural system modifications; Loss of early successional habitat

- Actions:
- *Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 2 - Residential and commercial development; Loss of early successional habitat due to development

- Actions:
- *Land/water protection; Conserve early successional habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis. Rank: 2*  
- Measure: Number

## Northern Flicker

*Colaptes auratus*

## Grassland Birds

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### Threat 1 - Natural system modifications; Loss of early successional habitat

- Actions:
- *Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 2 - Residential and commercial development; Loss of early successional habitat due to development

- Actions:
- *Land/water protection; Conserve early successional habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis. Rank: 2*  
- Measure: Number

## Northern Harrier

*Circus cyaneus*

## Grassland Birds

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### Threat 1 - Natural system modifications; Loss of early successional habitat

- Actions:
- *Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*

- Measure: Acres/Sites/Miles
- Resource and habitat protection. Rank: 3
  - Measure: Acres/Sites/Miles
- Education and awareness. Rank: 2
  - Measure: Number

**Threat 2 - Residential and commercial development; Loss of early successional habitat due to development**

- Actions: • Land/water protection; Conserve early successional habitat. Rank: 3  
 - Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning**

- Actions: • Data collection and analysis. Rank: 2  
 - Measure: Number

**Savannah Sparrow**

*Passerculus sandwichensis*

**Grassland Birds**

**Threat 1 - Natural system modifications; Loss of early successional habitat**

- Actions: • Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3  
 - Measure: Number/Plans
- Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
 - Measure: Acres/Sites/Miles
- Resource and habitat protection. Rank: 3  
 - Measure: Acres/Sites/Miles
- Education and awareness. Rank: 2  
 - Measure: Number

**Threat 2 - Residential and commercial development; Loss of early successional habitat due to development**

- Actions: • Land/water protection; Conserve early successional habitat. Rank: 3  
 - Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning**

- Actions: • Data collection and analysis. Rank: 2  
 - Measure: Number

**Short-eared Owl**

*Asio flammeus*

**Grassland Birds**

**Threat 1 - Natural system modifications; Loss of early successional habitat**

- Actions: • Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3  
 - Measure: Number/Plans
- Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3  
 - Measure: Acres/Sites/Miles
- Resource and habitat protection. Rank: 3  
 - Measure: Acres/Sites/Miles
- Education and awareness. Rank: 2  
 - Measure: Number

**Threat 2 - Residential and commercial development; Loss of early successional habitat due to development**

- Actions: • Land/water protection; Conserve early successional habitat. Rank: 3  
 - Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning**

- Actions: • Data collection and analysis. Rank: 2  
 - Measure: Number

# BIRDS

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## Black-bellied Plover

*Pluvialis squatarola*

## Intertidal and Mudflat Birds

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### Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

### Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

### Threat 4 - Other; Potential oil spill

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Dunlin

*Calidris alpina*

## Intertidal and Mudflat Birds

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### Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

### Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

### Threat 4 - Other; Potential oil spill

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Greater Yellowlegs

*Tringa melanoleuca*

## Intertidal and Mudflat Birds

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### Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

### Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

### Threat 4 - Other; Potential oil spill

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Least Sandpiper

*Calidris minutilla*

## Intertidal and Mudflat Birds

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### Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

### Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

### Threat 4 - Other; Potential oil spill

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Purple Sandpiper

*Calidris maritima*

## Intertidal and Mudflat Birds

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### Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

### Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

### Threat 4 - Other; Potential oil spill

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Red Knot

*Calidris canutus*

## Intertidal and Mudflat Birds

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### Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

### Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

### Threat 4 - Other; Potential oil spill

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Roseate Tern

*Sterna dougallii*

## Intertidal and Mudflat Birds

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**Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites**

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

**Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise**

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

**Threat 3 - Lack of planning**

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

**Threat 4 - Other; Potential oil spill**

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

**Threat 5 - Natural system modifications; Loss of sand lance, which is primary prey**

- Actions:
- *Species management; Develop management plan for sand lance. Rank: 3*  
- Measure: Projects/Plans

**Ruddy Turnstone**

*Arenaria interpres*

**Intertidal and Mudflat Birds**

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**Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites**

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

**Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise**

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

**Threat 3 - Lack of planning**

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

**Threat 4 - Other; Potential oil spill**

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

**Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites**

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

**Threat 2 - Other; Loss of stop over sites due to sea level rise**

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

**Threat 3 - Lack of planning**

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

**Threat 4 - Other; Potential oil spill**

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

**Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites**

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

**Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise**

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

**Threat 3 - Lack of planning**

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

**Threat 4 - Other; Potential oil spill**

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

**Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites**

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

**Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise**

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

**Threat 3 - Lack of planning**

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

**Threat 4 - Other; Potential oil spill**

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

**Short-billed Dowitcher***Limnodromus griseus***Intertidal and Mudflat Birds****Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites**

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Protect stopover sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Educate public about the importance of stopover sites. Rank: 2*  
- Measure: Number

**Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise**

- Actions:
- *Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2*  
- Measure: Number

**Threat 3 - Lack of planning**

- Actions:
- *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*  
- Measure: Number

**Threat 4 - Other; Potential oil spill**

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

**White-rumped Sandpiper***Calidris fuscicollis***Intertidal and Mudflat Birds****Threat 1 - Recreational activities; Increased human disturbance at stopover migration sites**

- Actions:
- *Site/area management; Minimize human disturbance at stopover sites. Rank: 3*

- Measure: Acres/Sites/Miles
- Site/area protection; Protect stopover sites. Rank: 3
  - Measure: Acres/Sites/Miles
- Awareness and communications; Educate public about the importance of stopover sites. Rank: 2
  - Measure: Number

**Threat 2 - Habitat shifting and alteration; Loss of stop over sites due to sea level rise**

- Actions:
- Site/area protection; Land protection to allow for stop over foraging habitat migration. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management regarding mitigation of sea level rise on coastal property. Rank: 2
    - Measure: Number

**Threat 3 - Lack of planning**

- Actions:
- Data collection and analysis; Initiate monitoring of primary resources. Rank: 2
    - Measure: Number

**Threat 4 - Other; Potential oil spill**

- Actions:
- Policies and regulations. Rank: 2
    - Measure: Number/Plans
  - Compliance and enforcement. Rank: 2
    - Measure: Number/Interventions/Cases

## BIRDS

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**Atlantic Brant**

*Branta bernicla*

**Marine Bay and Estuary Birds**

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**Threat 1 - Lack of information**

- Actions:
- Data collection and analysis. Rank: 3
    - Measure: Number

**Threat 2 - Human intrusions and disturbance; Loss of wintering habitat**

- Actions:
- Education and awareness. Rank: 2
    - Measure: Number
  - Land/water protection. Rank: 3
    - Measure: Acres/Sites/Miles

**Threat 3 - Invasive non-native/alien species**

- Actions:
- Invasive/problematic species control. Rank: 3
    - Measure: Acres/Sites/Projects
  - Species management. Rank: 2
    - Measure: Projects/Plans
  - Education and awareness. Rank: 2
    - Measure: Number

**Threat 4 - Hunting and collecting terrestrial animals**

- Actions:
- Education and awareness. Rank: 3
    - Measure: Number
  - Compliance and enforcement. Rank: 2
    - Measure: Number/Interventions/Cases

**Canvasback**

*Aythya valisineria*

**Marine Bay and Estuary Birds**

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**Threat 1 - Lack of information**

- Actions:
- Data collection and analysis. Rank: 3
    - Measure: Number

**Threat 2 - Human intrusions and disturbance; Loss of wintering habitat**

- Actions:
- *Education and awareness. Rank: 2*  
- Measure: Number
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive non-native/alien species**

- Actions:
- *Invasive/problematic species control. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Species management. Rank: 2*  
- Measure: Projects/Plans
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Greater Scaup**

*Aythya marila*

**Marine Bay and Estuary Birds**

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**Threat 1 - Lack of information**

- Actions:
- *Data collection and analysis. Rank: 3*  
- Measure: Number

**Threat 2 - Human intrusions and disturbance; Loss of wintering habitat**

- Actions:
- *Education and awareness. Rank: 2*  
- Measure: Number
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive non-native/alien species**

- Actions:
- *Invasive/problematic species control. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Species management. Rank: 2*  
- Measure: Projects/Plans
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Lesser Scaup**

*Aythya affinis*

**Marine Bay and Estuary Birds**

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**Threat 1 - Lack of information**

- Actions:
- *Data collection and analysis. Rank: 3*  
- Measure: Number

**Threat 2 - Human intrusions and disturbance; Loss of wintering habitat**

- Actions:
- *Education and awareness. Rank: 2*  
- Measure: Number
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive non-native/alien species**

- Actions:
- *Invasive/problematic species control. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Species management. Rank: 2*  
- Measure: Projects/Plans
  - *Education and awareness. Rank: 2*  
- Measure: Number

## Black Scoter

*Melanitta americana*

## Marine Inshore Birds

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### Threat 1 - Lack of information; Population data needed

- Actions: • *Data collection and analysis. Rank: 3*  
- Measure: Number

### Threat 2 - Renewable energy; Wind turbines

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Pollution; Specifically oil

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 4 - Fishing and harvesting aquatic resources; By-catch

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 5 - Human intrusions and disturbance

- Actions: • *Site/area management. Rank: 2*  
- Measure: Acres/Sites/Miles

### Threat 6 - Habitat shifting and alteration; Due to climate change

- Actions: • *Site/area protection. Rank: 2*  
- Measure: Acres/Sites/Miles

### Threat 7 - Hunting and collecting terrestrial animals; Adult survival threatened

- Actions: • *Education and awareness. Rank: 3*  
- Measure: Number
- *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases

## Bufflehead

*Bucephala albeola*

## Marine Inshore Birds

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### Threat 1 - Lack of information; Population data needed

- Actions: • *Data collection and analysis. Rank: 3*  
- Measure: Number

### Threat 2 - Renewable energy; Wind turbines

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Pollution; Specifically oil

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 4 - Fishing and harvesting aquatic resources; By-catch

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 5 - Human intrusions and disturbance

- Actions: • *Site/area management. Rank: 2*  
- Measure: Acres/Sites/Miles

### Threat 6 - Habitat shifting and alteration; Due to climate change

- Actions: • *Site/area protection. Rank: 2*  
- Measure: Acres/Sites/Miles

## Common Eider

*Somateria mollissima*

## Marine Inshore Birds

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### Threat 1 - Lack of information; Population data needed

- Actions: • *Data collection and analysis. Rank: 3*

- Measure: Number

**Threat 2 - Renewable energy; Wind turbines**

Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Pollution; Specifically oil**

Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Fishing and harvesting aquatic resources; By-catch**

Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 5 - Human intrusions and disturbance**

Actions: • Site/area management. Rank: 2  
- Measure: Acres/Sites/Miles

**Threat 6 - Habitat shifting and alteration; Due to climate change**

Actions: • Site/area protection. Rank: 2  
- Measure: Acres/Sites/Miles

**Common Goldeneye**

*Bucephala clangula*

**Marine Inshore Birds**

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**Threat 1 - Lack of information; Population data needed**

Actions: • Data collection and analysis. Rank: 3  
- Measure: Number

**Threat 2 - Renewable energy; Wind turbines**

Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Pollution; Specifically oil**

Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Fishing and harvesting aquatic resources; By-catch**

Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 5 - Human intrusions and disturbance**

Actions: • Site/area management. Rank: 2  
- Measure: Acres/Sites/Miles

**Threat 6 - Habitat shifting and alteration; Due to climate change**

Actions: • Site/area protection. Rank: 2  
- Measure: Acres/Sites/Miles

**Common Loon**

*Gavia immer*

**Marine Inshore Birds**

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**Threat 1 - Lack of information; Population data needed**

Actions: • Data collection and analysis. Rank: 3  
- Measure: Number

**Threat 2 - Renewable energy; Wind turbines**

Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Pollution; Specifically oil**

Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Fishing and harvesting aquatic resources; By-catch**

Actions: • Policies and regulations. Rank: 3

- Measure: Number/Plans

**Threat 5 - Human intrusions and disturbance**

- Actions: • Site/area management. Rank: 2  
- Measure: Acres/Sites/Miles

**Harlequin Duck**

*Histrionicus histrionicus*

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**Marine Inshore Birds**

**Threat 1 - Lack of information; Population data needed**

- Actions: • Data collection and analysis. Rank: 3  
- Measure: Number

**Threat 2 - Renewable energy; Wind turbines**

- Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Pollution; Specifically oil**

- Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Fishing and harvesting aquatic resources; By-catch**

- Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 5 - Human intrusions and disturbance**

- Actions: • Site/area management. Rank: 2  
- Measure: Acres/Sites/Miles

**Threat 6 - Habitat shifting and alteration; Due to climate change**

- Actions: • Site/area protection. Rank: 2  
- Measure: Acres/Sites/Miles

**Horned Grebe**

*Podiceps auritus*

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**Marine Inshore Birds**

**Threat 1 - Lack of information; Population data needed**

- Actions: • Data collection and analysis. Rank: 3  
- Measure: Number

**Threat 2 - Renewable energy; Wind turbines**

- Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Pollution; Specifically oil**

- Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Fishing and harvesting aquatic resources; By-catch**

- Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Red-breasted Merganser**

*Mergus serrator*

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**Marine Inshore Birds**

**Threat 1 - Lack of information; Population data needed**

- Actions: • Data collection and analysis. Rank: 3  
- Measure: Number

**Threat 2 - Renewable energy; Wind turbines**

- Actions: • Policies and regulations. Rank: 3  
- Measure: Number/Plans

### **Threat 3 - Pollution; Specifically oil**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: *Number/Plans*

### **Threat 4 - Fishing and harvesting aquatic resources; By-catch**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: *Number/Plans*

### **Threat 5 - Human intrusions and disturbance**

- Actions: • *Site/area management. Rank: 2*  
- Measure: *Acres/Sites/Miles*

### **Threat 6 - Habitat shifting and alteration; Due to climate change**

- Actions: • *Site/area protection. Rank: 2*  
- Measure: *Acres/Sites/Miles*

## **Surf Scoter**

*Melanitta perspicillata*

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## **Marine Inshore Birds**

### **Threat 1 - Lack of information; Population data needed**

- Actions: • *Data collection and analysis. Rank: 3*  
- Measure: *Number*

### **Threat 2 - Renewable energy; Wind turbines**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: *Number/Plans*

### **Threat 3 - Pollution; Specifically oil**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: *Number/Plans*

### **Threat 4 - Fishing and harvesting aquatic resources; By-catch**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: *Number/Plans*

### **Threat 5 - Human intrusions and disturbance**

- Actions: • *Site/area management. Rank: 2*  
- Measure: *Acres/Sites/Miles*

### **Threat 6 - Habitat shifting and alteration; Due to climate change**

- Actions: • *Site/area protection. Rank: 2*  
- Measure: *Acres/Sites/Miles*

## **White-winged Scoter**

*Melanitta deglandi*

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## **Marine Inshore Birds**

### **Threat 1 - Lack of information; Population data needed**

- Actions: • *Data collection and analysis. Rank: 3*  
- Measure: *Number*

### **Threat 2 - Renewable energy; Wind turbines**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: *Number/Plans*

### **Threat 3 - Pollution; Specifically oil**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: *Number/Plans*

### **Threat 4 - Fishing and harvesting aquatic resources; By-catch**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: *Number/Plans*

### **Threat 5 - Human intrusions and disturbance**

- Actions: • *Site/area management. Rank: 2*  
- Measure: *Acres/Sites/Miles*

## Threat 6 - Habitat shifting and alteration; Due to climate change

- Actions: • *Site/area protection. Rank: 2*  
- Measure: Acres/Sites/Miles

# BIRDS

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## Cory's Shearwater

*Calonectris diomedea*

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## Marine Pelagic Birds

### Threat 1 - Industrial and military effluents; Oil pollution

- Actions: • *Policies and regulations; Double-hulled barges. Rank: 2*  
- Measure: Number/Plans

### Threat 2 - Renewable energy; Wind energy

- Actions: • *Policies and regulations; Proper placement. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Fishing and harvesting aquatic resources; By-catch

- Actions: • *Policies and regulations. Rank: 2*  
- Measure: Number/Plans

## Great Shearwater

*Puffinus gravis*

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## Marine Pelagic Birds

### Threat 1 - Industrial and military effluents; Oil pollution

- Actions: • *Policies and regulations; Double-hulled barges. Rank: 2*  
- Measure: Number/Plans

### Threat 2 - Renewable energy; Wind energy

- Actions: • *Policies and regulations; Proper placement. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Fishing and harvesting aquatic resources; By-catch

- Actions: • *Policies and regulations. Rank: 2*  
- Measure: Number/Plans

## Northern Gannet

*Morus bassanus*

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## Marine Pelagic Birds

### Threat 1 - Industrial and military effluents; Oil pollution

- Actions: • *Policies and regulations; Double-hulled barges. Rank: 2*  
- Measure: Number/Plans

### Threat 2 - Renewable energy; Wind energy

- Actions: • *Policies and regulations; Proper placement. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Pollution; Habitat degradation from impairment of water quality

- Actions: • *Data collection and analysis; Assess effects of sedimentation. Rank: 2*  
- Measure: Number
- *Data collection and analysis; Assess effects of stream bank disturbance. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Assess effects of water withdrawals. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Evaluate water quality effects on priority species. Rank: 2*  
- Measure: Number
  - *Planning; Develop strategies to mitigate aquatic degradation. Rank: 2*  
- Measure: Number

### Threat 4 - Housing and urban areas; Impacts of urbanization

- Actions:
- *Site/area protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles

## Razorbill

*Alca torda*

## Marine Pelagic Birds

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### Threat 1 - Industrial and military effluents; Oil pollution

- Actions:
- *Policies and regulations; Double-hulled barges. Rank: 2*  
- Measure: Number/Plans

### Threat 2 - Renewable energy; Wind energy

- Actions:
- *Policies and regulations; Proper placement. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Fishing and harvesting aquatic resources; By-catch

- Actions:
- *Policies and regulations. Rank: 2*  
- Measure: Number/Plans

### Threat 4 - Lack of information

- Actions:
- *Data collection and analysis. Rank: 2*  
- Measure: Number

## Red-throated Loon

*Gavia stellata*

## Marine Pelagic Birds

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### Threat 1 - Lack of information; Population data needed

- Actions:
- *Data collection and analysis. Rank: 3*  
- Measure: Number

### Threat 2 - Renewable energy; Wind turbines

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Pollution; Specifically oil

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 4 - Fishing and harvesting aquatic resources; By-catch

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 5 - Human intrusions and disturbance

- Actions:
- *Site/area management. Rank: 2*  
- Measure: Acres/Sites/Miles

## BIRDS

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## King Rail

*Rallus elegans*

## Freshwater Birds

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### Threat 1 - Invasive non-native/alien species; Increasing phragmites

- Actions:
- *Invasive/problematic species control; Control phragmites. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Habitat and natural process restoration; Restore treated areas to natural function. Rank: 2*  
- Measure: Number/Plans

### Threat 2 - Housing and urban areas; Disturbance to habitat due to development

- Actions:
- *Land/water protection; Work with state and nonprofits to conserve appropriate properties that contain habitat. Rank: 3*

- Measure: Acres/Sites/Miles
- Education and awareness; Education of landowners about appropriate land management . Rank: 2  
- Measure: Number
- Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Recreational activities; Increased human disturbance of nesting habitat**

- Actions:
- Education and awareness; Education of landowners about appropriate land management . Rank: 1  
- Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3  
- Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- Education and awareness. Rank: 2  
- Measure: Number
  - Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Least Bittern**

*Ixobrychus exilis*

**Freshwater Birds**

**Threat 1 - Invasive non-native/alien species; Increasing phragmites**

- Actions:
- Invasive/problematic species control; Control phragmites. Rank: 2  
- Measure: Acres/Sites/Projects
  - Habitat and natural process restoration; Restore treated areas to natural function. Rank: 2  
- Measure: Number/Plans

**Threat 2 - Housing and urban areas; Disturbance to habitat due to development**

- Actions:
- Land/water protection; Work with state and nonprofits to conserve appropriate properties that contain habitat. Rank: 3  
- Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management . Rank: 2  
- Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Recreational activities; Increased human disturbance of nesting habitat**

- Actions:
- Education and awareness; Education of landowners about appropriate land management . Rank: 1  
- Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3  
- Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- Education and awareness. Rank: 2

- Measure: Number
- Policies and regulations. Rank: 3
  - Measure: Number/Plans

## Marsh Wren

*Cistothorus palustris*

## Freshwater Birds

### Threat 1 - Invasive non-native/alien species; Increasing phragmites

- Actions:
- Invasive/problematic species control; Control phragmites. Rank: 2
    - Measure: Acres/Sites/Projects
  - Habitat and natural process restoration; Restore treated areas to natural function. Rank: 2
    - Measure: Number/Plans

### Threat 2 - Housing and urban areas; Disturbance to habitat due to development

- Actions:
- Land/water protection; Work with state and nonprofits to conserve appropriate properties that contain habitat. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management . Rank: 2
    - Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3
    - Measure: Number/Plans

### Threat 3 - Recreational activities; Increased human disturbance of nesting habitat

- Actions:
- Education and awareness; Education of landowners about appropriate land management . Rank: 1
    - Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3
    - Measure: Number/Plans

### Threat 4 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3
    - Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3
    - Measure: Number/Plans

### Threat 5 - Household sewage and urban waste water

- Actions:
- Education and awareness. Rank: 2
    - Measure: Number
  - Policies and regulations. Rank: 3
    - Measure: Number/Plans

## Pied-billed Grebe

*Podilymbus podiceps*

## Freshwater Birds

### Threat 1 - Invasive non-native/alien species; Increasing phragmites

- Actions:
- Invasive/problematic species control; Control phragmites. Rank: 2
    - Measure: Acres/Sites/Projects
  - Habitat and natural process restoration; Restore treated areas to natural function. Rank: 2
    - Measure: Number/Plans

### Threat 2 - Housing and urban areas; Disturbance to habitat due to development

- Actions:
- Land/water protection; Work with state and nonprofits to conserve appropriate properties that contain habitat. Rank: 3
    - Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management . Rank: 2
    - Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3

- Measure: Number/Plans

**Threat 3 - Recreational activities; Increased human disturbance of nesting habitat**

- Actions:
- Education and awareness; Education of landowners about appropriate land management . Rank: 1  
- Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3  
- Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- Education and awareness. Rank: 2  
- Measure: Number
  - Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Sora**

*Porzana carolina*

**Freshwater Birds**

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**Threat 1 - Invasive non-native/alien species; Increasing phragmites**

- Actions:
- Invasive/problematic species control; Control phragmites. Rank: 2  
- Measure: Acres/Sites/Projects
  - Habitat and natural process restoration; Restore treated areas to natural function. Rank: 2  
- Measure: Number/Plans

**Threat 2 - Housing and urban areas; Disturbance to habitat due to development**

- Actions:
- Land/water protection; Work with state and nonprofits to conserve appropriate properties that contain habitat. Rank: 3  
- Measure: Acres/Sites/Miles
  - Education and awareness; Education of landowners about appropriate land management . Rank: 2  
- Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Recreational activities; Increased human disturbance of nesting habitat**

- Actions:
- Education and awareness; Education of landowners about appropriate land management . Rank: 1  
- Measure: Number
  - Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3  
- Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- Education and awareness. Rank: 2  
- Measure: Number
  - Policies and regulations. Rank: 3  
- Measure: Number/Plans

**Threat 1 - Invasive non-native/alien species; Increasing phragmites**

- Actions:
- *Invasive/problematic species control; Control phragmites. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Habitat and natural process restoration; Restore treated areas to natural function. Rank: 2*  
- Measure: Number/Plans

**Threat 2 - Housing and urban areas; Disturbance to habitat due to development**

- Actions:
- *Land/water protection; Work with state and nonprofits to conserve appropriate properties that contain habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management. Rank: 2*  
- Measure: Number
  - *Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Recreational activities; Increased human disturbance of nesting habitat**

- Actions:
- *Education and awareness; Education of landowners about appropriate land management. Rank: 1*  
- Measure: Number
  - *Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3*  
- Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- *Education and awareness. Rank: 2*  
- Measure: Number
  - *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

**Threat 1 - Invasive non-native/alien species; Increasing phragmites**

- Actions:
- *Invasive/problematic species control; Control phragmites. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Habitat and natural process restoration; Restore treated areas to natural function. Rank: 2*  
- Measure: Number/Plans

**Threat 2 - Housing and urban areas; Disturbance to habitat due to development**

- Actions:
- *Land/water protection; Work with state and nonprofits to conserve appropriate properties that contain habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Education of landowners about appropriate land management. Rank: 2*  
- Measure: Number
  - *Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Recreational activities; Increased human disturbance of nesting habitat**

- Actions:
- *Education and awareness; Education of landowners about appropriate land management. Rank: 1*  
- Measure: Number

- *Policies and regulations; Policy regulations on buffer zones and land use. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Habitat shifting and alteration; Loss of nesting and foraging habitat due to climate change**

- Actions:
- *Land/water protection; Protection of conservation of lands to allow for marsh migration. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restoration of feeding and nesting habitat. Rank: 3*  
- Measure: Number/Plans

**Threat 5 - Household sewage and urban waste water**

- Actions:
- *Education and awareness. Rank: 2*  
- Measure: Number
  - *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

## BIRDS

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### American Black Duck

*Anas rubripes*

### Salt Marsh Birds

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**Threat 1 - Habitat shifting and alteration; Loss of habitat due to climate change**

- Actions:
- *Land/water protection; Conserve lands to allow for migration of salt marsh. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate landowners with appropriate habitat. Rank: 3*  
- Measure: Number

**Threat 2 - Pollution; Impact of mercury and other discharges**

- Actions:
- *Law and policy; Take action to modify discharges of pollutants. Rank: 2*  
- Measure: Number

**Threat 3 - Invasive and other problematic species and genes; Specifically phragmites**

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Habitat and natural process restoration. Rank: 2*  
- Measure: Number/Plans

**Threat 5 - Hunting and collecting terrestrial animals**

- Actions:
- *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### Clapper Rail

*Rallus longirostris*

### Salt Marsh Birds

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**Threat 1 - Habitat shifting and alteration; Loss of habitat due to climate change**

- Actions:
- *Land/water protection; Conserve lands to allow for migration of salt marsh. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate landowners with appropriate habitat. Rank: 3*  
- Measure: Number

**Threat 2 - Pollution; Impact of mercury and other discharges**

- Actions:
- *Law and policy; Take action to modify discharges of pollutants. Rank: 2*  
- Measure: Number

**Threat 3 - Invasive and other problematic species and genes; Specifically phragmites**

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Habitat and natural process restoration. Rank: 2*  
- Measure: Number/Plans

**Threat 5 - Hunting and collecting terrestrial animals**

- Actions: • *Policies and regulations. Rank: 3*  
- *Measure: Number/Plans*

## Nelson's Sparrow

*Ammodramus nelsoni*

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## Salt Marsh Birds

### Threat 1 - Habitat shifting and alteration; Loss of habitat due to climate change

- Actions: • *Land/water protection; Conserve lands to allow for migration of salt marsh. Rank: 3*  
- *Measure: Acres/Sites/Miles*
- *Education and awareness; Educate landowners with appropriate habitat. Rank: 3*  
- *Measure: Number*

### Threat 2 - Pollution; Impact of mercury and other discharges

- Actions: • *Law and policy; Take action to modify discharges of pollutants. Rank: 2*  
- *Measure: Number*

### Threat 3 - Invasive and other problematic species and genes; Specifically phragmites

- Actions: • *Invasive/problematic species control. Rank: 2*  
- *Measure: Acres/Sites/Projects*
- *Habitat and natural process restoration. Rank: 2*  
- *Measure: Number/Plans*

## Saltmarsh Sparrow

*Ammodramus caudacutus*

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## Salt Marsh Birds

### Threat 1 - Habitat shifting and alteration; Loss of habitat due to climate change

- Actions: • *Land/water protection; Conserve lands to allow for migration of salt marsh. Rank: 3*  
- *Measure: Acres/Sites/Miles*
- *Education and awareness; Educate landowners with appropriate habitat. Rank: 3*  
- *Measure: Number*

### Threat 2 - Pollution; Impact of mercury and other discharges

- Actions: • *Law and policy; Take action to modify discharges of pollutants. Rank: 2*  
- *Measure: Number*

### Threat 3 - Invasive and other problematic species and genes; Specifically phragmites

- Actions: • *Invasive/problematic species control. Rank: 2*  
- *Measure: Acres/Sites/Projects*
- *Habitat and natural process restoration. Rank: 2*  
- *Measure: Number/Plans*

## Seaside Sparrow

*Ammodramus maritimus*

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## Salt Marsh Birds

### Threat 1 - Habitat shifting and alteration; Loss of habitat due to climate change

- Actions: • *Land/water protection; Conserve lands to allow for migration of salt marsh. Rank: 3*  
- *Measure: Acres/Sites/Miles*
- *Education and awareness; Educate landowners with appropriate habitat. Rank: 3*  
- *Measure: Number*

### Threat 2 - Pollution; Impact of mercury and other discharges

- Actions: • *Law and policy; Take action to modify discharges of pollutants. Rank: 2*  
- *Measure: Number*

### Threat 3 - Invasive and other problematic species and genes; Specifically phragmites

- Actions: • *Invasive/problematic species control. Rank: 2*  
- *Measure: Acres/Sites/Projects*
- *Habitat and natural process restoration. Rank: 2*  
- *Measure: Number/Plans*

## Willet

*Tringa semipalmata*

## Salt Marsh Birds

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### Threat 1 - Invasive non-native/alien species; Increasing phragmites in nesting habitat

- Actions:
- *Invasive/problematic species control; Control phragmites. Rank: 2*  
- Measure: Acres/Sites/Projects
  - *Habitat and natural process restoration; Restore treated areas to natural function. Rank: 3*  
- Measure: Number/Plans

### Threat 2 - Recreational activities; Disturbance of nesting and foraging habitat

- Actions:
- *Land/water management; Minimize disturbance to nesting and foraging habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Education and awareness; Educate public about species nesting and foraging requirements. Rank: 2*  
- Measure: Number

### Threat 3 - Habitat shifting and alteration; Loss of salt marsh habitat due to Impact of sea level rise

- Actions:
- *Site/area protection; Conserve lands to allow for salt marsh migration. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area management; Manage lands for salt marsh migration. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate landowners to allow for salt marsh migration on private lands. Rank: 2*  
- Measure: Number

## BIRDS

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### Bald Eagle

*Haliaeetus leucocephalus*

### Other Birds

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#### Threat 1 - Human intrusions and disturbance

- Actions:
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Bank Swallow

*Riparia riparia*

### Other Birds

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#### Threat 1 - Natural system modifications; Lack of suitable nesting habitat

- Actions:
- *Site/area management; Minimize disturbance to habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Create and maintain nesting habitat. Rank: 2*  
- Measure: Number/Plans

### Chimney Swift

*Chaetura pelagica*

### Other Birds

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#### Threat 1 - Residential and commercial development; Loss of suitable nesting habitat in buildings

- Actions:
- *Education and awareness; Educating property owners regarding nesting habitats. Rank: 3*  
- Measure: Number

- *Species recovery; Artificial nesting chimney structures. Rank: 2*  
- Measure: Number/Animals

## Rusty Blackbird

*Euphagus carolinus*

## Other Birds

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### Threat 1 - Lack of information; RI is stopover habitat, need to determine habitat requirements during migration and additional information

- Actions:
- *Data collection and analysis. Rank: 3*  
- Measure: Number

### Threat 2 - Residential and commercial development; Loss of stopover habitat due to multiple reasons

- Actions:
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Agriculture and aquaculture; Loss of stopover habitat due to multiple reasons

- Actions:
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management. Rank: 3*  
- Measure: Acres/Sites/Miles

## BIRDS

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## American Kestrel

*Falco sparverius*

## Nest Box Birds

### Threat 1 - Natural system modifications; Loss of early successional habitat

- Actions:
- *Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number
  - *Species recovery; Erecting Kestrel nesting boxes near early successional habitat. Rank: 2*  
- Measure: Number/Animals

### Threat 2 - Residential and commercial development; Loss of early successional habitat due to development

- Actions:
- *Land/water protection; Conserve early successional habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Lack of planning

- Actions:
- *Data collection and analysis. Rank: 2*  
- Measure: Number

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## Eastern Bluebird

*Sialia sialis*

## Nest Box Birds

### Threat 1 - Natural system modifications; Habitat succession

- Actions:
- *Site/area management; Manage for early successional habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Species recovery; Create nesting cavities, nest boxes. Rank: 2*

## Osprey

*Pandion haliaetus*

## Nest Box Birds

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### Threat 1 - Residential and commercial development; Lack of suitable nesting habitat

- Actions:
- *Species recovery; Creating nesting platforms. Rank: 2*  
- Measure: Number/Animals

## Peregrine Falcon

*Falco peregrinus*

## Nest Box Birds

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### Threat 1 - Residential and commercial development; Lack of suitable nesting habitat

- Actions:
- *Species recovery; Creating nest boxes. Rank: 3*  
- Measure: Number/Animals

### Threat 2 - Natural system modifications; Loss of suitable foraging habitat during migration

- Actions:
- *Site/area management; Create and maintain early successional habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Conserve suitable early successional habitat near bluffs. Rank: 1*  
- Measure: Acres/Sites/Miles

## BIRDS

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## American Woodcock

*Scolopax minor*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Habitat succession

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)

- Actions:
- *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Invasive and other problematic species and genes

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

## Black-billed Cuckoo

*Coccyzus erythrophthalmus*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Habitat succession

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*

- Measure: Acres/Sites/Miles
- Site/area protection; Land protection of appropriate habitat. Rank: 3  
- Measure: Acres/Sites/Miles
- Education and awareness. Rank: 2  
- Measure: Number

**Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)**

- Actions:
- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects
  - Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive and other problematic species and genes**

- Actions:
- Invasive/problematic species control. Rank: 2  
- Measure: Acres/Sites/Projects

**Blue-winged Warbler**

*Vermivora cyanoptera*

**Shrubland Birds**

**Threat 1 - Natural system modifications; Habitat succession**

- Actions:
- Habitat and natural process restoration; Create early successional habitat. Rank: 3  
- Measure: Number/Plans
  - Site/area management; Create feathered edge habitat. Rank: 2  
- Measure: Acres/Sites/Miles
  - Site/area protection; Land protection of appropriate habitat. Rank: 3  
- Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2  
- Measure: Number

**Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)**

- Actions:
- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects
  - Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive and other problematic species and genes**

- Actions:
- Invasive/problematic species control. Rank: 2  
- Measure: Acres/Sites/Projects

**Brown Thrasher**

*Toxostoma rufum*

**Shrubland Birds**

**Threat 1 - Natural system modifications; Habitat succession**

- Actions:
- Habitat and natural process restoration; Create early successional habitat. Rank: 3  
- Measure: Number/Plans
  - Site/area management; Create feathered edge habitat. Rank: 2  
- Measure: Acres/Sites/Miles
  - Site/area protection; Land protection of appropriate habitat. Rank: 3  
- Measure: Acres/Sites/Miles
  - Education and awareness. Rank: 2  
- Measure: Number

**Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)**

- Actions:
- Land/water management. Rank: 3  
- Measure: Acres/Sites/Projects
  - Land/water protection. Rank: 3  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive and other problematic species and genes**

- Actions: • *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

## Chestnut-sided Warbler

*Setophaga pensylvanica*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Habitat succession

- Actions: • *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
- *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)

- Actions: • *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Invasive and other problematic species and genes

- Actions: • *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

## Eastern Kingbird

*Tyrannus tyrannus*

## Shrubland Birds

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### Threat 1 - Residential and commercial development; Loss and disturbance of habitat

- Actions: • *Site/area management; Minimize disturbance to habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
- *Land/water protection; Conserve nesting and foraging habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

## Eastern Towhee

*Pipilo erythrophthalmus*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Habitat succession

- Actions: • *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
- *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)

- Actions: • *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
- *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Invasive and other problematic species and genes

- Actions: • *Invasive/problematic species control. Rank: 2*

## Eastern Whip-poor-will

*Antrostomus vociferous*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Loss of early successional habitat

- Actions:
- *Habitat and natural process restoration; Create and maintain early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Land/water protection; Work with state and local non profits to conserve suitable habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

## Field Sparrow

*Spizella pusilla*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Habitat succession

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)

- Actions:
- *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Invasive and other problematic species and genes

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

## Gray catbird

*Dumetella carolinensis*

## Shrubland Birds

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### Threat 1 - Residential and commercial development; Loss and disturbance of habitat

- Actions:
- *Site/area management; Minimize disturbance to habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Land/water protection; Conserve nesting and foraging habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

## Indigo Bunting

*Passerina cyanea*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Habitat succession

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

- *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)**

- Actions:
- *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive and other problematic species and genes**

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

**Nashville Warbler**

*Oreothlypis ruficapilla*

**Shrubland Birds**

**Threat 1 - Natural system modifications; Habitat succession**

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)**

- Actions:
- *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive and other problematic species and genes**

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

**Prairie Warbler**

*Setophaga discolor*

**Shrubland Birds**

**Threat 1 - Natural system modifications; Habitat succession**

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)**

- Actions:
- *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive and other problematic species and genes**

- Actions:
- *Invasive/problematic species control. Rank: 2*

## Ruffed Grouse

*Bonasa umbellus*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Habitat succession

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)

- Actions:
- *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Invasive and other problematic species and genes

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

## Willow Flycatcher

*Empidonax traillii*

## Shrubland Birds

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### Threat 1 - Natural system modifications; Habitat succession

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

### Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)

- Actions:
- *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 3 - Invasive and other problematic species and genes

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

## Yellow-billed Cuckoo

*Coccyzus americanus*

## Shrubland Birds

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### Threat 1 - Housing and urban areas; Loss and disturbance of habitat

- Actions:
- *Land/water protection; Protection of nesting and forested habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

**Threat 1 - Natural system modifications; Habitat succession**

- Actions:
- *Habitat and natural process restoration; Create early successional habitat. Rank: 3*  
- Measure: Number/Plans
  - *Site/area management; Create feathered edge habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Land protection of appropriate habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Education and awareness. Rank: 2*  
- Measure: Number

**Threat 2 - Other; Loss of stop-over habitat due to multiple factors (development, human disturbance)**

- Actions:
- *Land/water management. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Invasive and other problematic species and genes**

- Actions:
- *Invasive/problematic species control. Rank: 2*  
- Measure: Acres/Sites/Projects

**BIRDS****Blackpoll Warbler***Setophaga striata***Coastal Shrub Birds****Threat 1 - Natural system modifications; Loss of stop over habitat**

- Actions:
- *Land/water management; Manage for shrub habitat . Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection; Conserve shrub habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 2 - Residential and commercial development; Loss of stopover habitat**

- Actions:
- *Land/water management; Manage land for stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection; Identify key stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Renewable energy**

- Actions:
- *Planning. Rank: 2*  
- Measure: Number

**Tree Swallow***Tachycineta bicolor***Coastal Shrub Birds****Threat 1 - Natural system modifications; Loss of habitat, specifically bayberry**

- Actions:
- *Land/water management; Manage for shrub habitat, specifically bayberry. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection; Conserve shrub habitat, specifically bayberry. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 2 - Residential and commercial development; Loss of stopover habitat**

- Actions:
- *Land/water management; Manage land for stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Land/water protection; Identify key stopover habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Renewable energy**

Actions: • *Planning. Rank: 2*  
- *Measure: Number*

# FISH

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## Fish (taxa wide)

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### Lack of information

- Actions:
- *Data collection and analysis; Assess the recruitment of eels into and out of lakes by monitoring their migration out of freshwater. Rank: 3*
  - *Data collection and analysis; Begin surveys in Narragansett Bay for pelagic fish earlier in the year to survey spring fish. Rank: 3*
  - *Data collection and analysis; Conduct a literature search to survey life history information, identify what has already been done on the species, how this information can be used to better understand Rhode Island's species, and identify other research needs. Rank: 3*
  - *Data collection and analysis; Create and implement invasive species monitoring protocol. Rank: 3*
  - *Data collection and analysis; Determine relative abundance of GCN species, especially freshwater fish and invertebrates. Rank: 3*
  - *Data collection and analysis; Determine appropriate indicator species or parameters to monitor water quality for pelagic / anadromous fauna. Rank: 3*
  - *Data collection and analysis; Develop and implement sampling protocol for aquatic exotics. Rank: 3*
  - *Data collection and analysis; Facilitate research to identify and mitigate disease potential. Rank: 3*
  - *Data collection and analysis; Identify and map critical areas in the life history of species, particularly spawning areas. Rank: 3*
  - *Data collection and analysis; Identify concentration areas for non-breeding populations. Rank: 3*
  - *Data collection and analysis; Increase data bank on species habitat preferences and use in oil spill response planning and mapping. Rank: 3*
  - *Data collection and analysis; Initiate monitoring of species at non-breeding sites. Rank: 3*
  - *Data collection and analysis; Monitor spatial qualities of habitat. Rank: 3*
  - *Data collection and analysis; Monitor the growth rates of demersal finfish to determine if they are growing at the historical rate or if there is a population that has already been studied that shows a similar pattern. Rank: 3*
  - *Data collection and analysis; Research abundance and distribution of species for which status and habitat can be determined, by including additional data collection in present studies. Rank: 3*
  - *Data collection and analysis; Research and develop sampling protocols, especially for mammals, freshwater fish, herps and beetles. Rank: 3*
  - *Data collection and analysis; Research environmental sensitivity for slight changes in environmental factors that may lead to large impacts to the resource. Rank: 3*
  - *Data collection and analysis; Research marine mortality to determine the mortality rate of fish once they return to the estuary. Rank: 3*
  - *Data collection and analysis; Research predator / prey relationships to determine where species are in the food chain by identifying their most common food sources and what preys on them. Rank: 3*
  - *Data collection and analysis; Research the bioaccumulation of pollutants in bottom feeders by locating, reducing and monitoring the input of pollutants into the water column. Rank: 3*
  - *Data collection and analysis; Research the impacts of pollution through tissue sampling of demersal finfish. Rank: 3*
  - *Data collection and analysis; Research whether hypoxia is changing the growth patterns for species of demersal finfish by using laboratory testing. Rank: 3*
  - *Data collection and analysis; Survey GCN species at priority sites. Rank: 3*
  - *Data collection and analysis; Undertake Multi season, pre- and post- dredging biological surveys to assess impacts to animal and submerged aquatic vegetation communities. Rank: 3*
  - *Data collection and analysis; Use gut content analyses to research the causes of high mortality after spawning, determining what is preying on species following spawning or if there are environmental causes. Rank: 3*
  - *Research, survey, inventory, monitor populations; Monitor the population and abundance of*

eels over their life span, gathering life history data and identifying other research needs. Rank: 3

- *Planning; Identify key locations where short-term closures may have the most impact to restore fish populations and close those areas to fisheries. Rank: 3*
- *Species and habitat management planning; Assess which species are the most susceptible to threats and monitor them as indicator species. Rank: 3*

#### **Invasive and other problematic species and genes**

- Actions:*
- *Technical assistance; Coordinate invasive species management with other state and regional programs. Rank: 2*
  - *Data collection and analysis; Identify and characterize fishery habitat functions and service in the area where the invasives have been found. Track changes in the species composition. Rank: 2*
  - *Data collection and analysis; Research invasive species management and monitoring protocols. Rank: 2*
  - *Invasive/problematic species control; Assess pathways of introduction from water gardens and mail order. Rank: 2*
  - *Invasive/problematic species control; Coordinate aquatic exotic management with stocking agencies and mosquito abatement personnel. Rank: 2*
  - *Invasive/problematic species control; Develop and implement invasive species management program. Rank: 2*
  - *Invasive/problematic species control; Develop and implement program to mitigate effect of aquatic exotics. Rank: 2*
  - *Invasive/problematic species control; Develop predator control program to conduct intervention where appropriate for priority species. Rank: 2*
  - *Invasive/problematic species control; Identify potential damaging aquatic invasives and exotics. Rank: 2*
  - *Invasive/problematic species control; Identify potential damaging exotic plants. Rank: 2*
  - *Invasive/problematic species control; Identify priority areas for invasive plant management. Rank: 2*
  - *Species management; Evaluate need for predator control intervention for priority species. Rank: 2*

#### **Pollution**

- Actions:*
- *Technical assistance; Coordinate chemical management with other state and regional programs. Rank: 3*
  - *Technical assistance; Coordinate with mosquito abatement personnel for chemical management. Rank: 3*
  - *Data collection and analysis; Assess effects of sedimentation. Rank: 3*
  - *Data collection and analysis; Identify chemical sources and compounds of concern. Rank: 3*
  - *Data collection and analysis; Increase data bank on species habitat preferences and use in oil spill response planning and mapping. Rank: 3*
  - *Data collection and analysis; Monitor areaa for sediment, nutrient, and contamination levels, using indicator species or long term instrumentation analysis. Rank: 3*
  - *Land/water management; Increase field and landscape buffers to provide cost effective protection against the cumulative effects of many small, but unavoidable, pollutant discharges associated with an active agriculture enterprise and the kinds of catastrophic pollution that can. Rank: 3*
  - *Habitat and natural process restoration; Manage stormwater runoff to duplicate the natural hydrologic cycle, maintaining natural infiltration and runoff rates to the maximum extent possible. Rank: 3*
  - *Law and policy; Discharges should be treated to the maximum extent practicable, including implementation of up-to-date methodologies for reducing discharges of biocides such as chlorine and other toxic substances. Rank: 3*

#### **Transportation and service corridors**

- Actions:*
- *Technical assistance; Avoid placing pipelines and accessory equipment used in conjunction with construction or dredging operations to the maximum extent possible close to kelp beds, eelgrass beds, estuarine / salt marshes and any other high value habitat. Rank: 2*

- *Technical assistance; Establish discussions with state and local D.O.T. Rank: 2*
- *Data collection and analysis; Assess means to mitigate road effects. Rank: 2*
- *Data collection and analysis; Identify areas of significant road effects in focal areas. Rank: 2*
- *Land/water management; Enhance habitat connectivity for priority species with culverts. Rank: 2*
- *Land/water management; Set up preventative measures to limit transportation both internationally and locally. Rank: 2*
- *Site/area management; Avoid locating roads near wetlands and fish bearing streams. Roads should be sited to avoid sensitive areas such as wetlands, streams, steep slopes. Rank: 2*
- *Habitat and natural process restoration; Conduct road mitigations where required. Rank: 2*

#### **Dams and water management/use**

- Actions:*
- *Data collection and analysis; Address cumulative impacts of past and current dredging operations on fishery resources by considering them as part of the permitting process. Rank: 3*
  - *Data collection and analysis; Assess effects of prolonged drawdowns. Rank: 3*
  - *Data collection and analysis; Assess effects of water releases at dams. Rank: 3*
  - *Data collection and analysis; Assess effects of water withdrawals. Rank: 3*
  - *Habitat and natural process restoration; Study all options for disposal of dredged materials, including disposal sites and methods used. Upland disposal sites should be considered as an alternative to offshore disposal sites. Rank: 3*
  - *Law and policy; The diking and draining of tidal marshlands and estuaries should not be undertaken unless a satisfactory compensatory mitigation plan is in effect and monitored. Rank: 3*

#### **Lack of Planning**

- Actions:*
- *Technical assistance; Coordinate monitoring with other state and regional monitoring programs. Rank: 2*
  - *Land/water management; Follow up the anadromous fish conservation plan by identifying fish ladders in need of retrofits to modify and maintain eel ramps at all fish ladders or dams. Rank: 2*
  - *Planning; Develop a strategic conservation plan for anadromous fish that will provide needed fish passage locations for shad, which can serve as a representative species. Rank: 2*
  - *Planning; Identify and map critical areas in the life history of species, particularly spawning areas, and determine site fidelity to those areas. Rank: 2*
  - *Planning; Use an adaptive management plan with ecological indicators to oversee monitoring and ensure mitigation objectives are met. Take corrective action as needed. Rank: 2*
  - *Species and habitat management planning; Identify priority sites for survey, especially for freshwater fish and invertebrates. Rank: 2*

#### **Agriculture and aquaculture**

- Actions:*
- *Resource and habitat protection; Improve land use efficiencies for key agricultural inputs including nitrogen phosphorus pesticides and irrigation water. Rank: 2*
  - *Planning; Identify priority parcels to retain as core forest areas with minimal management. Rank: 2*
  - *Planning; The full range of agriculture buffer practices has to be systematically deployed, protected and managed across the agriculture landscape or overall aquatic habitat improvements will be minimal. Rank: 2*

#### **Residential and commercial development; Lack of management and restoration of degraded habitat**

- Actions:*
- *Land/water protection; Implement priority restoration projects. Rank: 3*
  - *Species and habitat management planning; Identify suitable restoration projects. Rank: 3*

#### **Natural system modifications**

- Actions:*
- *Land/water management; Wherever possible, "soft" approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modifications should be used. Rank: 2*

#### **Biological resource use**

- Actions:*
- *Law and policy; Coordinate incidental take programs with regional or national initiatives. Rank: 3*

**Shipping lanes**

Actions: • *Compliance and enforcement; Enforcement of ballast exchange measures well out side the coastal zone. Rank: 1*

**Roads and railroads**

Actions: • *Site/area management; Assess means to mitigate road effects. Rank: 2*

**Lack of resources, staff, internal capacity**

Actions: • *Land/water management; Increase number and training of response teams in the event of an accident. Rank: 3*

**Climate change and severe weather**

Actions: • *Other climate change actions; Assess whether a succession of species may be occurring as a result of temperature changes. Rank: 2*

# FISH

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## Alewife

*Alosa pseudoharengus*

## Freshwater Fish

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### **Threat 1 - Dams and water management/use; Dams block passage, impacts water quantity and quality in streams for use as river herring habitat**

- Actions:
- *Resource and habitat protection; Remove dams, create passage in areas where dams can't be removed, prevent new obstructions from being created. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Remove dams to restore natural flow. Rank: 3*  
- Measure: Number/Plans
  - *Species reintroduction; Stock adults from neighboring healthy runs to reestablish. Rank: 3*  
- Measure: Number/Animals

### **Threat 2 - Fishing and harvesting aquatic resources; Bycatch in herring and whiting fishery**

- Actions:
- *Species management; Continue developing management plans to restore runs and prevent bycatch. Rank: 3*  
- Measure: Projects/Plans
  - *Policies and regulations; Create regulations to prevent or encourage lower bycatch. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement; Provide enforcement with resources to enforce protective regulations. Rank: 3*  
- Measure: Number/Interventions/Cases

### **Threat 3 - Problematic native species; predation by multiple species (cormorants, striped bass, etc.)**

- Actions:
- *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 3*  
- Measure: Number

### **Threat 4 - Household sewage and urban waste water; Water quality impacts to habitats**

- Actions:
- *Land/water management; Address impacts of stormwater runoff and pollution discharge. Rank: 2*  
- Measure: Acres/Sites/Projects

### **Threat 5 - Biological resource use; Demographic changes from incidental take (human)**

- Actions:
- *Education and awareness; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 2*  
- Measure: Number

## American Brook Lamprey

*Lampetra appendix*

## Freshwater Fish

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### **Threat 1 - Housing and urban areas; Development and land use impacting habitat;**

- Actions:
- *Site/area protection; Protect nursery and preferred habitat areas from impacts. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management; Create regulations to ensure protection of nursery or preferred habitat areas. Rank: 3*  
- Measure: Acres/Sites/Miles

### **Threat 2 - Dams and water management/use; Dams block passage, impacts water quantity in streams as well; impounding water effects their preferred benthic habitat**

- Actions:
- *Habitat and natural process restoration; Implement practices to restore habitat, including dam removal and other activities to increase stream connectivity. Rank: 3*  
- Measure: Number/Plans

### **Threat 3 - Household sewage and urban waste water; Water quality impacts to habitats**

- Actions:
- *Awareness and communications; Create public awareness about habitat importance. Rank: 2*  
- Measure: Number

**Threat 1 - Dams and water management/use; Dams block passage, impacts water quantity in streams as well; Issues with entrainment in power plants**

- Actions:*
- *Resource and habitat protection; Remove dams, create passage in areas where dams can't be removed, prevent new obstructions from being created, require power plants to monitor entrainment issue and mitigate as necessary. Rank: 3*  
*- Measure: Acres/Sites/Miles*
  - *Habitat and natural process restoration; Remove dams to restore natural flow . Rank: 3*  
*- Measure: Number/Plans*

**Threat 2 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:*
- *Species management; Create management plans to restore runs and prevent harvest of critical life stages. Rank: 3*  
*- Measure: Projects/Plans*
  - *Species reintroduction; Promote culturing to protect returning eels. Rank: 1*  
*- Measure: Number/Animals*
  - *Policies and regulations; Implement the management plan. Rank: 3*  
*- Measure: Number/Plans*
  - *Compliance and enforcement; Regulate and enforce harvest restrictions/regulations. Rank: 3*  
*- Measure: Number/Interventions/Cases*

**Threat 3 - Household sewage and urban waste water; Water quality impacts to habitats**

- Actions:*
- *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 2*  
*- Measure: Number*

**Threat 4 - Fishing and harvesting aquatic resources; Demographic changes from incidental take (human)**

- Actions:*
- *Education and awareness; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 2*  
*- Measure: Number*
  - *Law and policy; Coordinate incidental take programs with regional or national initiatives. Rank: 2*  
*- Measure: Number*

**Threat 5 - Lack of information**

- Actions:*
- *Data collection and analysis; Assess the recruitment of eels into and out of lakes by monitoring their migration out of freshwater. Rank: 2*  
*- Measure: Number*

**Threat 6 - Lack of information**

- Actions:*
- *Research, survey, inventory, monitor populations; Monitor the population and abundance of eels over their life span, gathering life history data and identifying other research needs. Rank: 2*  
*- Measure: Number/Studies; Monitor the population and abundance of eels over their life span, gathering life history data and identifying other research needs*

**Threat 1 - Dams and water management/use; Dams block passage, impacts water quantity and quality in streams for use as river herring habitat**

- Actions:*
- *Resource and habitat protection; Remove dams, create passage in areas where dams can't be removed, prevent new obstructions from being created. Rank: 3*  
*- Measure: Acres/Sites/Miles*
  - *Habitat and natural process restoration; Remove dams to restore natural flow . Rank: 3*  
*- Measure: Number/Plans*
  - *Species reintroduction; Stock adults from neighboring healthy runs to reestablish. Rank: 3*  
*- Measure: Number/Animals*

**Threat 2 - Fishing and harvesting aquatic resources; Bycatch in herring and whiting fishery**

- Actions:*
- *Species management; Continue developing management plans to restore runs and prevent*

bycatch. Rank: 3  
- Measure: Projects/Plans

- Policies and regulations; Create regulations to prevent or encourage lower bycatch. Rank: 2  
- Measure: Number/Plans
- Compliance and enforcement; Provide enforcement with resources to enforce protective regulations. Rank: 3  
- Measure: Number/Interventions/Cases

**Threat 3 - Problematic native species; predation by multiple species (cormorants, striped bass, etc.)**

- Actions:
- Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 3  
- Measure: Number

**Threat 4 - Household sewage and urban waste water; Water quality impacts to habitats**

- Actions:
- Land/water management; Address impacts of stormwater runoff and pollution discharge. Rank: 2  
- Measure: Acres/Sites/Projects

**Threat 5 - Biological resource use; Demographic changes from incidental take (human)**

- Actions:
- Education and awareness; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 2  
- Measure: Number

**Atlantic Salmon**

*Salmo salar*

**Freshwater Fish**

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**Threat 1 - Dams and water management/use; Dams block passage, impacts water quantity in streams as well;**

- Actions:
- Resource and habitat protection; Remove dams, create passage in areas where dams can't be removed, prevent new obstructions from being created. Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Remove dams to restore natural flow. Rank: 3  
- Measure: Number/Plans
  - Species management; Brood stock enhancement. Rank: 1  
- Measure: Projects/Plans
  - Species reintroduction; Brood stock enhancement. Rank: 1  
- Measure: Number/Animals

**Threat 2 - Introduced genetic material; Farmed salmon contaminating natural population genetics**

- Actions:
- Policies and regulations; Create robust management plans to prevent genetic contamination from aquaculture and protect natural populations from overharvest. Rank: 1  
- Measure: Number/Plans
  - Compliance and enforcement; Provide enforcement with resources to enforce protective regulations. Rank: 1  
- Measure: Number/Interventions/Cases

**Threat 3 - Household sewage and urban waste water; Water quality impacts to habitats**

- Actions:
- Site/area management; Restore vegetated buffers, implement stormwater controls, reduce nutrient pollution, reduce impervious surfaces, and other watershed protection actions. Rank: 2  
- Measure: Acres/Sites/Miles
  - Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 1  
- Measure: Number

**Threat 4 - Fishing and harvesting aquatic resources; Demographic changes from incidental take (human)**

- Actions:
- Education and awareness; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 1  
- Measure: Number

**Threat 5 - Climate change and severe weather; Climate change impacting habitat**

- Actions:
- Data collection and analysis; Research temperature impacts on population and monitor population. Rank: 2  
- Measure: Number

## Atlantic Sturgeon

*Acipenser oxyrinchus*

## Freshwater Fish

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### Threat 1 - Biological resource use; Fishing impacting population sustainability

- Actions:
- *Species management; Create management plans to restore runs and prevent bycatch. Rank: 3*  
- Measure: Projects/Plans

### Threat 2 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Policies and regulations; Create regulations to prevent or encourage lower bycatch. Rank: 3*  
- Measure: ng
  - *Compliance and enforcement; Provide enforcement with resources to enforce protective regulations. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Fishing and harvesting aquatic resources; Harvested for food as well as for roe, and captured as bycatch

- Actions:
- *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 2*  
- Measure: Number

## Blacknose Dace

*Rhinichthys atratulus*

## Freshwater Fish

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### Threat 1 - Housing and urban areas; Development and land use impacting habitat;

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

### Threat 2 - Dams and water management/use; Dams inhibiting connectivity

- Actions:
- *Site/area management; Create regulations to prevent habitat loss. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Remove dams or create passage to promote connectivity. Rank: 2*  
- Measure: Number/Plans

### Threat 3 - Household sewage and urban waste water; Water quality impacts to habitat

- Actions:
- *Awareness and communications; Create public awareness of the species through education programs. Rank: 2*  
- Measure: Number

## Blueback Herring

*Alosa aestivalis*

## Freshwater Fish

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### Threat 1 - Dams and water management/use; Dams block passage, impacts water quantity and quality in streams for use as river herring habitat

- Actions:
- *Resource and habitat protection; Remove dams, create passage in areas where dams can't be removed, prevent new obstructions from being created. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Remove dams to restore natural flow. Rank: 3*  
- Measure: Number/Plans
  - *Species reintroduction; Stock adults from neighboring healthy runs to reestablish. Rank: 3*  
- Measure: Number/Animals

### Threat 2 - Fishing and harvesting aquatic resources; Bycatch in herring and whiting fishery

- Actions:
- *Species management; Continue developing management plans to restore runs and prevent bycatch. Rank: 3*  
- Measure: Projects/Plans
  - *Policies and regulations; Create regulations to prevent or encourage lower bycatch. Rank: 2*  
- Measure: Number/Plans

- *Compliance and enforcement; Provide enforcement with resources to enforce protective regulations. Rank: 3*  
- Measure: Number/Interventions/Cases

**Threat 3 - Problematic native species; predation by multiple species (cormorants, striped bass, etc.)**

- Actions:
- *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 3*  
- Measure: Number

**Threat 4 - Household sewage and urban waste water; Water quality impacts to habitats**

- Actions:
- *Land/water management; Address impacts of stormwater runoff and pollution discharge. Rank: 2*  
- Measure: Acres/Sites/Projects

**Threat 5 - Biological resource use; Demographic changes from incidental take (human)**

- Actions:
- *Education and awareness; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 2*  
- Measure: Number

**Bridle Shiner**

*Notropis bifrenatus*

**Freshwater Fish**

**Threat 1 - Housing and urban areas; Watershed development**

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 2 - Invasive non-native/alien species; Predation and displacement by invasive species;**

- Actions:
- *Data collection and analysis; Conduct more intensive survey and acquire better understanding of species occurrence and distribution. Rank: 1*  
- Measure: Number
  - *Education and awareness; Create public awareness of the species through education programs. Rank: 1*  
- Measure: Number

**Brook Trout**

*Salvelinus fontinalis*

**Freshwater Fish**

**Threat 1 - Housing and urban areas; Development and land use impacting habitat**

- Actions:
- *Site/area protection; Protect areas of preferred habitat, especially currently unprotected areas. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area protection; Investigate the feasibility of identifying and establishing sanctuary areas. Rank: 2*  
- Measure: Acres/Sites/Miles

**Threat 2 - Dams and water management/use; Dams inhibiting connectivity**

- Actions:
- *Site/area protection; Protect preferred habitat areas from impacts. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management; Create regulations to ensure protection of preferred habitat areas. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Remove dams and redesign road crossings to create passage and promote connectivity. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Household sewage and urban waste water; Water quality impacts to habitats**

- Actions:
- *Site/area management; Restore vegetated buffers, implement stormwater controls, reduce nutrient pollution, reduce impervious surfaces, and other watershed protection actions. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 4 - Problematic native species; Predation by native mammals**

- Actions: • *Awareness and communications; Create public awareness of the species through education programs. Rank: 1*  
- Measure: Number

**Threat 5 - Habitat shifting and alteration; Climate change impacting habitat**

- Actions: • *Data collection and analysis; Research temperature impacts on population and monitor population. Rank: 2*  
- Measure: Number

**Threat 6 - Transportation and service corridors; Loss of habitat from plant succession**

- Actions: • *Site/area protection; Identify priority parcels to retain as core forest areas with minimal management. Rank: 3*  
- Measure: Acres/Sites/Miles

**Common Shiner**

*Luxilus cornutus*

**Freshwater Fish**

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**Threat 1 - Housing and urban areas; Watershed development**

- Actions: • *Site/area protection; Protect areas of preferred habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

**Threat 2 - Invasive non-native/alien species; Predation and displacement by invasive species**

- Actions: • *Invasive/problematic species control; Control importation of non-native species. Rank: 2*  
- Measure: Acres/Sites/Projects
- *Awareness and communications; Create public awareness of the species through education programs. Rank: 3*  
- Measure: Number

**Inland Silverside**

*Menidia beryllina*

**Freshwater Fish**

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**Threat 1 - Housing and urban areas; Development and land use impacting habitat;**

- Actions: • *Site/area protection; Protect areas of preferred habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
- *Site/area management; Create management plans to restore and protect spawning population. Rank: 2*  
- Measure: Acres/Sites/Miles
- *Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 2*  
- Measure: Number/Plans

**Threat 2 - Household sewage and urban waste water; Water quality impacts to habitat**

- Actions: • *Awareness and communications; Create public awareness of the species through education programs. Rank: 1*  
- Measure: Number

**Threat 3 - Lack of information**

- Actions: • *Data collection and analysis; Need more research to identify habitat and population issues. Rank: 2*  
- Measure: Number

**Rainbow Smelt**

*Osmerus mordax*

**Freshwater Fish**

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**Threat 1 - Household sewage and urban waste water; Water quality impacts to habitat;**

- Actions: • *Resource and habitat protection; Remove dams, create passage in areas where dams can't be removed, prevent new obstructions from being created. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Habitat and natural process restoration; Introduce broodstock. Rank: 2*  
- Measure: Number/Plans

- *Species management; Continue to enforce regulations. Rank: 2*  
- Measure: Projects/Plans

**Threat 2 - Temperature extremes; Temperature extremes**

- Actions:
- *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 2*  
- Measure: Number

**Threat 3 - Biological resource use; Demographic changes from incidental take (human)**

- Actions:
- *Technical assistance; Coordinate with other internal agencies to manage most efficiently. Rank: 2*  
- Measure: Number
  - *Education and awareness; Develop and provide educational program/material to reduce incidental mortality and take from humans. Rank: 2*  
- Measure: Number

**Redbreast Sunfish**

*Lepomis auritus*

**Freshwater Fish**

**Threat 1 - Housing and urban areas; Development and land use impacting habitat;**

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 2 - Household sewage and urban waste water; Water quality impacts to habitat**

- Actions:
- *Awareness and communications; Create public awareness of the species through education programs. Rank: 2*  
- Measure: Number
  - *Site/area management; Create regulations to ensure protection of nursery or preferred habitat areas. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Remove dams or create passage to promote connectivity. Rank: 3*  
- Measure: Number/Plans

**Weakfish**

*Cynoscion regalis*

**Freshwater Fish**

**Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Species management; Implement management plans to restore spawning population and prevent overharvest. Rank: 3*  
- Measure: Projects/Plans
  - *Policies and regulations; Manage for sustainable harvest. Rank: 3*  
- Measure: Number/Plans

**Threat 2 - Climate change and severe weather; Juvenile nursery areas being impacted by climate change**

- Actions:
- *Site/area management; Restore vegetated buffers, implement stormwater controls, reduce nutrient pollution, reduce impervious surfaces, and other watershed protection actions. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate landowners about vegetated buffers, stormwater controls, nutrient pollution, impervious surfaces, and other watershed protection problems and active solutions. Rank: 1*  
- Measure: Number

**White Perch**

*Morone americana*

**Freshwater Fish**

**Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Site/area management; Create management plans to restore spawning population and prevent overharvest. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration. Rank: 2*  
- Measure: Number/Plans
  - *Awareness and communications. Rank: 1*  
- Measure: Number

## FISH

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### Butterfish

*Poronotus triacanthus*

### Estuarine Fish

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#### Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Species management; Continue to implement management plans to restore spawning population and prevent overharvest. Rank: 2*  
- Measure: Projects/Plans
  - *Species recovery; Promote management plans to maintain the rebuilding of the stock. Rank: 2*  
- Measure: Number/Animals
  - *Training; Create programs to inform best fishing practices to protect the stock and avoid bycatch. Rank: 3*  
- Measure: Number/Students/Instructors

#### Threat 2 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Policies and regulations; Create regulations to prevent or encourage lower bycatch. Rank: 2*  
- Measure: Number/Plans
  - *Private sector standards and codes; Create programs that allow harvest in a sustainable manner. Rank: 2*  
- Measure: Number

## FISH

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### American Sand Lance

*Ammodytes americanus*

### Marine Fish

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#### Threat 1 - Other ecosystem modifications; Dredging or direct impact to habitat

- Actions:
- *Resource and habitat protection; Protect preferred habitat from impacts. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Prevent dredging or other direct impacts to preferred habitat. Rank: 2*  
- Measure: Number/Plans

#### Threat 2 - Household sewage and urban waste water; Water quality impacts to habitats

- Actions:
- *Data collection and analysis; Create grants to promote research to study population impacts beyond human impacts. Rank: 2*  
- Measure: Number

### Atlantic Cod

*Gadus morhua*

### Marine Fish

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#### Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Species management; Continue to implement management plans to restore spawning population and prevent overharvest. Rank: 3*

- Measure: Projects/Plans
- Policies and regulations; Create regulations to protect spawning populations. Rank: 3  
- Measure: Number/Plans

**Threat 2 - Temperature extremes; Temperature impacting habitat**

- Actions:
- Data collection and analysis; Collect data and monitor the population. Rank: 2  
- Measure: Number
  - Other; Adopt comprehensive ecosystem based management strategy. Rank: 2  
- Measure: Other

**Threat 3 - Lack of information**

- Actions:
- Data collection and analysis; Collect data and monitor the population. Rank: 3  
- Measure: Number

**Atlantic Herring**

*Clupea harengus*

**Marine Fish**

**Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- Species management; Continue to implement plans that promote protection of spawning stock. Rank: 3  
- Measure: Projects/Plans
  - Species recovery; Create management plans that promote species rebuilding plans. Rank: 1  
- Measure: Number/Animals
  - Policies and regulations; Create management systems useful for high volume fisheries. Rank: 2  
- Measure: Number/Plans
  - Compliance and enforcement; Enforce management system regulations that are useful for high volume fisheries. Rank: 2  
- Measure: Number/Interventions/Cases

**Threat 2 - Problematic native species; Predation by multiple species (cormorants, striped bass, etc.)**

- Actions:
- Resource and habitat protection; Continue to protect areas of known spawning aggregations. Rank: 3  
- Measure: Acres/Sites/Miles
  - Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 3  
- Measure: Number

**Threat 3 - Temperature extremes; Climate change impacting spatial areas with which herring are associated**

- Actions:
- Research, survey, inventory, monitor populations; Monitor and assess if abundance is shifting spatially. Rank: 2  
- Measure: Number/Studies

**Atlantic Menhaden**

*Brevoortia tyrannus*

**Marine Fish**

**Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- Resource and habitat protection; Protect areas that menhaden frequent and aggregate so they are not as susceptible to overharvest. Rank: 3  
- Measure: Acres/Sites/Miles
  - Species management; Implement regulations that can support ecological needs as well as human needs. Rank: 3  
- Measure: Projects/Plans
  - Policies and regulations; Develop regulations that are enforceable and effective for harvest control and management of this high volume fishery. Rank: 2  
- Measure: Number/Plans
  - Compliance and enforcement. Rank: 2  
- Measure: Number/Interventions/Cases

**Threat 2 - Problematic native species; Predation by multiple species (cormorants, striped bass, etc.)**

- Actions:
- *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 3*
    - Measure: Number

## Atlantic Silverside

## Marine Fish

*Menidia menidia*

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### Threat 1 - Household sewage and urban waste water; Water quality impacts to habitats

- Actions:
- *Resource and habitat protection; Protect areas that silversides frequent and aggregate . Rank: 2*
    - Measure: Acres/Sites/Miles
  - *Data collection and analysis; Create grants to promote research to study population impacts . Rank: 2*
    - Measure: Number

## Atlantic Tomcod

## Marine Fish

*Microgadus tomcod*

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### Threat 1 - Household sewage and urban waste water; Water quality impacts to habitats

- Actions:
- *Resource and habitat protection; Protect areas of preferred habitat. Rank: 2*
    - Measure: Acres/Sites/Miles

### Threat 2 - Temperature extremes; Climate change impacting spatial areas with which tomcod are associated

- Actions:
- *Data collection and analysis; Create grants to promote research to study the population and human induced impacts to that population. Rank: 2*
    - Measure: Number
  - *Planning; Include climate change implications in plans that affect tomcod. Rank: 2*
    - Measure: Number

## Bay Anchovy

## Marine Fish

*Anchoa mitchilli*

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### Threat 1 - Household sewage and urban waste water; Water quality impacts to habitats

- Actions:
- *Resource and habitat protection; Research is needed to identify the preferred habitat areas, so that they may be protected. Rank: 2*
    - Measure: Acres/Sites/Miles

### Threat 2 - Temperature extremes; Climate change impacting spatial areas bay anchovy are associated with

- Actions:
- *Data collection and analysis; Create grants to promote research to study the population and human induced impacts to that population. Rank: 2*
    - Measure: Number

## Black Sea Bass

## Marine Fish

*Centropristis striata*

---

### Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Resource and habitat protection; Protect of preferred habitat, including complex bottom habitat. Rank: 2*
    - Measure: Acres/Sites/Miles
  - *Species management; Continue to implement management plans to restore spawning population and prevent overharvest. Rank: 3*
    - Measure: Projects/Plans
  - *Habitat and natural process restoration; Enhance areas of preferred habitat, including complex bottom habitat. Rank: 2*
    - Measure: Number/Plans

## **Threat 2 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Policies and regulations; Create regulations to encourage sustainable harvest. Rank: 2*  
- Measure: Number/Plans
  - *Compliance and enforcement; Provide enforcement and resources necessary to enforce protective regulations. Rank: 2*  
- Measure: Number/Interventions/Cases
  - *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 3*  
- Measure: Number

## **Bluefish**

*Pomatomus saltatrix*

## **Marine Fish**

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### **Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Resource and habitat protection; Protect areas of preferred habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Species management; Continue to implement management plans to restore spawning population and prevent overharvest. Rank: 2*  
- Measure: Projects/Plans
  - *Policies and regulations; Continue to implement regulations to encourage sustainable harvest. Rank: 2*  
- Measure: Number/Plans

### **Threat 2 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Compliance and enforcement; Provide enforcement with resources to enforce protective regulations. Rank: 2*  
- Measure: Number/Interventions/Cases
  - *Data collection and analysis; Create grants to continue to increase biological understanding of bluefish as well as promote research to study population impacts beyond fishing related impacts. Rank: 2*  
- Measure: Number

## **False Albacore**

*Euthynnus alletteratus*

## **Marine Fish**

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### **Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Species management; Create management plans to restore spawning population and prevent overharvest. Rank: 1*  
- Measure: Projects/Plans
  - *Nonmonetary value; Promote education to inform public of ecosystem benefits. Rank: 2*  
- Measure: 6.5 nonmonetary value

## **Grubby Sculpin**

*Myoxocephalus aeneaeus*

## **Marine Fish**

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### **Threat 1 - Household sewage and urban waste water; Water quality impacts to habitat;**

- Actions:
- *Resource and habitat protection; Protect areas of preferred habitat. Rank: 2*  
- Measure: Acres/Sites/Miles

### **Threat 2 - Temperature extremes; Temperature extremes impacting habitat**

- Actions:
- *Data collection and analysis; Create grants to promote research to study the population and human impacts to that population. Rank: 2*  
- Measure: Number

## Hogchoker

*Trinectes maculatus*

## Marine Fish

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### Threat 1 - Household sewage and urban waste water; Water quality impacts to habitat;

- Actions:
- Resource and habitat protection; Protect areas of preferred habitat. Rank: 2  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 2  
- Measure: Number/Plans

### Threat 2 - Household sewage and urban waste water; Development impacting habitat quality

- Actions:
- Site/area management; Restore vegetated buffers, implement stormwater controls, reduce nutrient pollution, reduce impervious surfaces, and other watershed protection actions. Rank: 2  
- Measure: Acres/Sites/Miles

## Lined Seahorse

*Hippocampus erectus*

## Marine Fish

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### Threat 1 - Household sewage and urban waste water; Water quality impacts to habitat;

- Actions:
- Resource and habitat protection; Protect areas of preferred habitat. Rank: 2  
- Measure: Acres/Sites/Miles
  - Data collection and analysis; Create grants to promote research to study population impacts. Rank: 1  
- Measure: Number

## Mummichog

*Fundulus heteroclitus*

## Marine Fish

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### Threat 1 - Household sewage and urban waste water; water quality impacts to habitat;

- Actions:
- Site/area protection; Protect areas of preferred habitat. Rank: 2  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 2  
- Measure: Number/Plans

## Northern Sea Robin

*Prionotus carolinus*

## Marine Fish

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### Threat 1 - Problematic native species; Replacement by striped sea robin

- Actions:
- Resource and habitat protection; Protect areas of preferred habitat. Rank: 2  
- Measure: Acres/Sites/Miles
  - Species management; Create management plans to restore spawning population and prevent overharvest. Rank: 2  
- Measure: Projects/Plans
  - Policies and regulations; Create enforceable regulations to promote sustainability of species. Rank: 2  
- Measure: Number/Plans
  - Compliance and enforcement; Create enforceable regulations to promote sustainability of species. Rank: 2  
- Measure: Number/Interventions/Cases

### Threat 2 - Temperature extremes; Due to climate change and severe weather

- Actions:
- Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 2  
- Measure: Number

## Oyster Toadfish

*Opsanus tau*

## Marine Fish

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### Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Species management; Continue to implement plans to restore spawning population and prevent overharvest. Rank: 3*  
- Measure: Projects/Plans
  - *Species recovery; Continue to promote management plans to maintain the rebuilding of the stock. Rank: 2*  
- Measure: Number/Animals

### Threat 2 - Household sewage and urban waste water; Water quality impacts to habitat

- Actions:
- *Habitat and natural process restoration; Continue to promote the restoration of essential habitats. Rank: 3*  
- Measure: Number/Plans
  - *Policies and regulations; Create regulations to prevent or encourage lower bycatch. Rank: 2*  
- Measure: Number/Plans

## Pollock

*Pollathius virens*

## Marine Fish

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### Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Species management; Continue to implement management plans to restore spawning population and prevent overharvest. Rank: 3*  
- Measure: Projects/Plans
  - *Policies and regulations; Create regulations to protect spawning populations. Rank: 3*  
- Measure: Number/Plans

### Threat 2 - Temperature extremes; Temperature impacting habitat

- Actions:
- *Data collection and analysis; Create grants to promote research to study impacts beyond fishing related impacts. Rank: 2*  
- Measure: Number

## Rainwater Killifish

*Lucania parva*

## Marine Fish

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### Threat 1 - Household sewage and urban waste water; Water quality impacts to habitat;

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 2*  
- Measure: Number/Plans

## Sand Tiger

*Carcharias taurus*

## Marine Fish

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### Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Species management; Create management plans to restore spawning population and prevent overharvest. Rank: 3*  
- Measure: Projects/Plans
  - *Policies and regulations; Create regulations to protect spawning populations. Rank: 2*  
- Measure: Number/Plans
  - *Data collection and analysis; Research needed to identify spawning areas. Rank: 2*  
- Measure: Number

## Sheepshead Minnow

*Cyprinodon variegatus*

## Marine Fish

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### Threat 1 - Household sewage and urban waste water; Water quality impacts to habitat;

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 2*  
- Measure: Number/Plans

## Skates

*Raja spp.*

## Marine Fish

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### Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Species management; Continue to implement management plans to restore spawning population and prevent overharvest. Rank: 2*  
- Measure: Projects/Plans
  - *Species recovery; Promote management plans to maintain the rebuilding of the stock. Rank: 2*  
- Measure: Number/Animals

## Spiny Dogfish

*Squalus acanthias*

## Marine Fish

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### Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability

- Actions:
- *Species management; Continue to implement management plans to restore spawning population and prevent overharvest. Rank: 2*  
- Measure: Projects/Plans
  - *Species recovery; Continue to promote management plans to maintain the rebuilding of the stock. Rank: 2*  
- Measure: Number/Animals

## Spotfin Killifish

*Fundulus luciae*

## Marine Fish

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### Threat 1 - Lack of information; More info needed on this species

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 2*  
- Measure: Number/Plans
  - *Data collection and analysis; Research occurrence of this species in RI waters. Rank: 2*  
- Measure: Number

## Sticklebacks

*Gasterosteus spp*

## Marine Fish

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### Threat 1 - Housing and urban areas; Development and land use impacting habitat;

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 2*  
- Measure: Number/Plans

### Threat 2 - Household sewage and urban waste water; Water quality impacts to habitat

- Actions:
- *Site/area management; Restore vegetated buffers, implement stormwater controls, reduce*

*nutrient pollution, reduce impervious surfaces, and other watershed protection actions. Rank: 2*  
*- Measure: Acres/Sites/Miles*

## **Striped Killifish**

*Fundulus majalis*

## **Marine Fish**

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### **Threat 1 - Household sewage and urban waste water; Water quality impacts to habitat**

- Actions:
- *Site/area protection; Protect areas of preferred habitat. Rank: 2*  
*- Measure: Acres/Sites/Miles*
  - *Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 2*  
*- Measure: Number/Plans*

## **Tautog**

*Tautoga onitis*

## **Marine Fish**

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### **Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Resource and habitat protection; Protect areas of preferred habitat. Rank: 3*  
*- Measure: Acres/Sites/Miles*
  - *Habitat and natural process restoration; Promote the restoration and enhancement of essential habitats. Rank: 3*  
*- Measure: Number/Plans*
  - *Species recovery; Strengthen current management program to increase the speed of recovery. Rank: 3*  
*- Measure: Number/Animals*
  - *Policies and regulations; Strengthen current management program to increase the speed of recovery. Rank: 3*  
*- Measure: Number/Plans*
  - *Compliance and enforcement; Strengthen current management plan to increase the speed of recovery. Rank: 3*  
*- Measure: Number/Interventions/Cases*

### **Threat 2 - Temperature extremes; Temperature extremes impacting juvenile life stages**

- Actions:
- *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts. Rank: 2*  
*- Measure: Number*

## **Windowpane**

*Scophthalmus aquosus*

## **Marine Fish**

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### **Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Species management; Create management plans to restore spawning population and prevent overharvest. Rank: 3*  
*- Measure: Projects/Plans*
  - *Policies and regulations; Create regulations to encourage sustainable harvest. Rank: 3*  
*- Measure: Number/Plans*

## **Winter Flounder**

*Pseudopleuronectes americanus*

## **Marine Fish**

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### **Threat 1 - Fishing and harvesting aquatic resources; Fishing impacting population sustainability**

- Actions:
- *Species management; Continue to implement management plans to restore spawning population and prevent overharvest. Rank: 3*  
*- Measure: Projects/Plans*

- *Species recovery; Promote management plans to maintain the rebuilding of the stock. Rank: 3*  
- Measure: Number/Animals
- *Policies and regulations; Create regulations to encourage sustainable harvest. Rank: 3*  
- Measure: Number/Plans

**Threat 2 - Invasive non-native/alien species; Predation impacts from non native species and species expanding their range**

- Actions:
- *Habitat and natural process restoration; Promote the restoration of essential habitats. Rank: 3*  
- Measure: Number/Plans
  - *Policies and regulations; Create regulations to encourage sustainable harvest. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Temperature extremes; Temperature impacting habitat**

- Actions:
- *Data collection and analysis; Create grants to promote research to study population impacts beyond fishing related impacts, such as replacement by non-native striped sea robin. Rank: 3*  
- Measure: Number

# HERPS

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## Herps (taxa wide)

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### **Invasive non-native/alien species; Habitat loss and demographic changes from invasive species (vegetation and animal)**

- Actions:
- *Data collection and analysis; Research invasive species management and monitoring protocols. Rank: 3*
  - *Alliance and partnership development; Coordinate invasive species management with other state and regional programs. Rank: 2*
  - *Planning; Create and implement invasive species monitoring protocol. Rank: 1*
  - *Data collection and analysis; Identify potential damaging aquatic invasives and exotics Rank: 2. Rank: 2*
  - *Planning; Develop and implement sampling protocol for aquatic exotics.*

### **Transportation and service corridors; Habitat fragmentation from road effects**

- Actions:
- *Technical assistance; Establish discussions with state and local D.O.T.*
  - *Data collection and analysis; Identify areas of significant road effects in focal areas. Rank: 3*
  - *Habitat and natural process restoration; Conduct road mitigations where required. Rank: 3*
  - *Planning; Assess means to mitigate road effects. Rank: 3*

### **Pollution; Habitat fragmentation and degradation from chemical contaminants and disease**

- Actions:
- *Technical assistance; Coordinate with mosquito abatement personnel for chemical management.*
  - *Data collection and analysis; Identify chemical sources and compounds of concern. Rank: 3*
  - *Alliance and partnership development; Coordinate chemical management with other state and regional programs. Rank: 2*

### **Biological resource use; Demographic changes from incidental take (human)**

- Actions:
- *Education and awareness; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 3*
  - *Alliance and partnership development; Coordinate incidental take programs with regional or national initiatives.*

### **Lack of Planning; Habitat fragmentation from lack of focal area approach to conservation**

- Actions:
- *Outreach; Outreach to golf courses in focal areas concerning impact of vegetation and chemical use. Rank: 2*
  - *Outreach; Outreach to nurseries in focal areas concerning chemical use. Rank: 3*

### **Lack of information; Lack of information for monitoring and on-going assessment**

- Actions:
- *Research, survey, inventory, monitor habitats; Monitor spatial qualities of habitat. Rank: 3*

### **Residential and commercial development; Habitat loss from impairment of aquatic contiguity**

- Actions:
- *Habitat and natural process restoration; Enhance habitat connectivity for priority species with culverts. Rank: 2*

# AMPHIBIANS

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## Eastern Spadefoot

*Scaphiopus holbrookii*

## Amphibians

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### Threat 1 - Housing and urban areas; Preferred sandy soil type is also preferred by developers

- Actions:
- *Site/area protection; Area sensitive species, requires large landscape with multiple breeding sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Breeding sites not protected, so identify breeding sites and protect them. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect wetlands and associated upland habitats. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect wetlands and associated uplands. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3*  
- Measure: Number
  - *Habitat and natural process restoration; Construct and maintain new amphibian breeding habitat (seasonal pond project). Rank: 1*  
- Measure: Number/Plans

### Threat 2 - Roads and railroads; Road mortality and habitat fragmentation

- Actions:
- *Habitat and natural process restoration; Focal area/effective preserve size; restore natural migration routes; create breeding habitat; manage upland vegetation . Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Invasive non-native/alien species; Disease is an issue as are bullfrogs and upland vegetation

- Actions:
- *Species management; Monitoring and management. Rank: 3*  
- Measure: Projects/Plans
  - *Ex situ conservation; Head starting and captive breeding, one management action could be tadpole collection and rearing for recruitment purposes. Rank: 3*  
- Measure: Number

### Threat 4 - Droughts; The drying of breeding sites due to drought

- Actions:
- *Policies and regulations; Climate change may cause drought so needed to address climate change. Rank: 3*  
- Measure: Number/Plans

### Threat 5 - Natural systems modification; Loss of habitat from plant succession

- Actions:
- *Data collection and analysis; Identify new parcels needing serial-stage management. Rank: 3*  
- Measure: Number
  - *Species management; Manage important habitats as required. Rank: 3*  
- Measure: Projects/Plans
  - *Planning; Implement burn management on priority parcels. Rank: 3*  
- Measure: Number

### Threat 6 - Lack of information

- Actions:
- *Data collection and analysis; Research abundance and distribution of species for which status and habitat can be determined, by including additional data collection in present studies. Rank: 3*  
- Measure: Number

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## Four-toed Salamander

*Hemidactylium scutatum*

## Amphibians

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### Threat 1 - Housing and urban areas; Loss of habitat

- Actions:
- *Site/area protection; Localized migratory species. Rank: 3*  
- Measure: Acres/Sites/Miles

- *Resource and habitat protection; Some evidence for persistence in suburban areas. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
- *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans
- *Awareness and communications; Need to educate the public about habitat loss and species life history, publish the Amphibians of Rhode Island. Rank: 3*  
- Measure: Number
- *Data collection and analysis; Identify priority parcels to retain as core forest areas with minimal management. Rank: 3*  
- Measure: Number

#### **Threat 2 - Roads and railroads; Road mortality in the migratory pathway**

- Actions:*
- *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, look for opportunities to modify culverts, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

#### **Threat 3 - Dams and water management/use; Water flow can be restricted by culverts**

- Actions:*
- *Resource and habitat protection; Protect breeding wetlands, maintain existing hydrology, no dry outs or diverting stormwater to wetlands. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Enhance degraded habitat where possible. Rank: 3*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Construct and maintain new amphibian breeding habitat (seasonal pond project). Rank: 1*  
- Measure: Number/Plans

#### **Threat 4 - Invasive non-native/alien species; Disease**

- Actions:*
- *Species management; Monitoring and management. Rank: 3*  
- Measure: Projects/Plans

#### **Threat 5 - Droughts; The drying of breeding sites due to drought**

- Actions:*
- *Policies and regulations; Needed to address climate change. Rank: 3*  
- Measure: Number/Plans

#### **Threat 6 - Residential and commercial development; Loss of riparian vegetation, fringe wetlands due to shoreline development, bulkheads, and poor urban development**

- Actions:*
- *Site/area protection; Wherever possible, 'soft' approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modifications should be used. Rank: 1*  
- Measure: Acres/Sites/Miles

## **Fowler's Toad**

*Anaxyrus fowleri*

## **Amphibians**

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#### **Threat 1 - Housing and urban areas; Preferred sandy soil type is also preferred by developers**

- Actions:*
- *Site/area protection; Localized on the landscape; some breeding sites protected. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Wherever possible, 'soft' approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modifications should be used. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3*

- Measure: Number
- *Habitat and natural process restoration; Construct and maintain new amphibian breeding habitat (seasonal pond project). Rank: 3*
- Measure: Number/Plans

**Threat 2 - Roads and railroads; Road mortality in the migratory pathway**

- Actions:
- *Habitat and natural process restoration; Restore habitat where possible. Rank: 3. Species management*
  - Measure: Number/Plans

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

- Actions:
- *Site/area protection; Protect natural hydrology. Rank: 3*
  - Measure: Acres/Sites/Miles
  - *Site/area management; Restore natural hydrology where possible. Rank: 3*
  - Measure: Acres/Sites/Miles

**Threat 4 - Recreational activities; ORV use**

- Actions:
- *Site/area management; Fencing to protect habitat from ORV use. Rank: 3. Species management*
  - Measure: Acres/Sites/Miles
  - *Awareness and communications; Need to educate the public about the threat of ORVs in the habitat. Rank: 3*
  - Measure: Number
  - *Compliance and enforcement; Need for ORV restrictions in habitat. Rank: 3*
  - Measure: Number/Interventions/Cases

**Threat 5 - Invasive non-native/alien species; Release of non-native bullfrogs, fish predation of eggs and larvae, disease**

- Actions:
- *Awareness and communications; Educating the public about the threat of releasing bullfrogs. Rank: 3*
  - Measure: Number
  - *Compliance and enforcement; Enforcing the regulations prohibiting the sale of bullfrogs. Rank: 3*
  - Measure: Number/Interventions/Cases
  - *Species management; Monitoring and management. Rank: 3*
  - Measure: Projects/Plans

**Threat 6 - Household sewage and urban waste water; Road run-off, road salt**

- Actions:
- *Site/area management; Protect the habitat from road run-off, work with RI DOT to limit salt use in habitat. Rank: 3*
  - Measure: Acres/Sites/Miles
  - *Species management. Rank: 3*
  - Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; The drying of breeding areas due to drought, sea level rise**

- Actions:
- *Policies and regulations; Needed to address climate change. Rank: 3*
  - Measure: Number/Plans

**Threat 8 - Natural system modifications; Loss of habitat from plant succession**

- Actions:
- *Data collection and analysis; Identify priority parcels needing serial-stage management. Rank: 3*
  - Measure: Number
  - *Species management; Manage important habitats as required. Rank: 3*
  - Measure: Projects/Plans

**Marbled Salamander**

*Ambystoma opacum*

**Amphibians**

**Threat 1 - Residential and commercial development; Habitat soils make sites highly preferred by developers**

- Actions:
- *Site/area protection; Localized on the landscape; some breeding sites protected. Rank: 3*
  - Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Wherever possible, 'soft' approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modifications should be used. Rank: 1*

- Measure: Acres/Sites/Miles
- Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3
  - Measure: Number
- Policies and regulations; Need policies and regulations to protect habitat. Rank: 3
  - Measure: Number/Plans
- Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3
  - Measure: Number
- Land/water management; Identify priority parcels to retain as core forest areas with minimal management. Rank: 3
  - Measure: Acres/Sites/Projects

**Threat 2 - Roads and railroads; Road mortality in the migratory pathway**

- Actions:
- Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3
    - Measure: Number/Plans

**Threat 3 - Dams and water management/use; Water withdrawal and water restrictions due to culverts**

- Actions:
- Resource and habitat protection; Protect natural hydrology. Rank: 3
    - Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restore natural hydrology where possible, look for opportunities to modify culverts, work with RI DOT. Rank: 3
    - Measure: Number/Plans

**Threat 4 - Invasive and other problematic species and genes; Disease, bullfrogs, fish**

- Actions:
- Awareness and communications; Educating the public about the threat of releasing bullfrogs. Rank: 3
    - Measure: Number
  - Compliance and enforcement; Enforcing regulations prohibiting sale of bullfrogs. Rank: 3
    - Measure: Number/Interventions/Cases
  - Species management; Monitoring and management. Rank: 3
    - Measure: Projects/Plans

**Threat 5 - Household sewage and urban waste water; Road runoff**

- Actions:
- Site/area management; Protect the habitat from road run-off, work with RI DOT to limit salt use in habitat areas. Rank: 3
    - Measure: Acres/Sites/Miles

**Threat 6 - Climate change and severe weather; Sea level rise and drying of areas due to droughts**

- Actions:
- Law and policy; Needed to address climate change. Rank: 3
    - Measure: Number

**Threat 7 - Residential and commercial development; Loss of breeding habitat for amphibians**

- Actions:
- Habitat and natural process restoration. Rank: 1
    - Measure: Number/Plans

**Northern Dusky Salamander**

*Desmognathus fuscus*

**Amphibians**

**Threat 1 - Housing and urban areas; Degradation of streams, negatively modified near developed areas**

- Actions:
- Site/area protection; Localized on the landscape. Rank: 3
    - Measure: Acres/Sites/Miles
  - Resource and habitat protection; Species depends on groundwater seepage. Rank: 3
    - Measure: Acres/Sites/Miles
  - Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3
    - Measure: Number
  - Policies and regulations; Need policies and regulations to protect habitat. Rank: 3
    - Measure: Number/Plans
  - Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3

- Measure: Number
- *Planning; Identify priority parcels to retain as core forest areas with minimal management. Rank: 3*
- Measure: Number

**Threat 2 - Household sewage and urban waste water; Road runoff, siltation, road salt, scarification of streambeds**

- Actions:*
- *Resource and habitat protection; Protect the habitat from road run-off, work with RI DOT to limit salt use in habitat areas. Rank: 3*
  - Measure: Acres/Sites/Miles
  - *Research, survey, inventory, monitor habitats; Assess effects of stream bank disturbance. Rank: 2*
  - Measure: Number/Studies

**Threat 3 - Dams and water management/use; Water withdrawal and water restriction due to culverts**

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

**Threat 4 - Climate change and severe weather; Sea level rise and drying of breeding sites with drought**

- Actions:*
- *Policies and regulations; Needed to address climate change. Rank: 2*
  - Measure: Number/Plans

**Threat 5 - Invasive non-native/alien species; Disease**

- Actions:*
- *Species management; Monitoring and management. Rank: 1*
  - Measure: Projects/Plans

**Northern Leopard Frog**

*Lithobates pipiens*

**Amphibians**

**Threat 1 - Agriculture and aquaculture; Upland habitat highly developed for agriculture**

- Actions:*
- *Site/area protection; Large landscape species; also wherever possible, 'soft' approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modifications should be used. Rank: 3*
  - Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Breeding sites not protected. Rank: 3*
  - Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect wetlands and associated upland habitats. Rank: 3*
  - Measure: Number
  - *Policies and regulations; Need policies and regulations to protect wetlands and associated uplands. Rank: 3*
  - Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3*
  - Measure: Number
  - *Data collection and analysis; Research abundance and distribution of species for which status and habitat can be determined, by including additional data collection in present studies. Rank: 3*
  - Measure: Number

**Threat 2 - Agricultural and forestry effluents; Pollution in breeding habitats from agriculture**

- Actions:*
- *Site/area management; Requires hayfields or grazing or mowing regimes, work with farmers. Rank: 3*
  - Measure: Acres/Sites/Miles

**Threat 3 - Dams and water management/use; Water withdrawal and water restrictions due to culverts**

- Actions:*
- *Resource and habitat protection; Protect natural hydrology. Rank: 3*
  - Measure: Acres/Sites/Miles

- *Habitat and natural process restoration; Restore natural hydrology where possible, look for opportunities to modify culverts, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Invasive non-native/alien species; Disease**

- Actions: • *Species management; Monitoring and management. Rank: 3*  
- Measure: Projects/Plans

**Threat 5 - Droughts; Drying of breeding sites**

- Actions: • *Policies and regulations; Needed to address climate change. Rank: 3*  
- Measure: Number/Plans

**Threat 6 - Natural system modifications; Loss of habitat from plant succession**

- Actions: • *Data collection and analysis; Identify priority parcels needing serial-stage management, especially for Lepidoptera habitat. Rank: 3*  
- Measure: Number
- *Species management; Manage important habitats as required. Rank: 3*  
- Measure: Projects/Plans
  - *Habitat and natural process restoration; Construct and maintain new amphibian habitat, and breeding habitat (seasonal pond project). Rank: 3*  
- Measure: Number/Plans

**Threat 7 - Lack of information; Lack of information from research to address habitat and taxonomic issues**

- Actions: • *Data collection and analysis; Assess taxonomy/population relationships. Rank: 2*  
- Measure: Number

**Northern Spring Salamander**

*Gyrinophilus porphyriticus porphyriticus*

**Amphibians**

**Threat 1 - Housing and urban areas; Degradation of streams, negatively modified near developed areas**

- Actions: • *Site/area protection; Localized on the landscape. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Resource and habitat protection; Species depends on groundwater seepage. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3*  
- Measure: Number
  - *Land/water management; Identify priority parcels to retain as core forest areas with minimal management. Rank: 3*  
- Measure: Acres/Sites/Projects

**Threat 2 - Household sewage and urban waste water; Road runoff, siltation, road salt, scarification of streambeds**

- Actions: • *Resource and habitat protection; Protect the habitat from road run-off, work with RI DOT to limit salt use and stop siltation in habitat. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Site/area management; Restore habitat where it can be restored. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 3 - Dams and water management/use; Water withdrawal and water restrictions due to culverts**

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

**Threat 4 - Climate change and severe weather; Sea level rise and drying of breeding sites with drought**

- Actions: • *Law and policy; Needed to address climate change. Rank: 2*  
- Measure: Number

**Threat 5 - Invasive non-native/alien species; Disease**

- Actions: • *Species management; Monitoring and management. Rank: 1*  
- Measure: Projects/Plans

**Red-spotted Newt**

*Notophthalmus viridescens viridescens*

**Amphibians**

**Threat 1 - Residential and commercial development; Habitat soils make sites highly preferred by developers**

- Actions: • *Site/area protection; Localized on the landscape. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Resource and habitat protection; Some breeding sites protected. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3*  
- Measure: Number

**Threat 2 - Roads and railroads; Road mortality in the migratory pathway**

- Actions: • *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Dams and water management/use; Water withdrawal and water restrictions due to culverts**

- Actions: • *Resource and habitat protection; Protect natural hydrology. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Habitat and natural process restoration; Restore natural hydrology where possible, look for opportunities to modify culverts, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

**Threat 4 - Invasive and other problematic species and genes; Disease, bullfrogs, fish**

- Actions: • *Awareness and communications; Educating the public about the threats of releasing bullfrogs. Rank: 3*  
- Measure: Number
- *Compliance and enforcement; Enforcing regulations prohibiting sale of bullfrogs. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Species management; Monitoring and management. Rank: 3*  
- Measure: Projects/Plans

**Threat 5 - Household sewage and urban waste water; Road runoff**

- Actions: • *Site/area management; Protect the habitat from road run-off, work with RI DOT to limit salt use in habitat areas. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 6 - Climate change and severe weather; Sea level rise and drying of breeding sites, drought**

- Actions: • *Policies and regulations; Needed to address climate change. Rank: 3*  
- Measure: Number/Plans

**Spotted Salamander**

*Ambystoma maculatum*

**Amphibians**

**Threat 1 - Residential and commercial development; Habitat soils make sites highly preferred by developers**

- Actions: • *Site/area protection; Localized on the landscape. Rank: 3*  
- Measure: Acres/Sites/Miles
- *Resource and habitat protection; Some breeding sites protected. Rank: 3*

- Measure: Acres/Sites/Miles
- Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3  
- Measure: Number
- Policies and regulations; Need policies and regulations to protect habitat. Rank: 3  
- Measure: Number/Plans
- Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3  
- Measure: Number

**Threat 2 - Roads and railroads; Road mortality in the migratory pathway**

- Actions: • Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Dams and water management/use; Water withdrawal and water restrictions due to culverts**

- Actions: • Resource and habitat protection; Protect natural hydrology. Rank: 3  
- Measure: Acres/Sites/Miles
- Habitat and natural process restoration; Restore natural hydrology, look for opportunities to modify culverts, work with RI DOT. Rank: 3  
- Measure: Number/Plans

**Threat 4 - Invasive and other problematic species and genes; Disease, bullfrogs, fish**

- Actions: • Awareness and communications; Educating the public about the threats of releasing bullfrogs. Rank: 3  
- Measure: Number
- Compliance and enforcement; Enforcing regulations prohibiting sale of bullfrogs. Rank: 3  
- Measure: Number/Interventions/Cases
- Species management; Monitoring and management. Rank: 3  
- Measure: Projects/Plans

**Threat 5 - Climate change and severe weather; Sea level rise and drying of breeding sites**

- Actions: • Law and policy; Needed to address climate change. Rank: 3  
- Measure: Number

**Wood Frog**

*Lithobates sylvaticus*

**Amphibians**

**Threat 1 - Residential and commercial development; Habitat soils make sites highly preferred by developers**

- Actions: • Site/area protection; Localized on the landscape. Rank: 3  
- Measure: Acres/Sites/Miles
- Resource and habitat protection; Some breeding sites protected. Rank: 3  
- Measure: Acres/Sites/Miles
- Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3  
- Measure: Number
- Policies and regulations; Need policies and regulations to protect habitat. Rank: 3  
- Measure: Number/Plans
- Awareness and communications; Need to educate the public about habitat loss and species' life history, publish the Amphibians of Rhode Island. Rank: 3  
- Measure: Number
- Habitat and natural process restoration; Construct and maintain new amphibian breeding habitat (seasonal pond project). Rank: 1  
- Measure: Number/Plans

**Threat 2 - Roads and railroads; Road mortality in the migratory pathway**

- Actions: • Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Dams and water management/use; Water withdrawal and water restrictions due to culverts**

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

- Measure: Acres/Sites/Miles

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

- Measure: Number/Plans

**Threat 4 - Invasive and other problematic species and genes; Disease, bullfrogs, fish**

Actions: • *Awareness and communications; Educating the public about the threats of releasing bullfrogs. Rank: 3*

- Measure: Number

- *Compliance and enforcement; Enforcing regulations prohibiting sale of bullfrogs. Rank: 3*

- Measure: Number/Interventions/Cases

**Threat 5 - Household sewage and urban waste water; Road runoff**

Actions: • *Site/area management; Protect the habitat from road run-off, work with RI DOT to limit salt use in habitat areas. Rank: 3*

- Measure: Acres/Sites/Miles

**Threat 6 - Invasive non-native/alien species; Disease**

Actions: • *Species management; Monitoring and management. Rank: 3*

- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Sea level rise and drying of breeding sites, drought**

Actions: • *Policies and regulations; Needed to address climate change. Rank: 3*

- Measure: Number/Plans

**Threat 8 - Lack of information; Lack of information for monitoring and ongoing assessment**

Actions: • *Data collection and analysis; Continue established long-term monitoring protocols (enhancing when necessary). Rank: 2*

- Measure: Number

**Threat 9 - Residential and commercial development; Loss of riparian vegetation, fringe wetlands due to shoreline development, bulkheads, and poor urban development**

Actions: • *Site/area protection; Wherever possible, 'soft' approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modifications should be used. Rank: 1*

- Measure: Acres/Sites/Miles

# REPTILES

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## Atlantic Green Turtle

*Chelonia mydas mydas*

## Reptiles

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### Threat 1 - Fishing and harvesting aquatic resources; Bycatch issue

- Actions:
- *Linked enterprises and livelihood alternatives; Need to work with fishing industry and NMFS to develop new gear. Rank: 3*  
- Measure: Number
  - *Formal education; Fishing industry needs to be trained about life history of species. Rank: 2*  
- Measure: Students/Instructors
  - *Policies and regulations; Need to develop law and policies to protect the species. Rank: 3*  
- Measure: Number/Plans
  - *Ex situ conservation; Rescue and rehab. Rank: 2*  
- Measure: Number/Plans
  - *Data collection and analysis; Research on modified fishing gear. Rank: 2*  
- Measure: Number

### Threat 2 - Temperature extremes; Temperature extremes can increase strandings

- Actions:
- *Law and policy; Needed to address climate change. Rank: 1*  
- Measure: Number

## Common Ribbonsnake

*Thamnophis sauritus sauritus*

## Reptiles

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### Threat 1 - Housing and urban areas; Localized species with a specialized habitat, affected by habitat loss

- Actions:
- *Land/water protection; Depends on robust amphibian populations for food source; Construct new and maintain amphibian habitat, including breeding habitat (seasonal pond project). Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Site/area management; Some habitat not protected. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and the species' life history, publish the Reptiles of Rhode Island. Rank: 3*  
- Measure: Number
  - *Research, survey, inventory, monitor populations; Determine metapopulation structure. Rank: 3*  
- Measure: Number/Studies

### Threat 2 - Roads and railroads; Road mortality

- Actions:
- *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify culverts, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

### Threat 3 - Human intrusions and disturbance; Persecution of snakes by humans

- Actions:
- *Awareness and communications; Need to educate the public about the species' value and life history, publish the Reptiles of Rhode Island. Rank: 3*  
- Measure: Number

### Threat 4 - Household sewage and urban waste water; Road runoff

- Actions:
- *Site/area management; Protect habitat from chemical runoff, work with RI DOT. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restore habitat from chemical runoff where possible. Rank: 3*  
- Measure: Number/Plans

### Threat 5 - Invasive and other problematic species and genes; Disease

- Actions:
- *Species management; Monitoring and management. Rank: 2*  
- Measure: *Projects/Plans*
  - *Ex situ conservation; Headstart and captive breeding. Rank: 2*  
- Measure: *Number*

**Threat 6 - Natural system modifications; Loss of habitat from plant succession**

- Actions:
- *Data collection and analysis; Identify priority parcels needing serial-stage management. Rank: 3*  
- Measure: *Number*
  - *Habitat and natural process restoration; Develop fire prescriptions and implement burn management on priority parcels. Rank: 3*  
- Measure: *Number/Plans*
  - *Species management; Manage important habitats as required. Rank: 3*  
- Measure: *Projects/Plans*

**Threat 7 - Pollution; Habitat degradation from impairment of water quality**

- Actions:
- *Data collection and analysis; Assess effects of water withdrawals. Rank: 2*  
- Measure: *Number*

**Threat 8 - Residential and commercial development; Loss of riparian vegetation, fringe wetlands due to shoreline development, bulkheads, and poor urban development**

- Actions:
- *Site/area protection; Wherever possible, 'soft' approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modification should be used. Rank: 3*  
- Measure: *Acres/Sites/Miles*

**Eastern Box Turtle**

*Terrapene carolina carolina*

**Reptiles**

**Threat 1 - Residential and commercial development; Habitat preferred by developers**

- Actions:
- *Research, survey, inventory, monitor populations; Determine metapopulation structure. Rank: 3*  
- Measure: *Number/Studies*
  - *Land/water protection; Area sensitive species, and some habitat not protected. Rank: 3*  
- Measure: *Acres/Sites/Miles*
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: *Number*
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: *Number/Plans*
  - *Awareness and communications; Need to educate the public about habitat loss and the species' life history, publish the Reptiles of Rhode Island. Rank: 3*  
- Measure: *Number*

**Threat 2 - Roads and railroads; Road mortality**

- Actions:
- *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3*  
- Measure: *Number/Plans*

**Threat 3 - Hunting and collecting terrestrial animals; Take of species from the wild (human)**

- Actions:
- *Awareness and communications; Need to educate the public about the damage that removal from the wild can do to the population. Rank: 3*  
- Measure: *Number*
  - *Compliance and enforcement; Enforce compliance. Rank: 3*  
- Measure: *Number/Interventions/Cases*

**Threat 4 - Human intrusions and disturbance; Moving turtles from original habitat (human)**

- Actions:
- *Awareness and communications; Need to educate the public about moving animals and what it can do to the population. Rank: 3*  
- Measure: *Number*
  - *Compliance and enforcement; Enforce compliance. Rank: 3*  
- Measure: *Number/Interventions/Cases*

**Threat 5 - Problematic native species; Egg predation**

- Actions:
- *Site/area management; Control predators. Rank: 2*

- Measure: Acres/Sites/Miles
- *Species management; Nesting area protection, monitoring, possible predator excluder cages for nests. Rank: 1*
- Measure: Projects/Plans

**Threat 6 - Other ecosystem modifications; Plant succession limiting breeding habitat**

- Actions:
- *Site/area management; Limit disturbance in nesting areas. Rank: 2*
  - Measure: Acres/Sites/Miles
  - *Invasive/problematic species control; Eliminate vegetation. Rank: 2*
  - Measure: Acres/Sites/Projects
  - *Data collection and analysis; Identify priority parcels needing serial-stage management. Rank: 3*
  - Measure: Number
  - *Habitat and natural process restoration; Develop fire prescriptions and implement burn management on priority parcels. Rank: 3*
  - Measure: Number/Plans
  - *Species management; Manage important habitats as required. Rank: 3*
  - Measure: Projects/Plans

**Threat 7 - Invasive non-native/alien species; Disease**

- Actions:
- *Species management; Monitoring and management. Rank: 2*
  - Measure: Projects/Plans
  - *Ex situ conservation; Headstarting and captive breeding. Rank: 1*
  - Measure: Number
  - *Outreach; Develop and provide educational information about invasive species. Rank: 2*
  - Measure: Number/Projects/Reviews
  - *Planning; Develop and implement invasive species management program. Rank: 2*
  - Measure: Number

**Eastern Hog-nosed Snake**

*Heterodon platirhinos*

**Reptiles**

**Threat 1 - Housing and urban areas; Localized species with a specialized habitat, negatively affected by habitat loss**

- Actions:
- *Site/area protection; Large landscape species. Rank: 3*
  - Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Depends on robust amphibian population for food source, can benefit from selective forestry management/openings/successional habitat, work with foresters. Rank: 3*
  - Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*
  - Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*
  - Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and the species' life history, publish the Reptiles of Rhode Island. Rank: 3*
  - Measure: Number
  - *Habitat and natural process restoration; Restore habitats where toads occur. Rank: 3*
  - Measure: Number/Plans

**Threat 2 - Roads and railroads; Road mortality**

- Actions:
- *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3*
  - Measure: Number/Plans

**Threat 3 - Human intrusions and disturbance; Persecution of snakes by humans**

- Actions:
- *Awareness and communications; Need to educate the public about the species' value and life history, publish the Reptiles of Rhode Island. Rank: 3*
  - Measure: Number

**Threat 4 - Recreational activities; ORV use in the habitat**

- Actions:
- *Habitat and natural process restoration; Protect habitat of toads, eliminate ORV use. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Educate the public about species' habitat needs. Rank: 3*  
- Measure: Number
  - *Compliance and enforcement; Enforce ORV restrictions. Rank: 3*  
- Measure: Number/Interventions/Cases

**Threat 5 - Hunting and collecting terrestrial animals; Take of species from the wild (human)**

- Actions:
- *Awareness and communications; Need to educate the public about the damage that removal from the wild can do to the population. Rank: 3*  
- Measure: Number
  - *Compliance and enforcement; Enforce compliance. Rank: 3*  
- Measure: Number/Interventions/Cases

**Threat 6 - Household sewage and urban waste water; Road runoff contamination and siltation**

- Actions:
- *Site/area management; Protect habitat from chemical runoff, work with RI DOT. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restore habitats where possible. Rank: 3*  
- Measure: Number/Plans

**Threat 7 - Invasive non-native/alien species; Disease**

- Actions:
- *Species management; Monitoring and management. Rank: 2*  
- Measure: Projects/Plans
  - *Ex situ conservation; Headstarting and captive breeding. Rank: 2*  
- Measure: Number

**Threat 8 - Natural system modifications; Loss of habitat from plant succession**

- Actions:
- *Data collection and analysis; Identify priority parcels needing serial-stage management. Rank: 3*  
- Measure: Number
  - *Habitat and natural process restoration; Develop fire prescriptions and implement burn management on priority parcels. Rank: 3*  
- Measure: Number/Plans
  - *Species management; Manage important habitats as required.*  
- Measure: Projects/Plans

**Threat 9 - Lack of information; Collect data from which status and habitat of species can be determined**

- Actions:
- *Research, survey, inventor, monitor populations; Research abundance and distribution of species for which status and habitat can be determined, by including additional data collection in present studies. Rank: 3*  
- Measure: Research, survey, inventor, monitor populations
  - *Research, survey, inventory, monitor, habitats; Evaluate existing significant hibernacula. Rank: 1*  
- Measure: Research, survey, inventory, monitor, habitats

**Eastern Ratsnake**

*Pantherophis alleghaniensis*

**Reptiles**

**Threat 1 - Residential and commercial development; Uses early successional habitat, developable land**

- Actions:
- *Research, survey, inventory, monitor populations; Determine metapopulation structure. Rank: 3*  
- Measure: Number/Studies
  - *Land/water protection; Area sensitive species, and some habitat not protected. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and the species' life history, publish the Reptiles of Rhode Island. Rank: 3*  
- Measure: Number

**Threat 2 - Roads and railroads; Road mortality**

- Actions: • *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Human intrusions and disturbance; Persecution of snakes by humans**

- Actions: • *Awareness and communications; Need to educate the public about the species' value and life history, publish the Reptiles of Rhode Island. Rank: 3*  
- Measure: Number

**Threat 4 - Hunting and collecting terrestrial animals; Take of species from the wild (human)**

- Actions: • *Awareness and communications; Need to educate the public about the damage that removal from the wild can do to the population. Rank: 3*  
- Measure: Number
- *Compliance and enforcement; Enforce compliance. Rank: 3*  
- Measure: Number/Interventions/Cases

**Threat 5 - Invasive non-native/alien species; Disease**

- Actions: • *Species management; Monitoring and management. Rank: 2*  
- Measure: Projects/Plans
- *Ex situ conservation; Headstart and captive breeding. Rank: 1*  
- Measure: Number

**Kemp's Ridley Turtle**

*Lepidochelys kempii*

**Reptiles**

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**Threat 1 - Fishing and harvesting aquatic resources; Bycatch issue**

- Actions: • *Linked enterprises and livelihood alternatives; Need to work with fishing industry and NMFS to develop new gear. Rank: 3*  
- Measure: Number
- *Formal education; Fishing industry needs to be trained about life history of species. Rank: 2*  
- Measure: Students/Instructors
- *Policies and regulations; Need to develop law and policies to protect the species. Rank: 3*  
- Measure: Number/Plans
- *Ex situ conservation; Rescue and rehab. Rank: 2*  
- Measure: Number/Plans
- *Data collection and analysis; Research on modified fishing gear. Rank: 2*  
- Measure: Number

**Threat 2 - Temperature extremes; Temperature extremes can increase strandings from cold stunning**

- Actions: • *Law and policy; Needed to address climate change. Rank: 1*  
- Measure: Number
- *Ex situ conservation; Rescue and rehabilitation. Rank: 2*  
- Measure: Number/Plans

**Threat 3 - Shipping lanes; Propeller injuries**

- Actions: • *Policies and regulations; Need to explore enforcement of regulations. Rank: 2*  
- Measure: Number/Plans

**Leatherback Turtle**

*Dermochelys coriacea*

**Reptiles**

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**Threat 1 - Fishing and harvesting aquatic resources; Bycatch issue**

- Actions: • *Linked enterprises and livelihood alternatives; Need to work with fishing industry and NMFS to develop new gear. Rank: 3*  
- Measure: Number
- *Formal education; Fishing industry needs to be trained about life history of species. Rank: 2*  
- Measure: Students/Instructors
- *Policies and regulations; Need to develop law and policies to protect the species. Rank: 3*  
- Measure: Number/Plans
- *Ex situ conservation; Rescue and rehab. Rank: 2*

- Measure: Number/Plans

- *Data collection and analysis; Research on modified fishing gear. Rank: 2*  
- Measure: Number

**Threat 2 - Shipping lanes; Propeller injuries**

- Actions:
- *Policies and regulations; Need to explore enforcement of regulations. Rank: 1*  
- Measure: Number/Plans

**Loggerhead Turtle**

*Caretta caretta*

**Reptiles**

**Threat 1 - Fishing and harvesting aquatic resources; Bycatch issue**

- Actions:
- *Linked enterprises and livelihood alternatives; Need to work with fishing industry and NMFS to develop new gear. Rank: 3*  
- Measure: Number
  - *Formal education; Fishing industry needs to be trained about life history of species. Rank: 2*  
- Measure: Students/Instructors
  - *Policies and regulations; Need to develop law and policies to protect the species. Rank: 3*  
- Measure: Number/Plans
  - *Ex situ conservation; Rescue and rehab. Rank: 2*  
- Measure: Number/Plans
  - *Data collection and analysis; Research on modified fishing gear. Rank: 2*  
- Measure: Number

**Threat 2 - Temperature extremes; Temperature extremes can increase strandings**

- Actions:
- *Law and policy; Needed to address climate change. Rank: 1*  
- Measure: Number

**Threat 3 - Shipping lanes; Propeller injuries**

- Actions:
- *Policies and regulations; Need to explore enforcement of regulations. Rank: 2*  
- Measure: Number/Plans

**Northern Black Racer**

*Coluber constrictor constrictor*

**Reptiles**

**Threat 1 - Housing and urban areas; Uses early successional habitat, developable land**

- Actions:
- *Site/area protection; Area sensitive species. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Some habitat not protected. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans

**Threat 2 - Roads and railroads; Road mortality**

- Actions:
- *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Human intrusions and disturbance; Persecution of snakes by humans**

- Actions:
- *Awareness and communications; Need to educate the public about the species' value and life history, publish the Reptiles of Rhode Island. Rank: 3*  
- Measure: Number

**Threat 4 - Hunting and collecting terrestrial animals; Take of species from the wild**

- Actions:
- *Awareness and communications; Need to educate the public about the damage that removal from the wild can do to the population. Rank: 3*

- Measure: Number
- Compliance and enforcement; Enforce compliance. Rank: 3  
- Measure: Number/Interventions/Cases

#### **Threat 5 - Invasive non-native/alien species; Disease**

- Actions:
- Species management; Monitoring and management. Rank: 2  
- Measure: Projects/Plans
  - Ex situ conservation; Headstart and captive breeding. Rank: 1  
- Measure: Number

## **Northern Diamond-backed Terrapin**

*Malaclemys terrapin terrapin*

## **Reptiles**

#### **Threat 1 - Fishing and harvesting aquatic resources; Bycatch issue**

- Actions:
- Linked enterprises and livelihood alternatives; Need to work with fishing industry and NMFS to develop new gear. Rank: 3  
- Measure: Number
  - Formal education; Fishing industry needs to be trained about life history of species. Rank: 3  
- Measure: Students/Instructors
  - Policies and regulations; Need to develop law and policies to protect the species. Rank: 3  
- Measure: Number/Plans
  - Site/area management; Area restrictions. Rank: 3  
- Measure: Acres/Sites/Miles
  - Policies and regulations; Work toward requiring new technologies and/or turtle excluder devices for fishery methods that trap turtles, such as the whelk fishery which uses bait that attract the Northern Diamond-backed Terrapin (horseshoe crabs, fish, etc.). Rank: 3  
- Measure: Number/Plans

#### **Threat 2 - Roads and railroads; Road mortality during breeding season**

- Actions:
- Site/area management; Management of breeding sites (need to limit dogs and humans). Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Restore habitat where it can be restored. Rank: 3  
- Measure: Number/Plans
  - Education and awareness; Brochures educating the public about turtles on the road. Rank: 3  
- Measure: Number
  - Law and policy; Minimize the loss of habitats as much as possible. Rank: 3  
- Measure: Number

#### **Threat 3 - Hunting and collecting terrestrial animals; Take of species from the wild (human)**

- Actions:
- Awareness and communications; Need to educate the public about the damage that removal from the wild can do to the population. Rank: 3  
- Measure: Number
  - Compliance and enforcement; Enforce compliance. Rank: 3  
- Measure: Number/Interventions/Cases

#### **Threat 4 - Recreational activities; Propeller injuries**

- Actions:
- Awareness and communications; Need to educate the public about moving animals and what it can do to the population. Rank: 3  
- Measure: Number
  - Compliance and enforcement; Enforce compliance. Rank: 3  
- Measure: Number/Interventions/Cases

#### **Threat 5 - Human intrusions and disturbance; Moving turtles from original habitat (human)**

- Actions:
- Awareness and communications; Need to educate the public about moving animals and what it can do to the population. Rank: 3  
- Measure: Number
  - Compliance and enforcement; Enforce compliance. Rank: 3  
- Measure: Number/Interventions/Cases

#### **Threat 6 - Problematic native species; Egg predation**

- Actions:
- *Invasive/problematic species control; Control predators. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Ex situ conservation; Headstart and captive breeding. Rank: 1*  
- Measure: Number/Plans
  - *Species management; Nesting area protection, monitoring, possible predator excluder cages for nests. Rank: 1*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Flooding of marshes and coastline**

- Actions:
- *Law and policy; Needed to address climate change. Rank: 3*  
- Measure: Number
  - *Site/area management; Management of breeding sites. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restore habitat where possible. Rank: 2*  
- Measure: Number/Plans

**Spotted Turtle**

*Clemmys guttata*

**Reptiles**

**Threat 1 - Housing and urban areas; Localized species with a specialized habitat, affected by habitat loss**

- Actions:
- *Research, survey, inventory, monitor populations; Determine metapopulation structure. Rank: 3*  
- Measure: Number/Studies
  - *Resource and habitat protection; Some habitat not protected. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and the species' life history, publish the Reptiles of Rhode Island. Rank: 3*  
- Measure: Number

**Threat 2 - Roads and railroads; Road mortality**

- Actions:
- *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Hunting and collecting terrestrial animals; Take of species from the wild (human)**

- Actions:
- *Awareness and communications; Need to educate the public about the damage that removal from the wild can do to the population. Rank: 3*  
- Measure: Number
  - *Compliance and enforcement; Enforce compliance. Rank: 3*  
- Measure: Number/Interventions/Cases

**Threat 4 - Human intrusions and disturbance; Moving turtles from original habitat (human)**

- Actions:
- *Awareness and communications; Need to educate the public about moving animals and what it can do to the population. Rank: 3*  
- Measure: Number
  - *Compliance and enforcement; Enforce compliance. Rank: 3*  
- Measure: Number/Interventions/Cases

**Threat 5 - Dams and water management/use; Water withdrawals are an issue**

- Actions:
- *Resource and habitat protection; Protect natural hydrology. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restore natural hydrology where possible. Rank: 3*  
- Measure: Number/Plans

**Threat 6 - Problematic native species; Egg predation**

- Actions:
- *Site/area management; Control predators. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Species management; Nesting area protection, monitoring, possible predator excluder cages for*

nests. Rank: 1  
- Measure: Projects/Plans

**Threat 7 - Other ecosystem modifications; Plant succession limiting breeding habitat**

- Actions:
- Site/area management; Limit disturbance in nesting areas. Rank: 2  
- Measure: Acres/Sites/Miles
  - Invasive/problematic species control; Eliminate vegetation. Rank: 2  
- Measure: Acres/Sites/Projects

**Threat 8 - Household sewage and urban waste water; Road runoff**

- Actions:
- Resource and habitat protection; Protect natural hydrology. Rank: 3  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration; Protect the habitat from road run-off, work with RI DOT to limit salt use in habitat areas. Rank: 3  
- Measure: Number/Plans

**Threat 9 - Climate change and severe weather; Changing hydrology**

- Actions:
- Law and policy; Need to address climate change. Rank: 2  
- Measure: Number

**Threat 10 - Invasive non-native/alien species; Disease**

- Actions:
- Species management; Monitoring and management. Rank: 2  
- Measure: Projects/Plans
  - Ex situ conservation; Headstarting and captive breeding. Rank: 1  
- Measure: Number

**Threat 11 - Lack of information; Lack of information for monitoring and on-going assessment**

- Actions:
- Data collection and analysis; Continue established long-term monitoring protocols. Rank: 2  
- Measure: Number
  - Planning; Incorporate data into management planning. Rank: 2  
- Measure: Number

**Threat 12 - Invasive non-native/alien species; Habitat loss and demographic changes from invasive species (vegetative and animal)**

- Actions:
- Outreach; Develop and provide educational information about invasive species. Rank: 3  
- Measure: Number/Projects/Reviews
  - Planning; Develop and implement invasive species management program. Rank: 2  
- Measure: Number

**Threat 13 - Pollution; Habitat degradation from impairment of water quality**

- Actions:
- Data collection and analysis; Assess effects of water withdrawals and prolonged drawdowns. Rank: 2  
- Measure: Number
  - Data collection and analysis; Assess effects of sedimentation and evaluate water quality effects on priority species. Rank: 2  
- Measure: Number
  - Data collection and analysis; Assess effects of stream bank disturbance. Rank: 2  
- Measure: Number
  - Alliance and partnership development; Coordinate water quality protection with appropriate DOT, regional, and federal programs. Rank: 2  
- Measure: Number
  - Habitat and natural process restoration; Construct and maintain new amphibian breeding habitat (seasonal pond project). Rank: 1  
- Measure: Number/Plans
  - Planning; Develop strategies to mitigate aquatic degradation. Rank: 3  
- Measure: Number

**Threat 1 - Housing and urban areas; Localized species with a specialized habitat, negatively affected by habitat loss**

- Actions:*
- *Research, survey, inventory, monitor populations; Determine metapopulation structure. Rank: 3*  
- Measure: Number/Studies
  - *Resource and habitat protection; Some habitat not protected. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect habitat. Rank: 3*  
- Measure: Number
  - *Policies and regulations; Need policies and regulations to protect habitat. Rank: 3*  
- Measure: Number/Plans
  - *Awareness and communications; Need to educate the public about habitat loss and the species' life history, publish the Reptiles of Rhode Island. Rank: 3*  
- Measure: Number

**Threat 2 - Roads and railroads; Road mortality**

- Actions:*
- *Habitat and natural process restoration; Develop or facilitate passage through the landscape, modify road crossing areas, work with RI DOT. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Hunting and collecting terrestrial animals; Take of species from the wild (human)**

- Actions:*
- *Awareness and communications; Need to educate the public about the damage that removal from the wild can do to the population. Rank: 3*  
- Measure: Number
  - *Compliance and enforcement; Enforce compliance. Rank: 3*  
- Measure: Number/Interventions/Cases

**Threat 4 - Human intrusions and disturbance; Moving turtles from original habitat (human)**

- Actions:*
- *Awareness and communications; Need to educate the public about moving animals and what it can do to the population. Rank: 3*  
- Measure: Number
  - *Compliance and enforcement; Enforce compliance. Rank: 3*  
- Measure: Number/Interventions/Cases

**Threat 5 - Dams and water management/use; Water withdrawals are an issue**

- Actions:*
- *Resource and habitat protection; Protect natural hydrology. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Restore natural hydrology where possible. Rank: 3*  
- Measure: Number/Plans

**Threat 6 - Problematic native species; Egg predation**

- Actions:*
- *Site/area management; Control predators. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Species management; Nesting area protection, monitoring, possible predator excluder cages for nests. Rank: 1*  
- Measure: Projects/Plans

**Threat 7 - Other ecosystem modifications; Plant succession limiting breeding habitat**

- Actions:*
- *Site/area management; Limit disturbance in nesting areas. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Invasive/problematic species control; Eliminate vegetation. Rank: 2*  
- Measure: Acres/Sites/Projects

**Threat 8 - Household sewage and urban waste water; Road runoff**

- Actions:*
- *Resource and habitat protection; Protect natural hydrology. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration; Protect the habitat from road run-off, work with RI DOT to limit salt use in habitat areas. Rank: 3*  
- Measure: Number/Plans

**Threat 9 - Climate change and severe weather; Changing hydrology**

- Actions: • *Law and policy; Need to address climate change. Rank: 2*  
- Measure: Number

**Threat 10 - Invasive non-native/alien species; Disease**

- Actions: • *Species management; Monitoring and management. Rank: 2*  
- Measure: Projects/Plans
- *Ex situ conservation; Headstarting and captive breeding. Rank: 1*  
- Measure: Number

**Threat 11 - Invasive non-native/alien species; Habitat loss and demographic changes from invasive species (vegetative and animal)**

- Actions: • *Outreach; Develop and provide educational information about invasive species. Rank: 3*  
- Measure: Number/Projects/Reviews
- *Planning; Develop and implement invasive species management program.*  
- Measure: Number

**Threat 12 - Pollution; Habitat degradation from impairment of water quality**

- Actions: • *Alliance and partnership development; Coordinate water quality protection with appropriate DOT, regional, and federal programs. Rank: 3*  
- Measure: Alliance and partnership development
- *Planning; Develop strategies to mitigate aquatic degradation. Rank: 3*  
- Measure: Number
- *Data collection and analysis; Assess effects of water withdrawals and prolonged drawdowns. Rank: 3*  
- Measure: Number
- *Data collection and analysis; Assess effects of sedimentation and evaluate water quality effects on priority species. Rank: 3*  
- Measure: Number
- *Data collection and analysis; Assess effects of stream bank disturbance. Rank: 3*  
- Measure: Number

## INVERTS

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### Inverts (taxa wide)

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#### Natural system modifications; Plant succession

- Actions:
- *Land/water protection; Identify parcels needing seral-stage management.*
  - *Data collection and analysis; Evaluate effectiveness of management strategies.*
  - *Research, survey, inventory, monitor habitats; Identify parcels to retain as core forest areas with minimal management.*
  - *Land/water management; Manage important habitats as required. Develop fire prescriptions for priority parcels.*
  - *Habitat and natural process restoration; Implement burn management on priority parcels.*
  - *Alliance and partnership development; Coordinate with other state and regional programs.*
  - *Outreach; Expand public relations for fire management.*
  - *Planning; Develop management strategy to maintain successional vegetation.*

#### Pollution

- Actions:
- *Technical assistance; Coordinate chemical management with other state and regional programs. Rank: 2*
  - *Technical assistance; Coordinate with mosquito abatement personnel for chemical management. Rank: 2*
  - *Data collection and analysis; Identify chemical sources and compounds of concern. Rank: 1*

#### Invasive and other problematic species and genes

- Actions:
- *Alliance and partnership development; Coordinate invasive species management with other state and regional programs. Rank: 3*
  - *Invasive/problematic species control; Create and implement invasive species monitoring protocol. Rank: 2*
  - *Invasive/problematic species control; Research invasive species management and monitoring protocols.*

#### Lack of information

- Actions:
- *Data collection and analysis; Identify priority sites for survey, especially for freshwater fish and invertebrates. Rank: 3*
  - *Data collection and analysis; Survey GCN species at priority sites. Rank: 3*

## INVERTS

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### Beetles

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#### Lack of information

- Actions:
- *Data collection and analysis; Research and develop sampling protocols, especially for mammals, freshwater fish, herps and beetles. Rank: 3*
  - *Data collection and analysis; Create GIS coverage of shrublands.*

## INVERTS

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### Benthic Invertebrates

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#### Lack of information

- Actions:
- *Data collection and analysis; Conduct a literature search to identify key periods of the life history of benthic invertebrates and identify other research needs. Rank: 3*
  - *Data collection and analysis; Research predator / prey relationships to determine where species are in the food chain by identifying their most common food sources and what preys on them. Rank: 3*
  - *Research, survey, inventory, monitor populations; Assess the vulnerability of species during their reproductive cycle. Rank: 3*
  - *Research, survey, inventory, monitor populations; Expand species surveys and increase data collection by adding selected target species to existing surveys. Rank: 3*
  - *Research, survey, inventory, monitor populations; Research abundance and distribution of*

*species for which status and habitat can be determined, by including additional data collection in present studies. Rank: 3*

- *Research, survey, inventory, monitor habitats; Identify and map critical areas in the life history of species, particularly spawning areas. Rank: 3*

#### **Residential and commercial development**

- Actions:*
- *Research, survey, inventory, monitor populations; Monitor the status and condition of species before they are impacted by building commercial fisheries. Rank: 3*
  - *Law and policy; Minimize the loss of riparian habitats as much as possible. Rank: 3*
  - *Law and policy; The diking and draining of tidal marshlands and estuaries should not be undertaken unless a satisfactory compensatory mitigation plan is in effect and monitored. Rank: 3*

#### **Lack of Planning**

- Actions:*
- *Law and policy; Identify excess sedimentation in the watershed that prompts excessive maintenance dredging activities and implement appropriate management techniques to ensure actions are taken to curtail those causes. Rank: 2*
  - *Planning; Research slight changes in environmental factors that may lead to large impacts to the resource. Rank: 2*

#### **Biological resource use**

- Actions:*
- *Law and policy; Assess impacts to shellfish restoration projects and determine if they are adversely affecting restoration efforts. Rank: 3*
  - *Legislation; Identify harvest levels of benthic invertebrate species, Change statute to include currently unregulated species and harvest methods. Rank: 3*
  - *Law and policy; Aquaculture, overfishing, bycatch, and incidental take and disturbance. Rank: 3*

#### **Shipping lanes**

- Actions:*
- *Law and policy; Avoid new dredging to the maximum extent possible. Projects should be permitted only for water dependant purposes and only when no feasible alternatives are available. Disposal impacts should be considered. Rank: 3*
  - *Law and policy; Identify excess sedimentation in the watershed that prompts excessive maintenance dredging activities and implement appropriate management techniques to ensure actions are taken to curtail those causes. Rank: 3*

#### **Transportation and service corridors**

- Actions:*
- *Research, survey, inventory, monitor populations; Assess the site fidelity of benthic invertebrates, whether they will relocate to spawn or not spawn at all following disturbance. Rank: 2*
  - *Research, survey, inventory, monitor populations; Research life history data to locate species in their pre-emergent life stage. Rank: 2*

#### **Industrial and military effluents**

- Actions:*
- *Law and policy; Incorporate best management practices to prevent or minimize contamination from ship bidge waters, antifouling paints, shipboard accidents, shipyard work, maintenance dredging and disposal, and non point source contaminants from upland facilities related. Rank: 3*

#### **Energy production and mining**

- Actions:*
- *Training; Increase number and training of response teams in the event of an accident. Rank: 2*

## **INVERTS**

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### **Estuarine Invertebrates**

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#### **Lack of information**

- Actions:*
- *Data collection and analysis; Conduct a literature search to identify key periods of the life history of estuarine invertebrates, gather abundance and distribution data, and identify other research needs. Rank: 2*
  - *Data collection and analysis; Research predator / prey relationships to determine where species are in the food chain by identifying their most common food sources and what preys on them. Rank: 2*
  - *Database development; Identify and map critical areas and habitat types in the life history of species, particularly spawning areas, by incorporating estuarine invertebrates into other surveys. Rank: 3*

- *Research, survey, inventory, monitor habitats; Assess the water quality of estuarine invertebrate habitats, identifying the need for additional conservation actions. Rank: 3*

#### **Residential and commercial development**

- Actions:*
- *Land/water management; Wherever possible, "soft" approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modifications should be used. Rank: 3*
  - *Planning; Identify and characterize fishery habitat functions and service in the project area. Rank: 3*

#### **Lack of Planning**

- Actions:*
- *Data collection and analysis; Research environmental sensitivity for slight changes in environmental factors that may lead to large impacts to the resource. Rank: 2*
  - *Research, survey, inventory, monitor habitats; Assess which species may be indicators of the health of the marsh / estuarine environment. Rank: 2*

#### **Pollution**

- Actions:*
- *Law and policy; Locate discharge points in coastal waters well away from shellfish beds, seagrass beds, reefs and other similar fragile and productive habitats. Rank: 3*

#### **Problematic native species**

- Actions:*
- *Research, survey, inventory, monitor populations; Assess competition between species and inter-specific competition to determine if they are competing and, if so, how, where and what the competition is doing to the stocks. Rank: 2*

#### **Shipping lanes**

- Actions:*
- *Law and policy; Avoid placing pipelines and accessory equipment used in conjunction with construction or dredging operations to the maximum extent possible close to kelp beds, eelgrass beds, estuarine / salt marshes and any other high value habitat. Rank: 3*

#### **Transportation and service corridors**

- Actions:*
- *Law and policy; Avoid locating roads near wetlands and fish bearing streams. Roads should be sited to avoid sensitive areas such as wetlands, streams, steep slopes. Rank: 3*

#### **Energy production and mining**

- Actions:*
- *Research, survey, inventory, monitor habitats; Increase data bank on species habitat preferences and use in oil spill response planning and mapping. Rank: 2*

## **INVERTS**

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### **Habitat Invertebrates**

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#### **Lack of information**

- Actions:*
- *Data collection and analysis; Identify where habitat specific invertebrates are in the food chain, what they are a food source for, and determine if they are limited or a limiting factor. Rank: 2*
  - *Research, survey, inventory, monitor populations; Conduct a literature search to identify and map critical areas in the life history of habitat specific invertebrates and identify other research needs. Rank: 2*
  - *Research, survey, inventory, monitor populations; Research abundance and distribution of species for which status and habitat can be determined, by including additional data collection to existing surveys. Rank: 2*

#### **Residential and commercial development**

- Actions:*
- *Land/water management; Wherever possible, "soft" approaches (such as beach nourishment, vegetative plantings, and placement of large woody debris) to shoreline modifications should be used. Rank: 3*
  - *Law and policy; Adequate compensatory mitigation should be provided for unavoidable impacts. Rank: 3*

#### **Lack of Planning**

- Actions:*
- *Research, survey, inventory, monitor populations; Assess whether stocks of habitat specific invertebrates are in decline. Rank: 2*
  - *Law and policy; Use an adaptive management plan with ecological indicators to oversee monitoring and ensure mitigation objectives are met. Take corrective action as needed. Rank: 2*

#### **Energy production and mining**

- Actions:*
- *Database development; Increase data bank on species habitat preferences and use in oil spill response planning and mapping. Rank: 2*

- *Law and policy; Adequate compensatory mitigation should be provided for unavoidable impacts. Rank: 2*

#### **Industrial and military effluents**

- Actions:*
- *Law and policy; Incorporate best management practices to prevent or minimize contamination from ship bidge waters, antifouling paints, shipboard accidents, shipyard work, maintenance dredging and disposal, and non point source contaminants from upland facilities related.*

#### **Problematic native species**

- Actions:*
- *Research, survey, inventory, monitor populations; Research epiphytic growth on plants to determine if they are outcompeting other species or if they are in a balance. Rank: 1*

#### **Biological resource use**

- Actions:*
- *Law and policy; Adequate compensatory mitigation should be provided for unavoidable impacts. Rank: 3*

#### **Shipping lanes**

- Actions:*
- *Law and policy; Avoid placing pipelines and accessory equipment used in conjunction with construction or dredging operations to the maximum extent possible close to kelp beds, eelgrass beds, estuarine / salt marshes and any other high value habitat. Rank: 3*

#### **Transportation and service corridors**

- Actions:*
- *Law and policy; Adequate compensatory mitigation should be provided for unavoidable impacts. Rank: 3*

#### **Agriculture and aquaculture**

- Actions:*
- *Law and policy; Adequate compensatory mitigation should be provided for unavoidable impacts. Rank: 3*

#### **Climate change and severe weather**

## **INVERTS**

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### **Lepidoptera**

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#### **Lack of information**

- Actions:*
- *Data collection and analysis; Assess taxonomy/population relationships. Rank: 1*
  - *Data collection and analysis; Coordinate processing of specimens and conversion and storage of electronic data. Rank: 3*
  - *Research, survey, inventory, monitor populations; Determine geographic distribution of GCN species, especially invertebrates. Rank: 2*
  - *Research, survey, inventory, monitor populations; Identify breeding locations and geographic distribution, especially for invertebrates. Rank: 3*
  - *Research, survey, inventory, monitor habitats; Monitor spatial qualities of habitat. Rank: 2*
  - *Planning; Identify suitable restoration projects for Lepidoptera and/or Mussel habitat. Rank: 1*

#### **Invasive and other problematic species and genes**

- Actions:*
- *Research, survey, inventory, monitor populations; Identify potential damaging exotic plants. Rank: 3*
  - *Research, survey, inventory, monitor habitats; Identify priority areas for invasive plant management. Rank: 2*
  - *Education and awareness; Develop and provide educational information about invasive species. Rank: 1*
  - *Planning; Develop and implement invasive species management program. Rank: 2*

#### **Lack of Planning**

- Actions:*
- *Land/water protection; Implement priority restoration projects for Lepidoptera habitat. Rank: 2*
  - *Habitat and natural process restoration; Manage important habitats as required, especially for Lepidoptera habitat. Rank: 3*
  - *Planning; Evaluate need for specialty cover types, especially for Lepidoptera, and identify priority sites for management. Rank: 2*
  - *Species and habitat management planning; Develop management strategy to maintain successional vegetation. Identify parcels to retain as core forest areas with minimal management. Identify parcels needing seral-stage management. Manage important habitats as required. Develop fire prescriptions for priority parcels. Implement burn management on priority parcels. Expand public relations for fire management. Coordinate with other state and*

*regional programs. Evaluate effectiveness of management strategies. Rank: 3*

#### **Pollution**

- Actions:*
- *Outreach; Outreach to golf courses in focal areas concerning impact of vegetation and chemical use. Rank: 2*
  - *Outreach; Outreach to nurseries in focal areas concerning chemical use. Rank: 1*
  - *Outreach; Address application of chemicals by consumers in residential settings. Rank: 3*

#### **Fire and fire suppression**

- Actions:*
- *Alliance and partnership development; Coordinate burn management with other state and regional programs. Rank: 1*

#### **Residential and commercial development**

- Actions:*
- *Habitat and natural process restoration; Identify priority parcels needing seral-stage management, especially for Lepidoptera habitat. Rank: 2*

#### **Pollution**

- Actions:*
- *Outreach; Address application of chemicals by consumers in residential settings. Rank: 3*

## **INVERTS**

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### **Mussels**

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#### **Invasive and other problematic species and genes**

- Actions:*
- *Invasive/problematic species control. Rank: 2*
  - *Invasive/problematic species control; Assess pathways of introduction from water gardens and mail order. Rank: 3*
  - *Invasive/problematic species control; Develop and implement program to mitigate effect of aquatic exotics. Rank: 2*
  - *Invasive/problematic species control; Develop and implement sampling protocol for aquatic exotics. Rank: 2*
  - *Invasive/problematic species control; Identify potential damaging aquatic invasives and exotics. Rank: 3*
  - *Species management; Evaluate need for predator control intervention for priority species. Rank: 2*

#### **Transportation and service corridors**

- Actions:*
- *Technical assistance; Establish discussions with state and local D.O.T. Rank: 3*
  - *Resource and habitat protection; Enhance habitat connectivity for priority species with culverts. Rank: 1*
  - *Habitat and natural process restoration; Conduct road mitigations where required. Rank: 3*
  - *Planning; Assess means to mitigate road effects. Rank: 3*
  - *Planning; Identify areas of significant road effects in focal areas. Rank: 3*

#### **Pollution**

- Actions:*
- *Technical assistance; Coordinate water quality protection with appropriate DOT, regional and federal programs. Rank: 3*
  - *Data collection and analysis; Assess effects of sedimentation. Rank: 3*
  - *Data collection and analysis; Evaluate water quality effects on priority species. Rank: 3*
  - *Species and habitat management planning; Develop strategies to mitigate aquatic degradation. Rank: 3*

#### **Dams and water management/use**

- Actions:*
- *Data collection and analysis; Assess effects of prolonged drawdowns. Rank: 3*
  - *Data collection and analysis; Assess effects of water releases at dams. Rank: 2*
  - *Data collection and analysis; Assess effects of water withdrawals. Rank: 3*
  - *Outreach; Expand public awareness of fish passage issues. Rank: 3*

#### **Lack of information**

- Actions:*
- *Alliance and partnership development; Coordinate monitoring with other state and regional monitoring programs. Rank: 2*
  - *Data collection and analysis; Continue established long-term monitoring protocols. Rank: 2*
  - *Data collection and analysis; Determine relative abundance of GCN species, especially freshwater fish and invertebrates. Rank: 3*

### **Lack of information dissemination, outreach, education**

- Actions:
- *Technical assistance; Outreach to golf courses in focal areas concerning impact of vegetation and chemical use. Rank: 2*
  - *Technical assistance; Outreach to nurseries in focal areas concerning chemical use. Rank: 2*

### **Lack of Planning**

- Actions:
- *Planning; Enhance habitat connectivity for priority species with fish ladders. Rank: 3*
  - *Habitat and natural process restoration; Implement priority restoration projects for Mussel habitat. Rank: 2*

### **Biological resource use**

- Actions:
- *Law and policy; Coordinate incidental take programs with regional or national initiatives. Rank: 1*
  - *Outreach; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 1*

### **Human intrusions and disturbance**

- Actions:
- *Resource and habitat protection; Assess effects of stream bank disturbance. Rank: 2*

### **Invasive non-native/alien species**

- Actions:
- *Species management; Develop predator control program to conduct intervention where appropriate for priority species. Rank: 2*

### **Residential and commercial development**

- Actions:
- *Habitat and natural process restoration; Identify suitable restoration projects for Mussel habitat. Rank: 3*

## **INVERTS**

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### **Odonates**

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#### **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; Develop and provide educational program/materials to reduce incidental mortality and take from humans.*
  - *Site/area management; Limit access/use of pond shores/river banks for recreation.*

#### **Invasive and other problematic species and genes**

- Actions:
- *Technical assistance; Coordinate aquatic exotic management with stocking agencies and mosquito abatement personnel.*
  - *Research, survey, inventory, monitor populations; Identify potential damaging exotic plants.*
  - *Research, survey, inventory, monitor habitats; Identify priority areas for invasive plant management.*
  - *Planning; Develop and implement invasive species management program.*
  - *Planning; Develop and implement program to mitigate effect of aquatic exotics.*

#### **Lack of information**

- Actions:
- *Data collection and analysis; Assess threat from fish.*
  - *Data collection and analysis; Determine relative abundance of GCN species, especially freshwater fish and invertebrates.*
  - *Data collection and analysis; Determine geographic distribution of GCN species, especially invertebrates.*
  - *Data collection and analysis; Identify breeding locations and geographic distribution, especially for invertebrates.*
  - *Research, survey, inventory, monitor habitats; Monitor spatial qualities of habitat.*

#### **Transportation and service corridors**

- Actions:
- *Technical assistance; Establish discussions with state and local D.O.T.*
  - *Data collection and analysis; Identify areas of significant road effects in focal areas.*
  - *Habitat and natural process restoration; Conduct road mitigations where required.*
  - *Planning; Assess means to mitigate road effects.*

#### **Invasive non-native/alien species**

- Actions:*
- *Research, survey, inventory, monitor populations; Identify potential damaging aquatic invasives and exotics.*
  - *Education and awareness; Develop and provide educational information about invasive species.*
  - *Planning; Develop and implement sampling protocol for aquatic exotics.*

**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.*

**Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:*
- *Land/water protection.*
  - *Law and policy.*

**Lack of planning; Inadequate wetland regulations**

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*
  - *Site/area management.*

**Invasive non-native/alien species; Especially aquatic plants (e.g. Phragmites, Purple Loosestrife)**

- Actions:*
- *Species management; Monitor priority habitats for invasive plant species; Consider management/removal as appropriate.*

**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).*

# INVERTS

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## Alewife Floater

*Anodonta implicata*

## Fresh Water Aquatic Invertebrates

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### 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*  
- Measure: Number/Plans
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*  
- Measure: Number

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

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

### 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*  
- Measure: Number

## Eastern Pearlshell

*Margaritifera margaritifera*

## Fresh Water Aquatic Invertebrates

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### 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*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Restore the adjacent upland habitat, maintain the brook trout population. Rank: 3*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*  
- Measure: Number

### 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*  
- Measure: Acres/Sites/Miles

### 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*  
- Measure: Number

## Eastern Pond Mussel

*Ligumia nasuta*

## Fresh Water Aquatic Invertebrates

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### 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*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*  
- Measure: Number

### Threat 2 - Agricultural and forestry effluents; Pollution from farming

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

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

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

## **Golden Ambersnail**

*Succinea wilsoni*

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## **Fresh Water Aquatic Invertebrates**

## **Lampmussel**

*Lampsilis radiata*

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## **Fresh Water Aquatic Invertebrates**

### **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*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*  
- Measure: Number

### **Threat 2 - Agricultural and forestry effluents; Pollution from farming**

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

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

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

## **Squawfoot**

*Strophitus undulatus*

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## **Fresh Water Aquatic Invertebrates**

### **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*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*  
- Measure: Number

### **Threat 2 - Agricultural and forestry effluents; Pollution from farming**

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

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

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

## **Triangle Floater**

*Alasmidonta undulata*

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## **Fresh Water Aquatic Invertebrates**

### **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*  
- Measure: Acres/Sites/Miles
  - *Alliance and partnership development; Development of conservation partnerships will be necessary to protect or improve habitat. Rank: 3*  
- Measure: Number
  - *Alliance and partnership development. Rank: 2*  
- Measure: Number

### **Threat 2 - Agricultural and forestry effluents; Pollution from farming**

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

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

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

## **INVERTS**

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### **American Marsh Hopper**

*Ochestia grillus*

### **Salt Marsh Marine Invertebrates**

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#### **Threat 1 - Residential and commercial development; Coastal development**

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

#### **Threat 2 - Pollution; Water quality impacts to habitat**

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

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

### **Amphipod**

*Gammarus lawrencianus*

### **Salt Marsh Marine Invertebrates**

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#### **Threat 1 - Residential and commercial development; Coastal development**

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

#### **Threat 2 - Pollution; Water quality impacts to habitat**

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

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

**Amphipod**

*Gammarus faciatius*

**Salt Marsh Marine Invertebrates**

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**Threat 2 - Pollution; Water quality impacts to habitat**

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

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

**Amphipod**

*Hyale plumulosa*

**Salt Marsh Marine Invertebrates**

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**Threat 2 - Pollution; Water quality impacts to habitat**

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

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

**Atlantic Marsh Fiddler Crab**

*Uca pugnax*

**Salt Marsh Marine Invertebrates**

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**Threat 2 - Pollution; Water quality impacts to habitat**

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

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

**Atlantic Mud Piddock**

*Barnea truncata*

**Salt Marsh Marine Invertebrates**

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**Threat 2 - Pollution; Water quality impacts to habitat**

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

**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.*  
- Measure: Acres/Sites/Miles

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

## Atlantic Sand Fiddler Crab

*Uca pugnator*

## Salt Marsh Marine Invertebrates

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

- Actions:*
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### Threat 2 - Pollution; Water quality impacts to habitat

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

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

## Banded Marsh Hopper

*Uholorchestia uhleri*

## Salt Marsh Marine Invertebrates

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

- Actions:*
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### Threat 2 - Pollution; Water quality impacts to habitat

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

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

- Measure: Acres/Sites/Miles
- *Habitat and natural process restoration.*  
- Measure: Number/Plans

## Eastern Emerald Elysia

*Elysia chlorotica*

## Salt Marsh Marine Invertebrates

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### Threat 2 - Pollution; Water quality impacts to habitat

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

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

## False Angelwing

*Petricolaria pholadiformis*

## Salt Marsh Marine Invertebrates

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### Threat 2 - Pollution; Water quality impacts to habitat

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

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

## Marsh Snail

*Melampus bidentatus*

## Salt Marsh Marine Invertebrates

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

- Actions:
- Resource and habitat protection; Prevent development of marsh habitats.  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration.  
- Measure: Number/Plans

### Threat 2 - Pollution; Water quality impacts to habitat

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

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

## Modest Alderia

*Alderia modesta*

## Salt Marsh Marine Invertebrates

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

- Actions:
- Resource and habitat protection; Prevent development of marsh habitats.  
- Measure: Acres/Sites/Miles
  - Habitat and natural process restoration.  
- Measure: Number/Plans

### Threat 2 - Pollution; Water quality impacts to habitat

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

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

## Mouse Ear Marsh Snail

*Ovatella myosotis*

## Salt Marsh Marine Invertebrates

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**Threat 2 - Pollution; Water quality impacts to habitat**

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

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

**Northern Lacuna**

*Lacuna vincta*

**Salt Marsh Marine Invertebrates**

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**Threat 2 - Pollution; Water quality impacts to habitat**

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

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

**Purple Marsh Crab**

*Sesarma reticulatum*

**Salt Marsh Marine Invertebrates**

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

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### **Threat 2 - Pollution; Water quality impacts to habitat**

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

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

## **Red-jointed Fiddler Crab**

*Uca minax*

## **Salt Marsh Marine Invertebrates**

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### **Threat 1 - Residential and commercial development; Coastal development**

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### **Threat 2 - Pollution; Water quality impacts to habitat**

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

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

## **Ribbed Mussel**

*Geukensia demissa*

## **Salt Marsh Marine Invertebrates**

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### **Threat 1 - Residential and commercial development; Coastal development**

- Actions:
- *Resource and habitat protection; Prevent development of marsh habitats.*  
- Measure: Acres/Sites/Miles
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### **Threat 2 - Pollution; Water quality impacts to habitat**

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

- Measure: Acres/Sites/Miles

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

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## INVERTS

### Amphipod

*Gammarus tigrinus*

### Invertebrates of Aquatic Bed and Coastal Salt Pond

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**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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

### Bay Scallop

*Argopecten irradians*

### Invertebrates of Aquatic Bed and Coastal Salt Pond

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**Threat 1 - Pollution; Deteriorating water quality**

- Actions:
- *Land/water management; Enhance habitats. Rank: 3*  
- Measure: Acres/Sites/Projects
  - *Species management; Brood stock enhancement. Rank: 3*  
- Measure: Projects/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

### Nudibranch

*Tergipes tergipes*

### Invertebrates of Aquatic Bed and Coastal Salt Pond

---

### **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 .*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### **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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## **Red Gilled Worm**

*Marphysa belli*

## **Invertebrates of Aquatic Bed and Coastal Salt Pond**

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### **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 .*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### **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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## **INVERTS**

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## **American Lobster**

*Homarus americanus*

## **Marine Rocky Reef Invertebrates**

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

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

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

- Actions:
- *Ex situ conservation.*  
- Measure: Number

- *Habitat and natural process restoration; Population and juvenile habitat enhancement.*  
- Measure: Number/Plans
- *Education and awareness; V-notching program.*  
- Measure: Number
- *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases

**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.*  
- Measure: Number
  - *Education and awareness.*  
- Measure: Number

**Common Sea Star**

*Asterias forbesi*

**Marine Rocky Reef Invertebrates**

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

- Actions:*
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:*
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**Coral Worm**

*Dodecacera corallii*

**Marine Rocky Reef Invertebrates**

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

- Actions:*
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:*
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number

- *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Green Sea Urchin

*Strongylocentrotus droebachiensis*

## Marine Rocky Reef Invertebrates

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

- Actions:
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

### 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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Jonah Crab

*Cancer borealis*

## Marine Rocky Reef Invertebrates

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

- Actions:
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

### 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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Longnose Spider Crab

*Libinia dubia*

## Marine Rocky Reef Invertebrates

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

- Actions:
- *Policies and regulations.*  
- Measure: Number/Plans

- *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits*  
- Measure: Acres/Sites/Miles

**Northern Horse Mussel**

*Modiolus modiolus*

**Marine Rocky Reef Invertebrates**

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

- Actions:
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**Northern Star Coral**

*Astrangia poculata*

**Marine Rocky Reef Invertebrates**

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

- Actions:
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## **Portly Spider Crab**

*Libinia emarginata*

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## **Marine Rocky Reef Invertebrates**

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

- Actions:
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits*  
- Measure: Acres/Sites/Miles

## **Rock Crab**

*Cancer irroiatius*

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## **Marine Rocky Reef Invertebrates**

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

- Actions:
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## **Short-spined Brittle Star**

*Ophioderma brevispinum*

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## **Marine Rocky Reef Invertebrates**

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

- Actions:
- *Policies and regulations.*  
- Measure: Number/Plans
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Species management.*  
- Measure: Projects/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases
  - *Resource and habitat protection.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**INVERTS****American Tube-dwelling Anemone***Ceriantheopsis americana***Soft Sediment Marine Invertebrates****Threat 1 - Shipping lanes; Dredging and maintenance of navigational channels**

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**Atlantic Horseshore Crab***Limulus polyphemus***Soft Sediment Marine Invertebrates****Threat 1 - Fishing and harvesting aquatic resources; Over-exploitation as bait fishery**

- Actions:
- *Species management. Rank: 3*  
- Measure: Projects/Plans
  - *Site/area management. Rank: 3*

- Measure: Acres/Sites/Miles
- Resource and habitat protection. Rank: 3
- Measure: Acres/Sites/Miles

**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.
  - Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.
  - Measure: Acres/Sites/Miles

**Atlantic Surf Clam**

*Spisula solida*

**Soft Sediment Marine Invertebrates**

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

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
  - Measure: Acres/Sites/Miles
  - Policies and regulations.
  - Measure: Number/Plans
  - Habitat and natural process restoration.
  - Measure: Number/Plans

**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.
  - Measure: Acres/Sites/Miles
  - Policies and regulations.
  - Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.
  - Measure: Number/Plans

**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.
  - Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.
  - Measure: Acres/Sites/Miles

**Bamboo Worm**

*Clymenella torquata*

**Soft Sediment Marine Invertebrates**

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

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
  - Measure: Acres/Sites/Miles
  - Policies and regulations.
  - Measure: Number/Plans
  - Habitat and natural process restoration.
  - Measure: Number/Plans

**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.
  - Measure: Acres/Sites/Miles
  - Policies and regulations.
  - Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.
  - Measure: Number/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Bay Quahog

*Mercenaria mercenaria*

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## Soft Sediment Marine Invertebrates

### Threat 1 - Fishing and harvesting aquatic resources; Localized depletion

- Actions:
- *Species management; Area specific management controls. Rank: 3*  
- Measure: Projects/Plans
  - *Compliance and enforcement. Rank: 2*  
- Measure: Number/Interventions/Cases
  - *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

### 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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Blood Worm

*Glycera dibranchiata*

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## Soft Sediment Marine Invertebrates

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

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### 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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Blue Crab

*Callinectes sapidus*

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## Soft Sediment Marine Invertebrates

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

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

- Measure: Acres/Sites/Miles
- Policies and regulations.
  - Measure: Number/Plans
- Habitat and natural process restoration.
  - Measure: Number/Plans

**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.
    - Measure: Acres/Sites/Miles
  - Policies and regulations.
    - Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.
    - Measure: Number/Plans

**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.
    - Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.
    - Measure: Acres/Sites/Miles

**Burrowing Anemone**

*Actinothoe modesta*

**Soft Sediment Marine Invertebrates**

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

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
    - Measure: Acres/Sites/Miles
  - Policies and regulations.
    - Measure: Number/Plans
  - Habitat and natural process restoration.
    - Measure: Number/Plans

**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.
    - Measure: Acres/Sites/Miles
  - Policies and regulations.
    - Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.
    - Measure: Number/Plans

**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.
    - Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.
    - Measure: Acres/Sites/Miles

**Burrowing Anemone**

*Edwardsia elegans*

**Soft Sediment Marine Invertebrates**

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

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
    - Measure: Acres/Sites/Miles
  - Policies and regulations.
    - Measure: Number/Plans
  - Habitat and natural process restoration.

- Measure: Number/Plans

### **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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

### **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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## **Channeled Whelk**

*Busycon canaliculatus*

## **Soft Sediment Marine Invertebrates**

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

- Actions:
- Law and policy. Rank: 2  
- Measure: Number
  - Policies and regulations. Rank: 2  
- Measure: Number/Plans
  - Compliance and enforcement. Rank: 3  
- Measure: Number/Interventions/Cases

### **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  
- Measure: Number
  - Policies and regulations. Rank: 2  
- Measure: Number/Plans
  - Compliance and enforcement. Rank: 3  
- Measure: Number/Interventions/Cases

### **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  
- Measure: Projects/Plans
  - Species recovery; Limit or control by-catch or direct fisheries. Rank: 3  
- Measure: Number/Animals
  - Compliance and enforcement. Rank: 3  
- Measure: Number/Interventions/Cases

## **Clam Worm**

*Alitta virens*

## **Soft Sediment Marine Invertebrates**

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.

- Measure: Number/Plans

**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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

**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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

**Coastal Mud Shrimp**

*Upogebia affinis*

**Soft Sediment Marine Invertebrates**

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

**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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

**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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

**Common Sand Dollar**

*Echinarachnius parma*

**Soft Sediment Marine Invertebrates**

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

**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.  
- Measure: Acres/Sites/Miles

- *Policies and regulations.*  
- Measure: Number/Plans
- *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**Cone Worm**

*Pectinaria gouldii*

**Soft Sediment Marine Invertebrates**

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

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**Digging Amphipod**

*Haustorius canadensis*

**Soft Sediment Marine Invertebrates**

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

- Actions:*
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*

- Measure: Number/Plans

### **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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## **Dwarf Balloon Aeolis**

*Eubranchus exigus*

## **Soft Sediment Marine Invertebrates**

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

### **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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

### **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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## **Hairy Sea Cucumber**

*Sclerodactyla briareus*

## **Soft Sediment Marine Invertebrates**

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

### **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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

### **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.

- Measure: Number
- Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## Knobbed Whelk

*Busycon carica*

## Soft Sediment Marine Invertebrates

### 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  
- Measure: Number
  - Policies and regulations. Rank: 2  
- Measure: Number/Plans
  - Compliance and enforcement. Rank: 3  
- Measure: Number/Interventions/Cases

### Threat 2 - 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  
- Measure: Projects/Plans
  - Species recovery; Limit or control by-catch or direct fisheries. Rank: 3  
- Measure: Number/Animals
  - Compliance and enforcement. Rank: 3  
- Measure: Number/Interventions/Cases

### 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  
- Measure: Projects/Plans
  - Species recovery; Limit or control by-catch or direct fisheries. Rank: 3  
- Measure: Number/Animals
  - Compliance and enforcement. Rank: 3  
- Measure: Number/Interventions/Cases

## Lady Crab

*Ovalipes ocellatus*

## Soft Sediment Marine Invertebrates

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

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

### 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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

### 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.

- Measure: Number
- Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## Mantis Shrimp

*Squilla empusa*

## Soft Sediment Marine Invertebrates

### Threat 1 - Fishing and harvesting aquatic resources; Unregulated fishery

- Actions:
- Law and policy. Rank: 3  
- Measure: Number
  - Compliance and enforcement. Rank: 3  
- Measure: Number/Interventions/Cases
  - Data collection and analysis. Rank: 3  
- Measure: Number
  - Education and awareness. Rank: 3  
- Measure: Number

### 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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## Morton's Eggcockle

*Laevicardium mortoni*

## Soft Sediment Marine Invertebrates

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

- Actions:
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

### 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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

### 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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## Nudibranch

*Elysia catulus*

## Soft Sediment Marine Invertebrates

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

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

- Measure: Acres/Sites/Miles
- Policies and regulations.
  - Measure: Number/Plans
- Habitat and natural process restoration.
  - Measure: Number/Plans

**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.
    - Measure: Acres/Sites/Miles
  - Policies and regulations.
    - Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.
    - Measure: Number/Plans

**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.
    - Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.
    - Measure: Acres/Sites/Miles

**Ocean Quahog**

*Arctica islandica*

**Soft Sediment Marine Invertebrates**

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

- Actions:*
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
    - Measure: Acres/Sites/Miles
  - Policies and regulations.
    - Measure: Number/Plans
  - Habitat and natural process restoration.
    - Measure: Number/Plans

**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.
    - Measure: Acres/Sites/Miles
  - Policies and regulations.
    - Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.
    - Measure: Number/Plans

**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.
    - Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.
    - Measure: Acres/Sites/Miles

**Painted Balloon Worm**

*Eubranchus pallidus*

**Soft Sediment Marine Invertebrates**

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

- Actions:*
- Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.
    - Measure: Acres/Sites/Miles
  - Policies and regulations.
    - Measure: Number/Plans
  - Habitat and natural process restoration.

- Measure: Number/Plans

**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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

**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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

**Parchment Tube Worm**

*Spiochaetopterus costarum oculatus*

**Soft Sediment Marine Invertebrates**

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

**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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

**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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

**Parchment Worm**

*Chaetopterus variopedatus*

**Soft Sediment Marine Invertebrates**

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

**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.  
- Measure: Acres/Sites/Miles

- *Policies and regulations.*  
- Measure: Number/Plans
- *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**Razor Clam (Atlantic Jackknife)**

*Ensis directus*

**Soft Sediment Marine Invertebrates**

**Threat 1 - Fishing and harvesting aquatic resources; Unregulated species**

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

**Threat 2 - Pollution; Eutrophication**

- Actions:
- *Land/water management; Reduction in nitrogen. Rank: 3*  
- Measure: Acres/Sites/Projects

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**Sand Burrower**

*Amphiporeia virginiana*

**Soft Sediment Marine Invertebrates**

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

- Actions:
- *Resource and habitat protection; Prevent dredging and impacts on soft sediment habitats.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

**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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Sea Scallop

*Placopecten magellanicus*

## Soft Sediment Marine Invertebrates

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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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### 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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Sevenspine Bay Shrimp

*Crangon septemspinosa*

## Soft Sediment Marine Invertebrates

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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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### 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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*

## Soft-shell Clam

*Mya arenaria*

## Soft Sediment Marine Invertebrates

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

- Actions:
- *Compliance and enforcement; Poorly managed. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Species management. Rank: 2*  
- Measure: Projects/Plans
  - *Policies and regulations; Limit licenses and lower possession limits. Rank: 3*  
- Measure: Number/Plans

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

- Actions:
- *Law and policy. Rank: 2*  
- Measure: Number
  - *Species management; More restrictive management. Rank: 2*  
- Measure: Projects/Plans
  - *Awareness and communications. Rank: 3*  
- Measure: Number

### 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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Striped Nudibranch

*Cratena pilata*

## Soft Sediment Marine Invertebrates

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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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration.*  
- Measure: Number/Plans

### 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.*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations.*  
- Measure: Number/Plans
  - *Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

## Tube Worm

*Diopatra cuprea*

## Soft Sediment Marine Invertebrates

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

### 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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

### 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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## Tube-dwelling Amphipod

*Ampelisca spp.*

## Soft Sediment Marine Invertebrates

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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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration.  
- Measure: Number/Plans

### 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.  
- Measure: Acres/Sites/Miles
  - Policies and regulations.  
- Measure: Number/Plans
  - Habitat and natural process restoration; Close areas to allow for natural recolonization and succession of soft and sediment communities.  
- Measure: Number/Plans

### 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.  
- Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.  
- Measure: Acres/Sites/Miles

## INVERTS

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## Atlantic Mud Crab

*Panopeus herbstii*

## Shellfish Reef Invertebrates

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**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.*  
- Measure: Number/Plans
  - *Species reintroduction.*  
- Measure: Number/Animals
  - *Policies and regulations; Particularly for the protection of oyster reef habitat.*  
- Measure: Number/Plans
  - *Compliance and enforcement.*  
- Measure: Number/Interventions/Cases

**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.*  
- Measure: Number/Plans
  - *Resource and habitat protection; Protect vulnerable areas from coastal development.*  
- Measure: Acres/Sites/Miles
  - *Private sector standards and codes; Provide incentives to coastal landowners to use "living shoreline" or soft erosion control in practices that use biodegradable materials.*  
- Measure: Number

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

**Blue Mussel**

*Mytilus edulis*

**Shellfish Reef Invertebrates**

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**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*  
- Measure: Number/Animals

**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*  
- Measure: Number/Plans

**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.*  
- Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*  
- Measure: Acres/Sites/Miles

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

- Actions:
- *Data collection and analysis.*  
- Measure: Number
  - *Species management.*  
- Measure: Projects/Plans

**Eastern Oyster**

*Crassostrea virginica*

**Shellfish Reef Invertebrates**

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**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*
  - Measure: Number/Animals

**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*
  - Measure: Number/Plans

**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.*
  - Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*
  - Measure: Acres/Sites/Miles

**Flatback Mud Crab**

*Eurypanopeus depressus*

**Shellfish Reef Invertebrates**

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**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.*
  - Measure: Number/Plans
  - *Species reintroduction.*
  - Measure: Number/Animals
  - *Policies and regulations; Particularly for the protection of oyster reef habitat.*
  - Measure: Number/Plans
  - *Compliance and enforcement.*
  - Measure: Number/Interventions/Cases

**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.*
  - Measure: Number/Plans
  - *Resource and habitat protection; Protect vulnerable areas from coastal development.*
  - Measure: Acres/Sites/Miles
  - *Private sector standards and codes; Provide incentives to coastal landowners to use "living shoreline" or soft erosion control in practices that use biodegradable materials.*
  - Measure: Number

**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.*
  - Measure: Number
  - *Nonmonetary values; Promote education to inform public of ecosystem benefits.*
  - Measure: Acres/Sites/Miles

**Harris Mud Crab**

*Rhithropanopeus harrisi*

**Shellfish Reef Invertebrates**

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**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.*
  - Measure: Number/Plans
  - *Species reintroduction.*

- Measure: Number/Animals
- Policies and regulations; Particularly for the protection of oyster reef habitat.
  - Measure: Number/Plans
- Compliance and enforcement.
  - Measure: Number/Interventions/Cases

**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.
    - Measure: Number/Plans
  - Resource and habitat protection; Protect vulnerable areas from coastal development.
    - Measure: Acres/Sites/Miles
  - Private sector standards and codes; Provide incentives to coastal landowners to use "living shoreline" or soft erosion control in practices that use biodegradable materials.
    - Measure: Number

**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.
    - Measure: Number
  - Nonmonetary values; Promote education to inform public of ecosystem benefits.
    - Measure: Acres/Sites/Miles

## INVERTS

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### Longfin Inshore Squid

*Loligo pealeii*

### Pelagic Invertebrates

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**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
    - Measure: Projects/Plans
  - Livelihood and economic incentives; Co-management and private sector incentives to reduce exploitation.
    - Measure: Livelihood and economic incentives

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

- Actions:
- Law and policy.
    - Measure: Number
  - Education and awareness.
    - Measure: Number

## INVERTS

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### Caterpillar Hunter

*Calosoma wilcoxi*

### Beetles of Deciduous Forests

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**Threat 1 - Lack of information**

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

## Goldsmith Beetle

*Cotalpa lanigera*

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## Beetles of Deciduous Forests

### Threat 1 - Lack of information

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

## Ground Beetle

*Bembidion semicinctum*

---

## Beetles of Deciduous Forests

### Threat 1 - Lack of information

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

## Ground Beetle

*Calathus ingratus*

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## Beetles of Deciduous Forests

### Threat 1 - Lack of information

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

## Round Worm & Slug Hunter

*Carabus vinctus*

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## Beetles of Deciduous Forests

### Threat 1 - Lack of information

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

## Serrate Shoulder Slug Hunter

*Carabus serratus*

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## Beetles of Deciduous Forests

### Threat 1 - Lack of information

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

## Sylvan Worm & Slug Hunter

*Carabus sylvosus*

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## Beetles of Deciduous Forests

### Threat 1 - Lack of information

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

## INVERTS

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### Flea Beetle

*Phyllotreta chalybeipennis*

### Beetles of Maritime Beach Strands

---

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

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

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

### Hister Beetle

*Spilodiscus arcuatus*

### Beetles of Maritime Beach Strands

---

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

## INVERTS

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### False Mealworm Beetle

*Alobates morio*

### Beetles of Pitch Pine Barrens/Inland Sand Barrens

---

**Threat 1 - Lack of information**

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

### Ground Beetle

*Geopinus incrassatus*

### Beetles of Pitch Pine Barrens/Inland Sand Barrens

---

**Threat 1 - Lack of information**

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

**Lagriid Beetle**  
*Anaedes brunneus*

**Beetles of Pitch Pine Barrens/Inland Sand  
Barrens**

---

**Threat 1 - Lack of information**

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

**Seed-eating Ground Beetle**  
*Amara chalcea*

**Beetles of Pitch Pine Barrens/Inland Sand  
Barrens**

---

**Threat 1 - Lack of information**

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

---

**INVERTS**

**Dung Beetle**  
*Dichotomius carolinus*

**Dung Beetles**

---

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

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

**Dung Beetle**  
*Copris fricator*

**Dung Beetles**

---

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

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

**Tumblebug**  
*Canthon pilularius*

**Dung Beetles**

---

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

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

**Tumblebug**  
*Canthon vigilans*

**Dung Beetles**

---

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

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

# INVERTS

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## Big Sand Tiger Beetle

*Cicindela formosa generosa*

## Tiger Beetles

---

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

- Actions:
- Site/area management.  
- Measure: Acres/Sites/Miles
  - Manage for sand patches.  
- Measure: Manage for sand patches

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

- Actions:
- Land/water protection.  
- Measure: Acres/Sites/Miles
  - Protect sand patches.  
- Measure: Acres/Sites

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

- Actions:
- Land/water protection.  
- Measure: Acres/Sites/Miles
  - Protect habitats.  
- Measure: Acres/Sites/Miles

## Common Claybank Tiger Beetle

*Cicindela limbalis*

## Tiger Beetles

---

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

- Actions:
- Land/water protection.  
- Measure: Acres/Sites/Miles
  - Protect estuarine bluff clay habitats.  
- Measure: Protect estuarine bluff clay habitats

## Cow Path Tiger Beetle

*Cicindela purpurea purpurea*

## Tiger Beetles

---

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

- Actions:
- Land/water protection.  
- Measure: Acres/Sites/Miles
  - Protect habitats.  
- Measure: Acres/Sites/Miles

**Threat 2 - Natural system modifications; Succession**

- Actions:
- Site/area management.  
- Measure: Acres/Sites/Miles
  - Manage for habitat.  
- Measure: Acres/Sites/Projects
  - Habitat and natural process restoration.  
- Measure: Number/Plans
  - Prescribed burns to keep vegetation down.  
- Measure: prescribed burns to keep vegetation down

## Eastern Red-bellied Tiger Beetle

*Cicindela rufiventris rufiventris*

## Tiger Beetles

---

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

- Actions:
- Land/water protection.
    - Measure: Acres/Sites/Miles
  - Protect habitats.
    - Measure: Acres/Sites/Miles

**Threat 2 - Natural system modifications; Succession**

- Actions:
- Site/area management.
    - Measure: Acres/Sites/Miles
  - Manage for habitat.
    - Measure: Acres/Sites/Projects

**Festive Tiger Beetle***Cicindela scutellaris rugifrons***Tiger Beetles****Threat 1 - Natural system modifications; Succession of sand patches, anything that fills sand patch (grass, trees, asphalt)**

- Actions:
- Site/area management.
    - Measure: Acres/Sites/Miles
  - Manage for sand patches.
    - Measure: Manage for sand patches

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

- Actions:
- Land/water protection.
    - Measure: Acres/Sites/Miles
  - Protect sand patches.
    - Measure: Acres/Sites
  - Habitat and natural process restoration.
    - Measure: Number/Plans
  - Prescribed burns to keep vegetation down.
    - Measure: prescribed burns to keep vegetation down

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

- Actions:
- Land/water protection.
    - Measure: Acres/Sites/Miles
  - Protect habitats.
    - Measure: Acres/Sites/Miles

**Hairy-necked Tiger Beetle***Cicindela hirticollis rhodensis***Tiger Beetles****Threat 1 - Human intrusions and disturbance; Disturbance from recreation**

- Actions:
- Land/water protection.
    - Measure: Acres/Sites/Miles
  - Protect habitats.
    - Measure: Acres/Sites/Miles

**Margined Tiger Beetle***Cicindela marginata***Tiger Beetles****Threat 1 - Climate change and severe weather; Salt marsh species**

- Actions:
- Other climate change actions.
    - Measure: Other climate change actions

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

- Actions:
- Invasive/problematic species control.

### Northeast Beach Tiger Beetle

*Cicindela dorsalis dorsalis*

**Tiger Beetles**

### Oblique-lined Tiger Beetle

*Cicindela tranquebarica tranquebarica*

**Tiger Beetles**

#### Threat 1 - Human intrusions and disturbance; Disturbance from recreation

- Actions:
- Land/water protection.  
- Measure: Acres/Sites/Miles
  - Protect habitats.  
- Measure: Acres/Sites/Miles

## INVERTS

### 9-Spotted Lady Beetle/Ladybug

*Coccinella novemnotata*

**Other Beetles**

#### 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*.  
- Measure: Number
  - Species recovery, captive breeding, reintroduction.  
- Measure: Number/Animals, captive breeding, reintroduction

### American Burying Beetle

*Nicrophorus americanus*

**Other Beetles**

#### Threat 1 - Problematic native species; Too many scavenger

- Actions:
- Invasive/problematic species control.  
- Measure: Acres/Sites/Projects

#### Threat 2 - Other; Reduction in special food availability

- Actions:
- Species management.  
- Measure: Projects/Plans

### Bambardier Beetle

*Brachinus cyanipennis*

**Other Beetles**

#### 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  
- Measure: ng
  - Resource and habitat protection; Identify potential restoration sites. Rank: 3  
- Measure: ng
  - Site/area management; Conduct restoration projects. Rank: 3  
- Measure: ng
  - Habitat and natural process restoration; allow natural flooding regimes to function. Rank: 3  
- Measure: ng

**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*  
- Measure: ng
  - *Habitat and natural process restoration; Let some areas remain undisturbed to prevent release of pollutants from sediments. Rank: 2*  
- Measure: ng

**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*  
- Measure: ng
  - *Policies and regulations; Support increases in fines for illegal dumping. Rank: 2*  
- Measure: ng

**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*  
- Measure: ng
  - *Data collection and analysis; Monitor changes in habitat that may be caused by climate change. Rank: 3*  
- Measure: ng

**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. Rank: 2*  
- Measure: ng
  - *Data collection and analysis; Monitor changes in habitat that may be caused by climate change. Rank: 3*  
- Measure: ng

**Eastern Snail Eater**

*Scaphinotus elevatus*

**Other Beetles**

---

**Threat 1 - Lack of information**

- Actions:
- *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island. Rank: 2*  
- Measure: Number

**Elderberry Borer**

*Desmocerus palliatus*

**Other Beetles**

---

**Threat 1 - Lack of information**

- Actions:
- *Data collection and analysis; Conduct research to determine distribution and status in Rhode Island. Rank: 2*  
- Measure: Number

**Ground Beetle**

*Bembidion confusum*

**Other Beetles**

---

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

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

## Ground Beetle

*Agonum darlingtoni*

## Other Beetles

---

### Threat 1 - Lack of information

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

## Predaceous Diving Beetle

*Cybister fimbriolatus*

## Other Beetles

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## Round Sand Beetle

*Omophron tessellatum*

## Other Beetles

---

### Threat 1 - Lack of information

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

## INVERTS

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## Hessel's Hairstreak

*Callophrys hesseli*

## Lepidoptera of Atlantic White Cedar Swamps

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

- Actions:
- Policies and regulations.  
- Measure: Number/Plans
  - 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).  
- Measure: 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.  
- Measure: Other

### Threat 2 - Natural system modifications; Limited habitat

- Actions:
- Resource and habitat protection.  
- Measure: Acres/Sites/Miles

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

- Actions:
- Land/water protection.  
- Measure: Acres/Sites/Miles
  - Limit water withdrawals on multiple levels (private, community, utility, municipality).  
- Measure: Number/Projects

## Pale Green Pinion Moth

*Lithophane viridipallens*

## Lepidoptera of Atlantic White Cedar Swamps

---

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.*  
- Measure: ng

**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.*  
- Measure: ng

**Thaxter's Pinon Moth**

*Lithophane thaxteri*

**Lepidoptera of Atlantic White Cedar Swamps**

---

**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.*  
- Measure: Number

**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.*  
- Measure: Number

---

**INVERTS**

**Angus's Datana**

*Datana angusii*

**Lepidoptera of Deciduous Forests**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Black-dotted Ruddy Moth**

*Ilexia intractata*

**Lepidoptera of Deciduous Forests**

---

**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.*  
- Measure: Number

**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.*  
- Measure: Number

**Charming Underwing**

*Catocala blandula*

**Lepidoptera of Deciduous Forests**

---

**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.*

- Measure: Number

**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.

- Measure: Number

**Fragile Dagger Moth**

*Acronicta fragilis*

**Lepidoptera of Deciduous Forests**

---

**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.

- Measure: Number

**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.

- Measure: Number

**Hanham's Owlet**

*Phalaenostola hanhami*

**Lepidoptera of Deciduous Forests**

---

**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.

- Measure: Number

**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.

- Measure: Number

**Henry's Elfin**

*Callophrys henrici*

**Lepidoptera of Deciduous Forests**

---

**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.

- Measure: Number

**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.

- Measure: Number

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

Actions: • Land/water protection.

- Measure: Acres/Sites/Miles

• Conservation and acquisition of forests.

- Measure: Acres/Sites/Miles

**Hickory Hairstreak**

*Satyrium caryaevorum*

**Lepidoptera of Deciduous Forests**

---

**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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Holly Sallow

*Metaxaglaea violacea*

## Lepidoptera of Deciduous Forests

---

### Threat 1 - Agriculture and forestry effluents

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

### 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.*  
- Measure: Number

## Noctuid Moth

*Psaphida thaxterianus*

## Lepidoptera of Deciduous Forests

---

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Purple Plagodis Moth

*Plagodis kuetzingi*

## Lepidoptera of Deciduous Forests

---

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## INVERTS

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## American Brindle Moth

*Lithomoia germana*

## Lepidoptera of Dwarf Shrub Bog/Fen

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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.*

- Measure: Number

**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.

- Measure: Number

**Bog Copper**

*Lycaena epixanthe*

**Lepidoptera of Dwarf Shrub Bog/Fen**

---

**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.

- Measure: Number

**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.

- Measure: Number

**Bog Oligia**

*Oligia minuscula*

**Lepidoptera of Dwarf Shrub Bog/Fen**

---

**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.

- Measure: Number

**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.

- Measure: Number

**Bog Tiger Moth**

*Grammia speciosa*

**Lepidoptera of Dwarf Shrub Bog/Fen**

---

**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.

- Measure: Number

**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.

- Measure: Number

**Chalky Wave Moth**

*Scopula purata*

**Lepidoptera of Dwarf Shrub Bog/Fen**

---

**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.

- Measure: Number

**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.*  
- Measure: Number

### Coastal Swamp Metarranthis

*Metarranthis pilosaria*

### Lepidoptera of Dwarf Shrub Bog/Fen

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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.*  
- Measure: Number

#### **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.*  
- Measure: Number

### Pitcher Plant Borer

*Papaipema appassionate*

### Lepidoptera of Dwarf Shrub Bog/Fen

---

#### **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.*  
- Measure: Number

#### **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.*  
- Measure: Number

### Pitcher Plant Moth

*Exyra fax*

### Lepidoptera of Dwarf Shrub Bog/Fen

---

#### **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.*  
- Measure: Number

#### **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.*  
- Measure: Number

### Sharp-lined Powder Moth

*Eufidonia discospilata*

### Lepidoptera of Dwarf Shrub Bog/Fen

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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.*  
- Measure: Number

#### **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.*  
- Measure: Number

## Sulphur Angle Moth

*Speranza sulphurea*

## Lepidoptera of Dwarf Shrub Bog/Fen

---

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Tufted Sedge Moth

*Hypocoena inquinata*

## Lepidoptera of Dwarf Shrub Bog/Fen

---

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Venus Flytrap Cutworm

*Hempachnobia subporphyrea*

## Lepidoptera of Dwarf Shrub Bog/Fen

---

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## INVERTS

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## Acadian Hairstreak

*Satyrrium acadicum*

## Lepidoptera of Open Freshwater Wetlands (Emergent Marshes, Shrub Swamps, and Wet Meadows)

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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.*  
- Measure: Number

### 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.*  
- Measure: Number

**Black Dash**  
*Euphyes conspicua*

**Lepidoptera of Open Freshwater  
Wetlands (Emergent Marshes, Shrub  
Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Bridgham's Brocade**  
*Oligia bridghami*

**Lepidoptera of Open Freshwater  
Wetlands (Emergent Marshes, Shrub  
Swamps, and Wet Meadows)**

---

**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.*  
- Measure: Number

**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.*  
- Measure: Number

**Bronze Copper**  
*Lycaena hyllus*

**Lepidoptera of Open Freshwater  
Wetlands (Emergent Marshes, Shrub  
Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Chain Fern Borer Moth**  
*Papaipema stenocelis*

**Lepidoptera of Open Freshwater  
Wetlands (Emergent Marshes, Shrub  
Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Curved Halter Moth**

*Capis curvata*

**Lepidoptera of Open Freshwater  
Wetlands (Emergent Marshes, Shrub  
Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Drunk Apamea Moth**

*Apamea inebriata*

**Lepidoptera of Open Freshwater  
Wetlands (Emergent Marshes, Shrub  
Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Included Cordgrass Borer Moth**

*Photodes includens*

**Lepidoptera of Open Freshwater  
Wetlands (Emergent Marshes, Shrub  
Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Little Virgin Tiger Moth**

*Grammia virguncula*

**Lepidoptera of Open Freshwater  
Wetlands (Emergent Marshes, Shrub**

## Swamps, and Wet Meadows)

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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.*  
- Measure: Number

### **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.*  
- Measure: Number

### **Lost Sallow Moth**

*Eupsilia devia*

### **Lepidoptera of Open Freshwater Wetlands (Emergent Marshes, Shrub Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

### **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.*  
- Measure: Number

### **Louisiana Owlet Moth**

*Macrochilo louisiana*

### **Lepidoptera of Open Freshwater Wetlands (Emergent Marshes, Shrub Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

### **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.*  
- Measure: Number

### **Meadow Fritillary**

*Boloria bellona*

### **Lepidoptera of Open Freshwater Wetlands (Emergent Marshes, Shrub Swamps, and Wet Meadows)**

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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.*  
- Measure: Number

### **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.*  
- Measure: Number

### Sharp Angle Shades Moth

*Conservula anodonta*

### Lepidoptera of Open Freshwater Wetlands (Emergent Marshes, Shrub Swamps, and Wet Meadows)

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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.*  
- Measure: Number

#### 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.*  
- Measure: Number

### Silver-bordered Fritillary

*Boloria selene*

### Lepidoptera of Open Freshwater Wetlands (Emergent Marshes, Shrub Swamps, and Wet Meadows)

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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.*  
- Measure: Number

#### 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.*  
- Measure: Number

### Twin-dotted Macrochilo Moth

*Macrochilo hypocritalis*

### Lepidoptera of Open Freshwater Wetlands (Emergent Marshes, Shrub Swamps, and Wet Meadows)

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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.*  
- Measure: Number

#### 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.*  
- Measure: Number

## INVERTS

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### Aphrodite Fritillary

*Speyeria aphrodite*

### Lepidoptera of Ruderal Grasslands/Shrublands

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Chokeberry Underwing**

*Catocala crataegi*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Cobweb Skipper**

*Hesperia metea*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Dusted Skipper**

*Atrytonopsis hianna*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Four-spotted Speranza Moth**

*Speranza coortaria*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Olive Hairstreak**

*Callophrys gryneus*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Pink Streak Moth**

*Dargida rubripennis*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Pink-Border Yellow**

*Phytometra rhodarialis*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Polished Dart Moth**

*Euxoa perpolita*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Scarlet-winged Lichen Moth**

*Hypoprepia miniata*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Spotted Datana**

*Datana perspicua*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Triton Daggermoth**

*Acronicta tritona*

**Lepidoptera of Ruderal  
Grasslands/Shrublands**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**INVERTS**

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**Bay Underwing**

*Catocala badia*

**Moths of Maritime  
Grasslands/Shrublands**

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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.*  
- Measure: ng

**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.*  
- Measure: ng

**Benjamin's Abagrotis**

*Abagrotis nefascia benjamini*

**Moths of Maritime  
Grasslands/Shrublands**

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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.*  
- Measure: ng

**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.*  
- Measure: ng

**Dune Noctuid Moth**

*Sympistis riparia*

**Moths of Maritime  
Grasslands/Shrublands**

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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.*  
- Measure: ng

**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.*  
- Measure: ng

**Fringed Dart**

*Eucoptocnemis fimbriaris*

**Moths of Maritime  
Grasslands/Shrublands**

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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.*  
- Measure: ng

**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.*  
- Measure: ng

## Unexpected Cynia

*Cynia inopinatus*

## Moths of Maritime Grasslands/Shrublands

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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.*  
- Measure: Acres/Sites/Miles

### 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.*  
- Measure: ng

## Violet Dart Moth

*Euxoa violaris*

## Moths of Maritime Grasslands/Shrubland

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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.*  
- Measure: ng

### 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.*  
- Measure: ng

## INVERTS

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## Barrens Chaetagnia

*Chaetagnia tremula*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Barrens Xylotype

*Xylotype capax*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Black-eyed Zale

*Zale curema*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Blueberry Sallow

*Sympistis dentata*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Contracted Datana

*Datana contracta*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Dart Moth

*Leucania extincta*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Eastern Buck Moth

*Hemileuca maia*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**German Cousin**

*Sideridis congermana*

**Moths of Pitch Pine Woodlands/Barrens**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Gray Spring Zale**

*Zale submediana*

**Moths of Pitch Pine Woodlands/Barrens**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Joyful Holomelina Moth**

*Virbia laeta*

**Moths of Pitch Pine Woodlands/Barrens**

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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.*  
- Measure: Number

**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.*  
- Measure: Number

**Marooning Moth**

*Sideridis maryx*

**Moths of Pitch Pine Woodlands/Barrens**

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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.*

- Measure: Number

**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.

- Measure: Number

**Noctuid Moth**

*Hyperstrotia flaviguttata*

**Moths of Pitch Pine Woodlands/Barrens**

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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.

- Measure: Number

**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.

- Measure: Number

**Pine Barrens Zale**

*Zale lunifera*

**Moths of Pitch Pine Woodlands/Barrens**

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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.

- Measure: Number

**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.

- Measure: Number

**Pine Barrens Zanclognatha**

*Zanclognatha martha*

**Moths of Pitch Pine Woodlands/Barrens**

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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.

- Measure: Number

**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.

- Measure: Number

**Pink Star Moth**

*Derrima stellata*

**Moths of Pitch Pine Woodlands/Barrens**

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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.

- Measure: Number

**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.*  
- Measure: Number

## Scrub Euchlaena Moth

*Euchlaena madusaria*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### **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.*  
- Measure: Number

## Short-lined Chocolate

*Argyrostroma anilis*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### **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.*  
- Measure: Number

## Spotted Dart Moth

*Agrotis stigmata*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### **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.*  
- Measure: Number

## Underwing Moth

*Catocala n. sp.*

## Moths of Pitch Pine Woodlands/Barrens

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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.*  
- Measure: Number

### **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.*  
- Measure: Number

## INVERTS

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### Edward's Hairstreak

*Satyrium edwardsii*

### Butterflies of Pitch Pine Woodlands/Barrens

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#### **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.*  
- Measure: Number/Animals
  - *Species reintroduction; Establish new populations of larval food plants.*  
- Measure: Number/Animals

#### **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.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

#### **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.*  
- Measure: Number

### Frosted Elfin

*Callophrys (Decid.) irus (Baptisia type) AND Ca*

### Butterflies of Pitch Pine Woodlands/Barrens

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#### **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.*  
- Measure: Number/Animals
  - *Species reintroduction; Establish new populations of larval food plants.*  
- Measure: Number/Animals

#### **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.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

#### **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.*  
- Measure: Number

### Hoary Elfin

*Callophrys polios*

### Butterflies of Pitch Pine Woodlands/Barrens

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#### **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.*  
- Measure: Number/Animals
  - *Species reintroduction; Establish new populations of larval food plants.*  
- Measure: Number/Animals

**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.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**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.*  
- Measure: Number

**Persius Duskywing**

*Erynnis persius*

**Butterflies of Pitch Pine  
Woodlands/Barrens**

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**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.*  
- Measure: Number/Animals
  - *Species reintroduction; Establish new populations of larval food plants.*  
- Measure: Number/Animals

**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.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**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.*  
- Measure: Number

**Sleepy Duskywing**

*Erynnis brizo*

**Butterflies of Pitch Pine  
Woodlands/Barrens**

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**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.*  
- Measure: Number/Animals
  - *Species reintroduction; Establish new populations of larval food plants.*  
- Measure: Number/Animals

**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.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**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.*  
- Measure: Number

# INVERTS

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## Arrowhead Spiketail

*Cordulegaster obliqua*

## Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats

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### 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).*  
- Measure: Acres/Sites/Miles

### 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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

### Threat 3 - Lack of planning; Inadequate wetland regulations

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

### 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.*  
- Measure: Acres/Sites/Miles

### 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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

### 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.*  
- Measure: Projects/Plans

### Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

### 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.*  
- Measure: Acres/Sites/Miles

- *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
- Measure: Acres/Sites/Miles

**Comet Darner**

*Anax longipes*

**Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:*
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:*
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**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.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
- Measure: Acres/Sites/Miles

## **Common Sanddragon**

*Progomphus obscurus*

## **Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

### **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).*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

### **Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

### **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.*  
- Measure: Projects/Plans

### **Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*

- Measure: Number

**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.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
- Measure: Acres/Sites/Miles

**Crimson-ringed Whiteface**

*Leucorrhinia glacialis*

**Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

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**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects

- *Law and policy.*  
- Measure: Number
- *Planning.*  
- Measure: Number

**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.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
- Measure: Acres/Sites/Miles

**Lyre-tipped Spreadwing**

*Lestes unguiculatus*

**Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant**

## communities

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

### **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.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
- Measure: Acres/Sites/Miles

## **Pine Barrens Bluet**

*Enallagma recurvatum*

## **Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

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### **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).*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

### **Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

### **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.*

- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- Land/water management.  
- Measure: Acres/Sites/Projects
  - Law and policy.  
- Measure: Number
  - Planning.  
- Measure: Number

**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.  
- Measure: Acres/Sites/Miles
  - Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.  
- Measure: Acres/Sites/Miles

**Ringed Boghaunter**

*Williamsonia lintneri*

**Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

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**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).  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Number/Plans
  - Outreach.  
- Measure: Number/Projects/Reviews
  - Site/area management; Limit access and development of pond shores/river banks for recreation.  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.  
- Measure: Number/Plans
  - Outreach.  
- Measure: Number/Projects/Reviews
  - Site/area management; Limit access and development of pond shores/river banks for recreation.  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Number
  - Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**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.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
- Measure: Acres/Sites/Miles

**Threat 9 - Hunting and collecting terrestrial animals**

- Actions:
- *Policies and regulations; Limit collecting permits.*  
- Measure: Number/Plans
  - *Compliance and enforcement; Monitor results.*  
- Measure: Number/Interventions/Cases

**Threat 10 - Problematic native species; Introduction of beaver to habitat**

- Actions:
- *Data collection and analysis.*  
- Measure: Number
  - *Species management.*  
- Measure: Projects/Plans

**Scarlet Bluet**  
*Enallagma pictum*

**Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

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**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*

- Measure: Number/Projects/Reviews
- Site/area management; Limit access and development of pond shores/river banks for recreation.  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Number
  - Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.  
- Measure: Projects/Plans

**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.  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- Land/water management.  
- Measure: Acres/Sites/Projects
  - Law and policy.  
- Measure: Number
  - Planning.  
- Measure: Number

**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.  
- Measure: Acres/Sites/Miles
  - Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.  
- Measure: Acres/Sites/Miles

**Southern Sprite**  
*Nehalennia integricollis*

**Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

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**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).  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Number/Plans
  - Outreach.  
- Measure: Number/Projects/Reviews
  - Site/area management; Limit access and development of pond shores/river banks for recreation.  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in

*development projects.*

*- Measure: Number/Plans*

- *Outreach.*  
*- Measure: Number/Projects/Reviews*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
*- Measure: Acres/Sites/Miles*

**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.*  
*- Measure: Acres/Sites/Miles*

**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.*  
*- Measure: Number*

- *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
*- Measure: Projects/Plans*

**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.*  
*- Measure: Projects/Plans*

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

*Actions:* • *Land/water management.*  
*- Measure: Acres/Sites/Projects*

- *Law and policy.*  
*- Measure: Number*
- *Planning.*  
*- Measure: Number*

**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.*  
*- Measure: Acres/Sites/Miles*

- *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
*- Measure: Acres/Sites/Miles*

**Taper-tailed Darner**

*Gomphaeschna antilope*

**Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

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**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).*  
*- Measure: Acres/Sites/Miles*

**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.*  
*- Measure: Number/Plans*

- *Outreach.*  
*- Measure: Number/Projects/Reviews*
- *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
*- Measure: Acres/Sites/Miles*

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**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.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
- Measure: Acres/Sites/Miles

**Umbrella Shadowdragon**

*Neurocordulia obsoleta*

**Odonates of Springs, Graminoid Fen, Wetlands, Coastal Plain Quagmire and Pondshore, Eutrophic and Oligotrophic Ponds, and Brackish Habitats**

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**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews

- *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**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.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Protect upland surrounding ponds through fee conservation ownership and/or development rights.*  
- Measure: Acres/Sites/Miles

## INVERTS

**Arrow Clubtail**

*Stylurus spiniceps*

**Odonates of the Lower Perennial River**

**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*

- Measure: Number/Projects/Reviews
- Site/area management; Limit access and development of pond shores/river banks for recreation.  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.  
- Measure: Number/Plans
  - Outreach.  
- Measure: Number/Projects/Reviews
  - Site/area management; Limit access and development of pond shores/river banks for recreation.  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Number
  - Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.  
- Measure: Projects/Plans

**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.  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- Land/water management.  
- Measure: Acres/Sites/Projects
  - Law and policy.  
- Measure: Number
  - Planning.  
- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- Data collection and analysis; Monitor dam release schedule.  
- Measure: Number

**Threat 9 - Lack of information**

- Actions:
- Data collection and analysis; Additional inventory should focus on the larger rivers in the lower Pawcatuck system.  
- Measure: Number

**Blackwater Bluet**

*Enallagma weewa*

**Odonates of the Lower Perennial River**

**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).  
- Measure: Acres/Sites/Miles

**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.  
- Measure: Number/Plans
  - Outreach.  
- Measure: Number/Projects/Reviews

- *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*  
- Measure: Number

**Coppery Emerald**

*Somatochlora georgiana*

**Odonates of the Lower Perennial River**

**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*

- Measure: Number/Plans
- Outreach.
  - Measure: Number/Projects/Reviews
- Site/area management; Limit access and development of pond shores/river banks for recreation.
  - Measure: Acres/Sites/Miles

**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.
    - Measure: Acres/Sites/Miles

**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.
    - Measure: Number
  - Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.
    - Measure: Projects/Plans

**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.
    - Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- Land/water management.
    - Measure: Acres/Sites/Projects
  - Law and policy.
    - Measure: Number
  - Planning.
    - Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- Data collection and analysis; Monitor dam release schedule.
    - Measure: Number

## INVERTS

### American Rubyspot

*Hetaerina americana*

### Odonates of the Upper Perennial River

**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).
    - Measure: Acres/Sites/Miles

**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.
    - Measure: Number/Plans
  - Outreach.
    - Measure: Number/Projects/Reviews
  - Site/area management; Limit access and development of pond shores/river banks for recreation.
    - Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.
    - Measure: Number/Plans
  - Outreach.
    - Measure: Number/Projects/Reviews

- *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*  
- Measure: Number

**Brook Snaketail**

*Ophiogomphus aspersus*

**Odonates of the Upper Perennial River**

**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*  
- Measure: Number

**Delta-spotted Spiketail***Cordulegaster diastatops***Odonates of the Upper Perennial River****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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

- Measure: Projects/Plans

**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.*

- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

Actions: • *Land/water management.*

- Measure: Acres/Sites/Projects

• *Law and policy.*

- Measure: Number

• *Planning.*

- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

Actions: • *Data collection and analysis; Monitor dam release schedule.*

- Measure: Number

**Maine Snaketail**

*Ophiogomphus mainensis*

**Odonates of the Upper Perennial River**

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**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).*

- Measure: Acres/Sites/Miles

**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.*

- Measure: Number/Plans

• *Outreach.*

- Measure: Number/Projects/Reviews

• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

Actions: • *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*

- Measure: Number/Plans

• *Outreach.*

- Measure: Number/Projects/Reviews

• *Site/area management; Limit access and development of pond shores/river banks for recreation.*

- Measure: Acres/Sites/Miles

**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.*

- Measure: Acres/Sites/Miles

**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.*

- Measure: Number

• *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*

- Measure: Projects/Plans

**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.*

- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*  
- Measure: Number

**Mustached Clubtail**

*Gomphus adelphus*

**Odonates of the Upper Perennial River**

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**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*

- Measure: Number
- Planning.
- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- Data collection and analysis; Monitor dam release schedule.
  - Measure: Number

**Southern Pygmy Clubtail**

*Lanthus vernalis*

**Odonates of the Upper Perennial River**

**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).
  - Measure: Acres/Sites/Miles

**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.
  - Measure: Number/Plans
  - Outreach.
  - Measure: Number/Projects/Reviews
  - Site/area management; Limit access and development of pond shores/river banks for recreation.
  - Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.
  - Measure: Number/Plans
  - Outreach.
  - Measure: Number/Projects/Reviews
  - Site/area management; Limit access and development of pond shores/river banks for recreation.
  - Measure: Acres/Sites/Miles

**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.
  - Measure: Acres/Sites/Miles

**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.
  - Measure: Number
  - Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.
  - Measure: Projects/Plans

**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.
  - Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- Land/water management.
  - Measure: Acres/Sites/Projects
  - Law and policy.
  - Measure: Number
  - Planning.
  - Measure: Number

**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*

## Odonates of the Upper Perennial River

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### **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).*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

### **Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Acres/Sites/Miles

### **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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

### **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.*  
- Measure: Projects/Plans

### **Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

### **Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*  
- Measure: Number

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## Twin-spotted Spiketail

*Cordulegaster maculata*

## Odonates of the Upper Perennial River

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**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*  
- Measure: Number

**Zebra Clubtail**  
*Stylurus scudderii*

**Odonates of the Upper Perennial River**

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**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).*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Lack of planning; Inadequate wetland regulations**

- Actions:
- *Policies and regulations; Strengthen wetland regulations to allow larger regulatory buffers in development projects.*  
- Measure: Number/Plans
  - *Outreach.*  
- Measure: Number/Projects/Reviews
  - *Site/area management; Limit access and development of pond shores/river banks for recreation.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Acres/Sites/Miles

**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.*  
- Measure: Number
  - *Species management; Monitor priority habitats for invasive plant species, consider management/removal as appropriate.*  
- Measure: Projects/Plans

**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.*  
- Measure: Projects/Plans

**Threat 7 - Climate change and severe weather; Alteration of hydrology, water temperature, plant communities**

- Actions:
- *Land/water management.*  
- Measure: Acres/Sites/Projects
  - *Law and policy.*  
- Measure: Number
  - *Planning.*  
- Measure: Number

**Threat 8 - Dams and water management/use; Water management, dam releases**

- Actions:
- *Data collection and analysis; Monitor dam release schedule.*  
- Measure: Number

## INVERTS

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### Rusty-patched Bumble Bee

*Bombus affinis*

### Pollinators - Bumble Bees

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**Threat 1 - Lack of information; Population data needed (unknown pathogen)**

- Actions:
- *Data collection and analysis; Conduct inventory and determine location of populations. Rank: 2*  
- Measure: Number

**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*  
- Measure: Number

**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*  
- Measure: Number

**Threat 4 - Invasive non-native/alien species; Fungus introduced in commercially-reared bumble bees**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

**Yellow-banded Bumblebee**

*Bombus terricola*

**Pollinators - Bumble Bees**

**Threat 1 - Lack of information; Population data needed (unknown pathogen)**

- Actions: • *Data collection and analysis; Conduct inventory and determine location of populations. Rank: 2*  
- Measure: Number

**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*  
- Measure: Number

**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*  
- Measure: Number

**Threat 4 - Invasive non-native/alien species; Fungus introduced in commercially-reared bumble bees**

- Actions: • *Policies and regulations. Rank: 3*  
- Measure: Number/Plans

**INVERTS**

**Monarch Butterfly**

*Danaus plexippus*

**Pollinators - Monarch Butterfly**

**Threat 1 - Other ecosystem modifications; Decline in populations of milkweed**

- Actions: • *Habitat and natural process restoration. Rank: 2*  
- Measure: Number/Plans
- *Species recovery; Restoration of milkweed populations, including propagation of milkweed using locally-sourced seed. Rank: 3*  
- Measure: Number/Animals
  - *Training; Workshops and other educational forums in creating and enhancing pollinator habitats. Rank: 3*  
- Measure: Number/Students/Instructors

**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*  
- Measure: Number

**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*  
- Measure: Number

**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*  
- Measure: Number/Plans
- *Awareness and communications; Public education concerning the effects of herbicides on dependent pollinator organisms. Rank: 3*  
- Measure: Number

# INVERTS

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## Achemon Sphinx

*Eumorpha achemon*

## Pollinators - Silkworm and Sphinx Moths

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### 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.*  
- Measure: Number
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Big Poplar Sphinx

*Pachysphinx modesta*

## Pollinators - Silkworm and Sphinx Moths

---

### 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.*  
- Measure: Number
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Cecropia Moth

*Hyalophora cecropia*

## Pollinators - Silkworm and Sphinx Moths

---

### 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.*  
- Measure: Number
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number

### 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.*

## Hermit Sphinx

*Sphinx eremitus*

## Pollinators - Silkworm and Sphinx Moths

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### 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.*  
- Measure: Number
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Hydrangea Sphinx

*Darapsa versicolor*

## Pollinators - Silkworm and Sphinx Moths

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### 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.*  
- Measure: Number
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number

### 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.*  
- Measure: Number

## Laurel Sphinx

*Sphinx kalmiae*

## Pollinators - Silkworm and Sphinx Moths

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### 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.*  
- Measure: Number
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
- Measure: Number/Plans

### 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.*  
- Measure: Number

### 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.*

*- Measure: Number*

## **Promethia Silkmoth**

## **Pollinators - Silkworm and Sphinx Moths**

*Callosamia promethea*

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### **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.*  
*- Measure: Number*
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
*- Measure: Number/Plans*

### **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.*  
*- Measure: Number*

### **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.*  
*- Measure: Number*

## **Tulip Tree Silkworm**

## **Pollinators - Silkworm and Sphinx Moths**

*Callosamia angulifera*

---

### **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.*  
*- Measure: Number*
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
*- Measure: Number/Plans*

### **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.*  
*- Measure: Number*

### **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.*  
*- Measure: Number*

## **Waved Sphinx**

## **Pollinators - Silkworm and Sphinx Moths**

*Ceratonia undulosa*

---

### **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.*  
*- Measure: Number*
  - *Policies and regulations; Formulate policies concerning the introduction of Compsilura for control of pest species of moths.*  
*- Measure: Number/Plans*

### **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.*  
*- Measure: Number*

### **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.  
- Measure: Number

## Wild Cherry Sphinx

*Sphinx drupiferarum*

## Pollinators - Silkworm and Sphinx Moths

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### 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.  
- Measure: Number
  - Policies and regulations; Formulate policies concerning the introduction of *Compsilura* for control of pest species of moths.  
- Measure: Number/Plans

### 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.  
- Measure: Number

### 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.  
- Measure: Number

## INVERTS

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### Bee-like Robber Fly

*Laphria champlainii*

### Robber Flies

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#### 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.  
- Measure: Acres/Sites/Miles
  - Resource and habitat protection; Control public access to their primary habitat areas, Pitch Pine Woodlands and Barrens.  
- Measure: Acres/Sites/Miles
  - Site/area management; Control public access to their primary habitat areas, Pitch Pine Woodlands and Barrens.  
- Measure: Acres/Sites/Miles

#### 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.  
- Measure: Number/Plans
  - Site/area management; Conduct management by methods identified.  
- Measure: Acres/Sites/Miles

#### 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.  
- Measure: Number
  - Outreach; Research into other, species specific pesticides.  
- Measure: Number/Projects/Reviews
  - Planning.  
- Measure: Number
  - Policies and regulations.  
- Measure: Number/Plans

#### 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.*  
- Measure: *Invasive/problematic species control*

## Robber Fly

*Pogonosoma dorsatum*

## Robber Flies

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### 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.*  
- Measure: *Acres/Sites/Miles*
- *Resource and habitat protection; Control public access to their primary habitat areas, Pitch Pine Woodlands and Barrens.*  
- Measure: *Acres/Sites/Miles*
  - *Site/area management; Control public access to their primary habitat areas, Pitch Pine Woodlands and Barrens.*  
- Measure: *Acres/Sites/Miles*

### 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.*  
- Measure: *Number/Plans*
- *Site/area management; Conduct management by methods identified.*  
- Measure: *Acres/Sites/Miles*

### 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.*  
- Measure: *Number*
- *Outreach; Research into other, species specific pesticides.*  
- Measure: *Number/Projects/Reviews*
  - *Planning.*  
- Measure: *Number*
  - *Policies and regulations.*  
- Measure: *Number/Plans*

### 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.*  
- Measure: *Invasive/problematic species control*

## Robber Fly

*Stichopogon argenteus*

## Robber Flies

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

### Threat 2 - Invasive non-native/alien species; Japanese Sand Sedge (*Carex kobomugi*)

- Actions: • *Invasive/problematic species control; Control of current populations and early detection of new incursions.*  
- Measure: *Acres/Sites/Projects*

- *Site/area management; Control of current populations and early detection of new incursions.*  
- Measure: Acres/Sites/Miles

### **Threat 3 - Recreational activities; Visitors and dogs trampling habitat**

- Actions:
- *Site/area protection; Control human access by fencing, patrols, etc.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Control human access by fencing, patrols, etc.*  
- Measure: Acres/Sites/Miles
  - *Site/area management; Control human access by fencing, patrols, etc.*  
- Measure: Acres/Sites/Miles
  - *Awareness and communications; Signage, brochures, public education opportunities.*  
- Measure: Awareness and communications

### **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.*  
- Measure: Acres/Sites/Miles
  - *Resource and habitat protection; Intensify clean-up actions in event of spills or pollution from development and/or developed areas.*  
- Measure: Acres/Sites/Miles

## **INVERTS**

### **Giant Stonefly**

*Attaneuria ruralis*

### **Stoneflies, Mayflies, and True Flies**

#### **Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)**

- Actions:
- *Compliance and enforcement. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*  
- Measure: Number/Plans
  - *Planning; Manage storm water and run-off. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect land in watershed. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Protect and maintain or restore water quality. Rank: 3*  
- Measure: Acres/Sites/Projects

#### **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*  
- Measure: Number
  - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*  
- Measure: Number/Plans
  - *Education and awareness; Educate public to conserve water. Rank: 3*  
- Measure: Number

#### **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*  
- Measure: Number
  - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

## Golden Stoneflies

*Paragnetina sp.*

## Stoneflies, Mayflies, and True Flies

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### Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:
- *Compliance and enforcement. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*  
- Measure: Number/Plans
  - *Planning; Manage storm water and run-off. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect land in watershed. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Protect and maintain or restore water quality. Rank: 3*  
- Measure: Acres/Sites/Projects

### 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*  
- Measure: Number
  - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*  
- Measure: Number/Plans
  - *Education and awareness; Educate public to conserve water. Rank: 3*  
- Measure: Number

### 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*  
- Measure: Number
  - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate public to conserve water and energy. Rank: 2*  
- Measure: Number

## Mayflies (Little Maryatts)

*Epeorus sp.*

## Stoneflies, Mayflies, and True Flies

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### Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:
- *Compliance and enforcement. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*  
- Measure: Number/Plans
  - *Planning; Manage storm water and run-off. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect land in watershed. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Protect and maintain or restore water quality. Rank: 3*  
- Measure: Acres/Sites/Projects

### 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*  
- Measure: Number
  - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*  
- Measure: Number/Plans
  - *Education and awareness; Educate public to conserve water. Rank: 3*  
- Measure: Number

**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*  
- Measure: Number
  - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate public to conserve water and energy. Rank: 2*  
- Measure: Number

**Sallflies**

*Haploperla sp.*

**Stoneflies, Mayflies, and True Flies**

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**Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)**

- Actions:
- *Compliance and enforcement. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*  
- Measure: Number/Plans
  - *Planning; Manage storm water and run-off. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect land in watershed. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Protect and maintain or restore water quality. Rank: 3*  
- Measure: Acres/Sites/Projects

**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*  
- Measure: Number
  - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*  
- Measure: Number/Plans
  - *Education and awareness; Educate public to conserve water. Rank: 3*  
- Measure: Number

**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*  
- Measure: Number
  - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

## Small Minnow Mayflies

*Heterocloeon sp.*

## Stoneflies, Mayflies, and True Flies

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### Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:
- *Compliance and enforcement. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*  
- Measure: Number/Plans
  - *Planning; Manage storm water and run-off. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect land in watershed. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Protect and maintain or restore water quality. Rank: 3*  
- Measure: Acres/Sites/Projects

### 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*  
- Measure: Number
  - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*  
- Measure: Number/Plans
  - *Education and awareness; Educate public to conserve water. Rank: 3*  
- Measure: Number

### 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*  
- Measure: Number
  - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate public to conserve water and energy. Rank: 2*  
- Measure: Number

## Watersnipe Flies

*Atherix spp.*

## Stoneflies, Mayflies, and True Flies

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### Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)

- Actions:
- *Compliance and enforcement. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*  
- Measure: Number/Plans
  - *Planning; Manage storm water and run-off. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect land in watershed. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Protect and maintain or restore water quality. Rank: 3*  
- Measure: Acres/Sites/Projects

### 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*  
- Measure: Number
  - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*  
- Measure: Number/Plans
  - *Education and awareness; Educate public to conserve water. Rank: 3*  
- Measure: Number

**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*  
- Measure: Number
  - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate public to conserve water and energy. Rank: 2*  
- Measure: Number

## **Yellow Stonefly**

*Eccoptura xanthenes*

## **Stoneflies, Mayflies, and True Flies**

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**Threat 1 - Pollution; Run-off and other water quality impacts (taxa sensitive to pollution)**

- Actions:
- *Compliance and enforcement. Rank: 3*  
- Measure: Number/Interventions/Cases
  - *Habitat and natural process restoration; Support protection and establishment of riparian buffer. Rank: 3*  
- Measure: Number/Plans
  - *Planning; Manage storm water and run-off. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect land in watershed. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Land/water management; Protect and maintain or restore water quality. Rank: 3*  
- Measure: Acres/Sites/Projects

**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*  
- Measure: Number
  - *Land/water protection; Protect surrounding land and connected waterways. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Policies and regulations; Management plan compliance and enforcement. Rank: 3*  
- Measure: Number/Plans
  - *Education and awareness; Educate public to conserve water. Rank: 3*  
- Measure: Number

**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*  
- Measure: Number
  - *Planning; Protect and maintain water resources and infrastructure. Rank: 3*  
- Measure: Number
  - *Land/water protection; Protect tree cover to maintain water temperatures. Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Education and awareness; Educate public to conserve water and energy. Rank: 2*

- *Measure: Number*

# MAMMALS

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## Mammals (taxa wide)

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### Lack of information

- Actions:
- *Data collection and analysis; Continue established long-term monitoring protocols. Rank: 2.5*
  - *Data collection and analysis; Evaluate existing significant hibernacula. Rank: 3*
  - *Data collection and analysis; Initiate monitoring of primary resources. Rank: 2*
  - *Data collection and analysis; Research abundance and distribution of species for which status and habitat can be determined, by including additional data collection in present studies. Rank: 3*
  - *Research, survey, inventory, monitor populations; Assess taxonomy/population relationships. Rank: 3*
  - *Research, survey, inventory, monitor populations; Determine metapopulation structure. Rank: 1*

### Invasive and other problematic species and genes

- Actions:
- *Invasive/problematic species control; Develop and implement invasive species management program. Rank: 3*
  - *Invasive/problematic species control; Develop and provide educational information about invasive species. Rank: 3*
  - *Alliance and partnership development; Coordinate invasive species management with other state and regional programs. Rank: 2*
  - *Planning; Create and implement invasive species monitoring protocol. Rank: 2*
  - *Planning; Research invasive species management and monitoring protocols. Rank: 2*

### Transportation and service corridors

- Actions:
- *Technical assistance; Establish discussions with state and local D.O.T. Rank: 1*
  - *Alliance and partnership development; Coordinate incidental take programs with regional or national initiatives. Rank: 1.5*
  - *Planning; Assess means to mitigate road effects. Rank: 1*
  - *Planning; Enhance habitat connectivity for priority species with culverts. Rank: 2*

### Roads and railroads

- Actions:
- *Law and policy; Conduct road mitigations where required.*
  - *Planning; Identify areas of significant road effects in focal areas.*

### Human intrusions and disturbance

- Actions:
- *Education and awareness; Develop and provide educational program/materials to reduce incidental mortality and take from humans. Rank: 2*

### Natural system modifications

- Actions:
- *Habitat and natural process restoration; Develop fire prescriptions for priority parcels.*

# MAMMALS

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## Big Brown Bat

*Eptesicus fuscus*

Bats

**Threat 1 - Invasive and other problematic species and genes; Currently common and widespread, but because other species are so threatened, need to continue monitoring species. Subject to white nose, but different lifestyle and behaviors make less susceptible to threat from white nose.**

- Actions:
- *Data collection and analysis; Continued monitoring of species abundance. Rank: 3*  
- Measure: Number
  - *Data collection and analysis; Find methodology to control the spread of WNS. Rank: 2*  
- Measure: Number
  - *Data collection and analysis; Research reasons individuals survive WNS and others do not. Rank: 2*  
- Measure: Number

**Threat 2 - Residential and commercial development; Habitat loss of maternal roost sites (e.g., old barns, other man made structures)**

- Actions:
- *Species management; Bat box construction. Rank: 2*  
- Measure: Projects/Plans
  - *Land/water protection; Water quality important for direct consumption and because of prey insect habitat needs. Rank: 2*  
- Measure: Acres/Sites/Miles

**Threat 3 - Pollution; Widespread pesticide use for insect control potentially reduces prey source for bats**

- Actions:
- *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
- Measure: Number

**Threat 4 - Agriculture and aquaculture; Widespread pesticide use on crops potentially reduces prey source for bats**

- Actions:
- *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
- Measure: Number

**Threat 5 - Biological resource use; Demographic changes from incidental take (human)**

- Actions:
- *Data collection and analysis; Evaluate permitting process for nuisance wildlife control permits which result in incidental take and exclusion from buildings in order to enforce time of year restrictions and improve reporting requirements. Rank: 1*  
- Measure: Number

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## Eastern Red Bat

*Lasiurus borealis*

Bats

**Threat 1 - Renewable energy; Threatened by wind turbine development**

- Actions:
- *Policies and regulations; Work with all levels of government to regulate cut-in speeds and placement to avoid bat habitats. Rank: 3*  
- Measure: Number/Plans
  - *Data collection and analysis; Collect more information on status and distribution to understand species needs better for summer roost sites. Rank: 3*  
- Measure: Number

**Threat 2 - Residential and commercial development; Habitat loss of critical micro-features**

- Actions:
- *Research, survey, inventory, monitor habitats; Evaluate existing significant and suitable habitat. Rank: 3*  
- Measure: Number/Studies

**Threat 3 - Agriculture and aquaculture; Widespread pesticide use on crops potentially reduces prey source for bats**

- Actions:
- *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
- Measure: Number

**Threat 4 - Pollution; Widespread pesticide use for insect control potentially reduces prey source for bats**

- Actions:
- *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
- Measure: Number

## Eastern Small-footed Myotis

*Myotis leibii*

Bats

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### Threat 1 - Invasive and other problematic species and genes; Introduced disease, White-nose syndrome (WNS)

- Actions:
- *Data collection and analysis; Collect more information on status and distribution to understand species needs better for summer/winter roost sites. Rank: 3*  
- Measure: Number

### Threat 2 - Residential and commercial development; Habitat loss of maternal roost sites (e.g., old barns, snags, other man made and natural structures)

- Actions:
- *Species management; Bat box construction if research shown to assist species. Rank: 3*  
- Measure: Projects/Plans
  - *Data analysis and collection; Research species needs and most likely areas to be found in Rhode Island.*  
- Measure: Data analysis and collection

### Threat 3 - Pollution; Widespread pesticide use for insect control potentially reduces prey source for bats

- Actions:
- *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
- Measure: Number

### Threat 4 - Human intrusions and disturbance; Human activities interfering with security of winter hibernation

- Actions:
- *Site/area protection; Install gates and limit access to hibernacula if they become known.*  
- Measure: Acres/Sites/Miles

### Threat 5 - Residential and commercial development; Habitat loss of critical micro-features

- Actions:
- *Research, survey, inventory, monitor habitats; Evaluate existing areas that could be important hibernacula. Rank: 2*  
- Measure: Number/Studies

## Hoary Bat

*Lasiurus cinereus*

Bats

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### Threat 1 - Renewable energy; Threatened by wind turbine development

- Actions:
- *Policies and regulations; Work with all levels of government to regulate cut-in speeds and placement to avoid bat habitats. Rank: 3*  
- Measure: Number/Plans
  - *Data collection and analysis; Collect more information on status and distribution to understand species needs better for summer roost sites. Rank: 3*  
- Measure: Number

### Threat 2 - Residential and commercial development; Habitat loss of critical micro-features

- Actions:
- *Research, survey, inventory, monitor habitats; Evaluate existing significant and suitable habitat. Rank: 3*  
- Measure: Number/Studies

### Threat 3 - Agriculture and aquaculture; Widespread pesticide use on crops potentially reduces prey source for bats

- Actions:
- *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
- Measure: Number

### Threat 4 - Pollution; Widespread pesticide use for insect control potentially reduces prey source for bats

- Actions:
- *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
- Measure: Number

## Little Brown Myotis

*Myotis lucifugus*

Bats

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### Threat 1 - Invasive and other problematic species and genes; Introduced disease, White-nose syndrome (WNS)

- Actions:*
- *Awareness and communications; Build awareness to reduce impacts to bat populations. Most likely both summer and winter resident species, increase tolerance of the species by the public. Inform public to take care in areas that could provide stable temperatures above freezing, such as old buildings or deep cracks in the ground near ledges, as these are possible winter hibernacula. Rank: 3*  
- Measure: Number
  - *Data collection and analysis; Collect more information on status and distribution to understand species needs better for summer roost sites. Rank: 3*  
- Measure: Number

**Threat 2 - Residential and commercial development; Habitat loss of maternal roost sites (e.g., old barns, snags, other man made and natural structures)**

- Actions:*
- *Species management; Bat box construction if research shown to assist species; Grest management. Rank: 3*  
- Measure: Projects/Plans

**Threat 3 - Human intrusions and disturbance; Human activities interfering with security of winter hibernation**

- Actions:*
- *Site/area protection; Install gates and limit access to known hibernacula during the winter months. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 4 - Biological resource use; Demographic changes from incidental take (human)**

- Actions:*
- *Data collection and analysis; Evaluate permitting process for extermination permits which result in incidental take and exclusion from buildings, in order to enforce time of year restrictions and improve reporting requirements. Rank: 2*  
- Measure: Number

**Threat 5 - Residential and commercial development; Habitat loss of critical micro-features**

- Actions:*
- *Research, survey, inventory, monitor habitats; Evaluate existing significant hibernacula. Rank: 2*  
- Measure: Number/Studies

**Threat 6 - Pollution; Widespread pesticide use for insect control potentially reduces prey source for bats**

- Actions:*
- *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
- Measure: Number

**Northern Long-eared Bat**

*Myotis septentrionalis*

**Bats**

**Threat 1 - Invasive and other problematic species and genes; Introduced disease, White-nose syndrome (WNS)**

- Actions:*
- *Awareness and communications; Build awareness to reduce supplemental impacts to bat populations. Summer and winter resident species, increase tolerance of the species by the public. Rank: 3*  
- Measure: Number
  - *Data collection and analysis; Collect more information on status and distribution to understand species needs better for summer roost sites and winter hibernacula. Rank: 3*  
- Measure: Number
  - *Data collection and analysis; Find methodology to control the spread of WNS. Rank: 3*  
- Measure: Number

**Threat 2 - Residential and commercial development; Habitat loss of maternal roost sites (e.g., old barns, snags, other man made and natural structures)**

- Actions:*
- *Species management; Bat box construction. Rank: 3*  
- Measure: Projects/Plans
  - *Site/area protection; Forest management.*  
- Measure: Acres/Sites/Miles

**Threat 3 - Human intrusions and disturbance; Human activities interfering with security of winter hibernation**

- Actions:*
- *Site/area protection; Install gates and limit access to known hibernacula during the winter months. Rank: 3*  
- Measure: Acres/Sites/Miles

**Threat 4 - Biological resource use; Demographic changes from incidental take (human)**

- Actions:*
- *Data collection and analysis; Evaluate permitting process for extermination permits which result*

*in incidental take and exclusion from buildings, in order to enforce time of year restrictions and improve reporting requirements. Rank: 2*

*- Measure: Number*

**Threat 5 - Residential and commercial development; Habitat loss of critical micro-features**

*Actions: • Research, survey, inventory, monitor habitats; Evaluate existing significant hibernacula. Rank: 2*  
*- Measure: Number/Studies*

**Threat 6 - Pollution; Widespread pesticide use for insect control potentially reduces prey source for bats**

*Actions: • Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
*- Measure: Number*

**Silver-haired Bat**

**Bats**

*Lasionycteris noctivagans*

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**Threat 1 - Renewable energy; Threatened by wind turbine development**

*Actions: • Policies and regulations; Work with all levels of government to regulate cut-in speeds and placement to avoid bat habitats. Rank: 3*  
*- Measure: Number/Plans*

*• Data collection and analysis; Collect more information on status and distribution to understand species needs better for summer roost sites. Rank: 3*  
*- Measure: Number*

**Threat 2 - Residential and commercial development; Habitat loss of critical micro-features**

*Actions: • Research, survey, inventory, monitor habitats; Evaluate existing significant and suitable habitat. Rank: 3*  
*- Measure: Number/Studies*

**Threat 3 - Agriculture and aquaculture; Widespread pesticide use on crops potentially reduces prey source for bats**

*Actions: • Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
*- Measure: Number*

**Threat 4 - Pollution; Widespread pesticide use for insect control potentially reduces prey source for bats**

*Actions: • Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 1*  
*- Measure: Number*

**Tri-colored Bat**

**Bats**

*Perimyotis subflavus*

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**Threat 1 - Invasive and other problematic species and genes; Introduced disease, White-nose syndrome (WNS)**

*Actions: • Awareness and communications; Build awareness to reduce impacts to bat populations. Summer resident species, increase tolerance of the species by the public. Rank: 3*  
*- Measure: Number*

*• Data collection and analysis; Collect more information on status and distribution to understand species needs better for summer roost sites. Rank: 3*  
*- Measure: Number*

**Threat 2 - Residential and commercial development; Habitat loss of maternal roost sites (e.g., old barns, snags, other man made and natural structures)**

*Actions: • Land/water protection; Protect areas with trees suitable for maternity colonies and roosting. Rank: 3*  
*- Measure: Acres/Sites/Miles*

*• Data analysis and collection; Determine if useful to construct bat boxes for this species. Rank: 1*  
*- Measure: Data analysis and collection*

**Threat 3 - Residential and commercial development; Habitat loss of critical micro-features**

*Actions: • Research, survey, inventory, monitor habitats; Evaluate existing significant and potential hibernacula. Rank: 2*  
*- Measure: Number/Studies*

**Threat 4 - Biological resource use; Demographic changes from incidental take (human)**

- Actions: • *Data collection and analysis; Evaluate permitting process for extermination permits which result in incidental take and exclusion from buildings, in order to enforce time of year restrictions and improve reporting requirements. Rank: 2*  
- Measure: Number

**Threat 5 - Pollution; Widespread pesticide use for insect control potentially reduces prey source for bats**

- Actions: • *Data collection and analysis; Impacts must be evaluated to understand extent of threat. Rank: 2*  
- Measure: Number

**Threat 6 - Human intrusions and disturbance; Human activities interfering with security of winter hibernation**

- Actions: • *Site/area protection; Install gates and limit access to known hibernacula during the winter months. Rank: 3*  
- Measure: Acres/Sites/Miles

## MAMMALS

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### Fin Whale

*Balaenoptera physalus*

### Marine Mammals

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**Threat 1 - Shipping lanes; Mortality from ship collisions**

- Actions: • *Policies and regulations; At the federal and international level to reduce collisions, managing ship speeds and routing. Rank: 3*  
- Measure: Number/Plans
- *Species recovery; Federal recovery plan in place, state should cooperate in outlined recovery activities. Rank: 3*  
- Measure: Number/Animals

**Threat 2 - Fishing and harvesting aquatic resources; Incidental bycatch**

- Actions: • *Policies and regulations; Federal and state-level regulations to reduce bycatch related to fixed-gear fisheries. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Human intrusions and disturbance; Anthropogenic noise in the water**

- Actions: • *Policies and regulations; At the federal and international level work to reduce noise pollution in water. Rank: 2*  
- Measure: Number/Plans
- *Data collection and analysis; Research to fill in information needs about noise effects; Important to provide guidance on timing of work in offshore waters (e.g., installation of wind turbines). Rank: 2*  
- Measure: Number

### Harbor Porpoise

*Phocoena phocoena*

### Marine Mammals

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**Threat 1 - Fishing and harvesting aquatic resources; Incidental by catch**

- Actions: • *Policies and regulations; Federal and state-level regulations to reduce bycatch related to fixed-gear fisheries. Rank: 3*  
- Measure: Number/Plans

**Threat 2 - Human intrusions and disturbance; Anthropogenic noise in the water**

- Actions: • *Policies and regulations; At the federal and international level work to reduce noise pollution in water. Rank: 2*  
- Measure: Number/Plans
- *Data analysis and collection; Research to fill in information needs about noise effects. Rank: 2*  
- Measure: Data analysis and collection

### Harbor Seal

*Phoca vitulina*

### Marine Mammals

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**Threat 1 - Human intrusions and disturbance; Disturbance at haul out sites from humans in boats and kayaks**

- Actions:
- Awareness and communications; Build public awareness of existing regulations that protect the species. (marine mammal covered by federal law therefore public not allowed to disturb species). Rank: 2  
- Measure: Number

**Threat 2 - Habitat shifting and alteration; Higher sea levels will inundate haul-out sites**

- Actions:
- Policies and regulations; International regulation of greenhouse gases. Rank: 2  
- Measure: Number/Plans
  - Site/area management; Artificial haul-out creation. Rank: 1  
- Measure: Acres/Sites/Miles

**Humpback Whale***Megaptera novaeangliae***Marine Mammals****Threat 1 - Shipping lanes; Mortality from ship collisions**

- Actions:
- Policies and regulations; At the federal and international level to reduce collisions, managing ship speeds and routing. Rank: 3  
- Measure: Number/Plans
  - Species recovery; Federal recovery plan in place, state should cooperate in outlined recovery activities. Rank: 3  
- Measure: Number/Animals

**Threat 2 - Fishing and harvesting aquatic resources; Incidental by catch**

- Actions:
- Policies and regulations; Federal and state-level regulations to reduce bycatch related to fixed-gear fisheries. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Human intrusions and disturbance; Anthropogenic noise in the water**

- Actions:
- Policies and regulations; At the federal and international level work to reduce noise pollution in water. Rank: 2  
- Measure: Number/Plans
  - Data collection and analysis; Research to fill in information needs about noise effects; Important to provide guidance on timing of work in offshore waters (e.g., installation of wind turbines). Rank: 2  
- Measure: Number

**North Atlantic Right Whale***Eubalaena glacialis***Marine Mammals****Threat 1 - Shipping lanes; Mortality from ship collisions**

- Actions:
- Policies and regulations; At the federal and international level to reduce collisions, managing ship speeds and routing. Rank: 3  
- Measure: Number/Plans
  - Species recovery; Federal recovery plan in place, state should cooperate in outlined recovery activities. Rank: 3  
- Measure: Number/Animals

**Threat 2 - Fishing and harvesting aquatic resources; Incidental by catch**

- Actions:
- Policies and regulations; Federal and state-level regulations to reduce bycatch related to fixed-gear fisheries. Rank: 3  
- Measure: Number/Plans

**Threat 3 - Human intrusions and disturbance; Anthropogenic noise in the water**

- Actions:
- Policies and regulations; At the federal and international level work to reduce noise pollution in water. Rank: 3  
- Measure: Number/Plans
  - Data collection and analysis; Research to fill in information needs about noise effects; Important to provide guidance on timing of work in offshore waters (e.g., installation of wind turbines). Rank: 2  
- Measure: Number

turbines). Rank: 2  
- Measure: Number

## MAMMALS

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### American Water Shrew

*Sorex (Otisorex) palustris*

### Terrestrial Mammals

**Threat 1 - Dams and water management/use; Habitat modifications of hydrology of wetlands leads to loss of invertebrates that are primary food source; This could also be pollution and vegetated cover along stream corridors and impacts on riparian areas (water withdrawals for agriculture)**

- Actions:
- Land/water protection; Protection hydrologic systems. Rank: 3  
- Measure: Acres/Sites/Miles
  - Policies and regulations; Strict Enforcement of wetlands regulations; Regulate water withdrawals for agriculture and domestic. Rank: 3  
- Measure: Number/Plans
  - Data collection and analysis; From 2005 SWAP need to continue to gather information and identify priority habitats. Rank: 3  
- Measure: Number

### Black Bear

*Ursus americanus*

### Terrestrial Mammals

**Threat 1 - Residential and commercial development; Habitat loss and human population shift from urban to rural areas, presence of people; Habitat loss of critical micro-features; Conflict with humans, human behaviors that attract bears and lead to conflicts- bird feeders, interactions with pets, trash, etc.**

- Actions:
- Awareness and communications; Increase awareness of potential for human bear conflict. Rank: 2  
- Measure: Number
  - Land/water protection; Large contiguous habitat protected as priority habitat to decrease potential for human wildlife interaction. Rank: 2  
- Measure: Acres/Sites/Miles
  - Data collection and analysis; From 2005 SWAP need to continue to gather information and identify priority habitats. Rank: 2  
- Measure: Number
  - Research, survey, inventory, monitor habitats; Evaluate existing significant hibernacula. Rank: 1  
- Measure: Number/Studies

**Threat 2 - Biological resource use; Demographic changes from incidental take (human)**

- Actions:
- Alliance and partnership development; Coordinate incidental take programs with regional and/or national initiatives. Rank: 1  
- Measure: Number

### Block Island Meadow Vole

*Microtus pennsylvanicus provectus*

### Terrestrial Mammals

**Threat 1 - Natural system modifications; Succession of early successional habitats on which the meadow vole is dependant**

- Actions:
- Habitat and natural process restoration; Management for early successional habitat. Rank: 2  
- Measure: Number/Plans
  - Awareness and communications; May also include working with landowners on Block Island to modify their policies on land management. Specifically to manage early successional habitats (also cross utility for burying beetles). Rank: 2  
- Measure: Number

**Threat 2 - Invasive non-native/alien species; Predation by domestic and feral cats**

- Actions:*
- *Awareness and communications; Work with public and educate about threats posed by outdoor cats. Rank: 3*  
- Measure: Number
  - *Species management; Feral cat trapping, and removal. Increase capacity of neuter and spay programs (free clinics, or funding for town programs) for domestic pets. Rank: 3*  
- Measure: Projects/Plans
  - *Policies and regulations; Encourage local policies to control or manage feral cats. Rank: 3*  
- Measure: Number/Plans

**Threat 3 - Transportation and service corridors; Habitat fragmentation from road effects**

- Actions:*
- *Data collection and analysis; Identify areas of significant road effects in focal areas. Rank: 1*  
- Measure: Number

**Bobcat**

*Lynx rufus*

**Terrestrial Mammals**

**Threat 1 - Residential and commercial development; Fragmentation of habitat, habitat loss and human population shift from urban to rural areas, presence of people**

- Actions:*
- *Awareness and communications; Increase public awareness about bobcats to increase tolerance of the species. Rank: 3*  
- Measure: Number
  - *Site/area protection; Protect important aspects of habitat (rocky outcrops for dening sites, manage for early successional habitat as needed). Rank: 2*  
- Measure: Acres/Sites/Miles
  - *Data collection and analysis; Continue to gather information and identify priority habitats. Rank: 2*  
- Measure: Number

**Threat 2 - Transportation and service corridors; Habitat fragmentation from road effects**

- Actions:*
- *Research, survey, inventory, monitor populations. Rank: 3*  
- Measure: Number/Studies
  - *Data analysis and collection; Identify areas of significant road effects in focal areas. Rank: 2*  
- Measure: Data analysis and collection
  - *Law and policy; Conduct road mitigations where required. Rank: 2*  
- Measure: Number

**Eastern Mole**

*Scalopus aquaticus*

**Terrestrial Mammals**

**Threat 1 - Lack of information; Species at fringe of range.**

- Actions:*
- *Data collection and analysis; Need for monitoring and research of distribution and abundance. Rank: 2*  
- Measure: Number

**New England Cottontail**

*Sylvilagus transitionalis*

**Terrestrial Mammals**

**Threat 1 - Other; Low population viability; Reduced genetic diversity in existing populations**

- Actions:*
- *Species reintroduction; Captive breeding and release to augment genetic diversity of existing populations at a range-wide level, multi-state effort. Rank: 3*  
- Measure: Number/Animals

**Threat 2 - Invasive non-native/alien species; Eastern cottontail population saturating the existing early successional habitat and maintaining high predator populations; Predation**

- Actions:*
- *Species management; Control Eastern cottontail; Begin experimental Eastern cottontail removal in core areas identified for New England cottontail reintroduction and evaluate the*

*response of the two species to management; Consider creation of a county level management zone for protection of New England cottontail (i.e. Washington County); The goal of this management zone would be to strive to create a stronghold for the New England cottontail in the state. Rank: 3*

*- Measure: Projects/Plans*

- *Awareness and communications; Work with public and educate about threats posed by outdoor cats. Rank: 2*  
*- Measure: Number*
- *Species management; Feral cat trapping, and removal. Increase capacity of neuter and spay programs (free clinics, or funding for town programs) for domestic pets. Rank: 2*  
*- Measure: Projects/Plans*
- *Policies and regulations; Encourage local policies to control or manage feral cats. Rank: 2*  
*- Measure: Number/Plans*

**Threat 3 - Natural system modifications; Loss of early successional habitats through plant succession and forest conversion; Insufficient forest management activities. Insufficient availability of habitats**

*Actions:*

- *Habitat and natural process restoration; Creation of sufficient patches in accordance with the Regional Conservation Strategy (Fuller and Tur, 2012) within the focus areas containing early successional habitats; Create more patches on state owned land. Rank: 3*

*- Measure: Number/Plans*

- *Alliance and partnership development; Collaboration between forestry and wildlife and agriculture divisions of state agency to increase habitat management for wildlife. Rank: 2*  
*- Measure: Number*
- *Species reintroduction; Species reintroduction must occur in cooperation with habitat management, as species not currently widely distributed. Rank: 3*  
*- Measure: Number/Animals*

**Threat 4 - Problematic native species; Predation rates; Avian and mammalian predation due to insufficient dispersal and escape habitat for prey species**

*Actions:*

- *Data collection and analysis; Research and monitoring of predation rates. Rank: 3*

*- Measure: Number*

- *Resource and habitat protection; Protect areas that provide the appropriate habitats, including escape habitats. Rank: 3*  
*- Measure: Acres/Sites/Miles*

**Threat 5 - Residential and commercial development; Habitat fragmentation that decreases patch size and increases predation rates**

*Actions:*

- *Policies and regulations; Create thoughtful development (cluster development). Rank: 2*

*- Measure: Number/Plans*

**Threat 6 - Lack of information; Numerous threats to forest structure (understory and overstory diversity and layers) and impact on this species survival (e.g., earthworm, silvicultural methods, patch size, soils)**

*Actions:*

- *Data collection and analysis; Research and evaluate threats to forest regeneration and the synergistic effect of multiple threats. Rank: 2*

*- Measure: Number*

**Threat 7 - Biological resource use; Demographic changes from incidental take (human)**

*Actions:*

- *Law and policy; Coordinate incidental take programs with regional and/or national initiatives. Rank: 1*

*- Measure: Number*

## **Smoky Shrew**

*Sorex (Otisorex) fumeus*

## **Terrestrial Mammals**

**Threat 1 - Lack of information; Threats unknown, species is rare and not well understood**

*Actions:*

- *Data collection and analysis; Further survey and study. From 2005 SWAP need to continue to gather information and identify priority habitats. Rank: 2*

*- Measure: Number*

**Threat 1 - Lack of information; Many threats unknown, as species is rare and not well understood**

- Actions:*
- *Data collection and analysis; Further survey and study; From 2005 SWAP need to continue to gather information and identify priority habitats. Rank: 3*
    - *Measure: Number*