

## *Limulus polyphemus* (Horseshoe Crab)

### Priority 1 Species of Greatest Conservation Need (SGCN)

**Class:** *Merostomata* (Horseshoe Crabs And Sea Scorpions)

**Order:** *Xiphosurida* (Horseshoe Crabs)

**Family:** *Limulidae* (Horseshoe Crabs)

#### General comments:

General information:

<http://www.asmfc.org/species/horseshoe-crab>

#### No Species Conservation Range Maps Available for Horseshoe Crab

#### SGCN Priority Ranking - Designation Criteria:

**Risk of Extirpation: NA**

**State Special Concern or NMFS Species of Concern: NA**

**Recent Significant Declines:**

Horseshoe Crab is currently undergoing steep population declines, which has already led to, or if unchecked is likely to lead to, local extinction and/or range contraction.

Notes:

<http://www.asmfc.org/species/horseshoe-crab>

**Regional Endemic: NA**

**High Regional Conservation Priority:**

**Atlantic States Marine Fisheries Commission Stock Assessments:**

Status: Decreasing, Status Comment: The New York and New England regions continue to see a decrease in abundance. These continued declines are being investigated by the Stock Assessment Subcommittee.

Reference:

<http://www.asmfc.org/species/horseshoe-crab>

High region

**High Climate Change Vulnerability: NA**

**Understudied rare taxa: NA**

**Historical: NA**

**Culturally Significant: NA**

#### Habitats Assigned to Horseshoe Crab:

Formation Name	Intertidal
<b>Macrogroup Name</b>	<b>Intertidal Mudflat</b>
<b>Habitat System Name:</b>	Non-Vascular Mudflat <b>**Primary Habitat**</b> <b>Notes:</b> adults spawn near tideline, eggs laid and develop near tideline, trilobite larval phase remains buried for a number of weeks, juveline feeding habitat, adult feeding habitat
<b>Macrogroup Name</b>	<b>Intertidal Sandy Shore</b>
<b>Habitat System Name:</b>	Sand Flat <b>**Primary Habitat**</b> <b>Notes:</b> adults spawn near tideline, eggs laid and develop near tideline, trilobite larval phase remains buried for a number of weeks, juveline feeding habitat, adult feeding habitat
<b>Macrogroup Name</b>	<b>Intertidal Tidal Marsh (peat-forming)</b>
<b>Habitat System Name:</b>	Acadian Coastal Salt Marsh <b>**Primary Habitat**</b> <b>Notes:</b> adults spawn near tideline, eggs laid and develop near tideline, trilobite larval phase remains buried for a number of weeks, juveline feeding habitat, adult feeding habitat

## *Limulus polyphemus* (Horseshoe Crab)

### Priority 1 Species of Greatest Conservation Need (SGCN)

**Class:** *Merostomata* (Horseshoe Crabs And Sea Scorpions)

**Order:** *Xiphosurida* (Horseshoe Crabs)

**Family:** *Limulidae* (Horseshoe Crabs)

Formation Name	Subtidal
<b>Macrogroup Name</b>	<b>Subtidal Coarse Gravel Bottom</b>
<b>Habitat System Name:</b>	Coarse Gravel <b>**Primary Habitat**</b> <b>Notes:</b> <i>over-wintering habitat, adult feeding habitat</i>
<b>Macrogroup Name</b>	<b>Subtidal Mud Bottom</b>
<b>Habitat System Name:</b>	Unvegetated <b>**Primary Habitat**</b> <b>Notes:</b> <i>over-wintering habitat, adult feeding habitat</i>
<b>Macrogroup Name</b>	<b>Subtidal Pelagic (Water Column)</b>
<b>Habitat System Name:</b>	Nearshore <b>Notes:</b> <i>larval development and dispersal</i>
<b>Habitat System Name:</b>	Offshore <b>Notes:</b> <i>larval development and dispersal</i>
<b>Macrogroup Name</b>	<b>Subtidal Sand Bottom</b>
<b>Habitat System Name:</b>	Unvegetated <b>**Primary Habitat**</b> <b>Notes:</b> <i>over-wintering habitat, adult feeding habitat</i>

### Stressors Assigned to Horseshoe Crab:

Stressor Priority Level based on Severity and Actionability		Moderate Severity	High Severity
	Highly Actionable	Medium-High	High
	Moderately Actionable	Medium	Medium-High
	Actionable with Difficulty	Low	Low

#### IUCN Level 1 Threat Biological Resource Use

**IUCN Level 2 Threat:** Fishing and Harvesting of Aquatic Resources

**Severity:** Severe

**Actionability:** Highly actionable

**Notes:** Unintentional catch by commercial trawling reduces population size and subsequently results in local extinctions, impaired role of the functional group "predator," and subsequently results in decreased benthic diversity through trophic cascades and thus decreases the availability of food for other species. Small-scale intentional catch for bait, biomedical products and research causes local population reductions

#### IUCN Level 1 Threat Pollution

**IUCN Level 2 Threat:** Agricultural and Forestry Effluents

**Severity:** Severe

**Actionability:** Moderately actionable

**Notes:** Crustacean larvae and adults are exceptionally sensitive to excessive nutrients, toxic chemicals (including pesticides and chemical therapeutants), and/or sediments.

**IUCN Level 2 Threat:** Domestic and Urban Waste Water

**Severity:** Severe

**Actionability:** Moderately actionable

**Notes:** Crustacean larvae and adults are exceptionally sensitive to excessive nutrients, toxic chemicals (including pesticides and chemical therapeutants), and/or sediments.

**IUCN Level 2 Threat:** Industrial and Military Effluents

**Severity:** Severe

**Actionability:** Moderately actionable

**Notes:** Industrial development has been statistically correlated with malformed horseshoe crab embryos. The specific causes of impact are increased non-point source pollution (heavy metals; mercury and tributyltin). Toxins can bioaccumulate in eggs fed on by sea birds. Likelihood is high. Actionability is moderate, i.e. the threat can be minimized in newly developing areas. Oil spills are toxic to species with intertidal distributions. Local scale spills have an unpredictable likelihood and actionability is moderate and influenced by response time to spills.

## *Limulus polyphemus* (Horseshoe Crab)

### Priority 1 Species of Greatest Conservation Need (SGCN)

**Class:** *Merostomata* (Horseshoe Crabs And Sea Scorpions)

**Order:** *Xiphosurida* (Horseshoe Crabs)

**Family:** *Limulidae* (Horseshoe Crabs)

#### IUCN Level 1 Threat      Residential and Commercial Development

##### IUCN Level 2 Threat:      Housing and Urban Areas

**Severity:** Severe      **Actionability:** Moderately actionable

**Notes:** Habitat degradation of estuaries and coastal areas cause decrease in available mating, egg-laying, larval development, and forage habitat. Likelihood is high and increasing (high certainty), current spatial extent is most severe in Southern Maine, but expanding along coast, so actionability is moderate, i.e. the threat can be minimized in newly developing areas.

#### IUCN Level 1 Threat      Residential and Commercial Development

##### IUCN Level 2 Threat:      Commercial and Industrial Areas

**Severity:** Moderate Severity      **Actionability:** Moderately actionable

**Notes:** Armored shores decrease availability of mating, egg-laying, larval development, and forage habitat. Spatial extent is fairly low (confined to a few areas), but is substantial in those areas. Actionability is moderate, i.e., can be minimized in newly developing areas.

#### IUCN Level 1 Threat      Climate Change and Severe Weather

##### IUCN Level 2 Threat:      Habitat Shifting or Alteration

**Severity:** Severe      **Actionability:** Actionable with difficulty

**Notes:** Sea level rise will result in significant loss of mating, egg-laying, larval development, and forage habitat. Ocean acidification may result in decreased survivorship of larvae, and growth and feeding shown in other Arthropods (crustaceans). Likelihood is high and large scale. The ability to mitigate sea level rise and ocean acidification is low.

##### IUCN Level 2 Threat:      Storms and Flooding

**Severity:** Severe      **Actionability:** Actionable with difficulty

**Notes:** Severe storms coincident with mating and egg laying has resulted in mass strandings and loss of eggs washed away in surf. Likelihood is low and unpredictable so actionability is low.

##### IUCN Level 2 Threat:      Temperature Extremes

**Severity:** Severe      **Actionability:** Actionable with difficulty

**Notes:** Increased water temperatures may have interactive effects with ocean pH decreasing survivorship of larvae and growth rate shown for other Arthropods (crustaceans). Likelihood is high (high certainty) and large scale. The ability to mitigate sea temperature change is low.

#### IUCN Level 1 Threat      Invasive and Other Problematic Species, Genes and Diseases

##### IUCN Level 2 Threat:      Invasive Non-native-Alien Species-Diseases

**Severity:** Moderate Severity      **Actionability:** Actionable with difficulty

**Notes:** Invasive non-native and alien diseases could have effects largely unknown at this time. Likelihood is high and large scale (throughout the region), so actionability is low.

### Species Level Conservation Actions Assigned to Horseshoe Crab:

*\*Only species specific conservation actions that address high (red) or medium-high (orange) priority stressors are summarized here.*

## *Limulus polyphemus* (Horseshoe Crab)

### Priority 1 Species of Greatest Conservation Need (SGCN)

**Class:** *Merostomata* (Horseshoe Crabs And Sea Scorpions)

**Order:** *Xiphosurida* (Horseshoe Crabs)

**Family:** *Limulidae* (Horseshoe Crabs)

<b>Conservation Action</b>	<b>Category:</b> Survey and Monitoring	<b>Biological Priority:</b> high	<b>Type:</b> new
----------------------------	--	----------------------------------	------------------

Conduct surveys to monitor and better understand distribution and abundance

#### Stressor(s) Addressed By This Conservation Action

Fishing and Harvesting of Aquatic Resources

<b>Conservation Action</b>	<b>Category:</b> Public Outreach	<b>Biological Priority:</b> high	<b>Type:</b> on-going
----------------------------	----------------------------------	----------------------------------	-----------------------

Encourage use of selective fishing gear that minimizes bycatch and impacts to habitat.

#### Stressor(s) Addressed By This Conservation Action

Fishing and Harvesting of Aquatic Resources

<b>Conservation Action</b>	<b>Category:</b> Habitat Management	<b>Biological Priority:</b> high	<b>Type:</b> on-going
----------------------------	-------------------------------------	----------------------------------	-----------------------

Purchase or protect undeveloped shoreline and adjacent areas that is known or potential habitat for horseshoe crab

#### Stressor(s) Addressed By This Conservation Action

Housing and Urban Areas

<b>Conservation Action</b>	<b>Category:</b> Research	<b>Biological Priority:</b> moderate	<b>Type:</b> on-going
----------------------------	---------------------------	--------------------------------------	-----------------------

Identify areas where degraded water quality may adversely impact horseshoe crabs

#### Stressor(s) Addressed By This Conservation Action

Domestic and Urban Waste Water

<b>Conservation Action</b>	<b>Category:</b> Research	<b>Biological Priority:</b> high	<b>Type:</b> on-going
----------------------------	---------------------------	----------------------------------	-----------------------

Promote research to fill data gaps and inform managers

#### Stressor(s) Addressed By This Conservation Action

Domestic and Urban Waste Water

### Guild Level Conservation Actions:

This Species is currently not attributed to a guild.

### Broad Taxonomic Group Conservation Actions:

Additional relevant conservation actions for this species are assigned within broader taxonomic groups in Maine's 2015 Wildlife Action Plan: Element 4, Table 4-1.

### Habitat Based Conservation Actions:

Additional conservation actions that may benefit habitat(s) associated with this species can be found in Maine's 2015 Wildlife Action Plan: Element 4, Table 4-15. Click on the Habitat Grouping of interest to launch a habitat based report summarizing relevant conservation actions and associated SGCN.

*The Wildlife Action Plan was developed through a lengthy participatory process with state agencies, targeted conservation partners, and the general public. The Plan is non-regulatory. The species, stressors, and voluntary conservation actions identified in the Plan complement, but do not replace, existing work programs and priorities by state agencies and partners.*