

**October 2014**

### **Determination of Lower Hudson Priority Species**

The Lower Hudson PRISM will need to identify species to prioritize for management, in addition to forming other strategies around conservation targets and protection of invasive species prevention zones. In preparation for prioritizing species to address as part of our strategic management efforts, information from several sources was collected and compiled together.

### **Strategy**

1. Determine the species' distribution in our region and in neighboring regions (NY, CT, Long Island/Staten Island PRISM(LIISMA), Catskills PRISM (CRISP), Capital/Mohawk PRISM )
2. Categorize species into initial buckets based on regional distribution
3. Determine the species' invasiveness or threat level
  - Based on NY State evaluations (plants)
  - Rankings in other states
  - Reports of invasiveness in other geographical areas

Note: at this point, this is all done *without* consideration of conservation targets that might be threatened.

4. Prioritize species within categories based on invasiveness ranking and threat to conservation targets

### **Sources Used**

#### **NY State Invasive Assessments**

We referenced the NY State assessments of invasiveness of non-native plant species available at <http://nyis.info/index.php?action=israt> . The assessments are posted on this same page and involved evaluation of ecological impact, biological characteristic and dispersal ability, ecological amplitude and distribution, and difficulty of control. More information about the evaluation process is also available on this page. The key to the NY State Invasiveness values is:

VH=Very High  
H= High  
M= Moderately invasive  
L = Low  
I = Insignificant  
U= Unknown  
N-A = Not assessable (does not persist outside of cultivation)

Virtually all VH and H species are specified on the NYS Prohibited and Regulated list which goes into effect March 10, 2015 (grace period for Barberry until Sept 10, 2015).

Unfortunately state-wide assessments for other invasive taxa were not available at this time.

#### **Regional Neighbors**

- (1) New Jersey - The Lower Hudson PRISM shares a border in Orange and Rockland Co with New Jersey and waters of the Hudson Bay. The New Jersey Invasive Species Strike Team (NJ ISST) is

the regional state-wide cooperative invasive species management organization in NJ. Director of Science, Mike Van Clef, has compiled species information and rankings for many species of interest to NJ with input from state experts. The NJ ISST has placed its strategic focus on emerging invasives – those that are just starting to become a problem in the state. The species evaluation system includes an invasiveness ranking (High=H, Moderate=M, Mild=L) and a distribution stage (Widespread, Stage 3, Stage 2, Stage 1, and Stage 0) where Stage 0 generally means absent but of concern while Stage 3 is a high number of detections but not quite to the Widespread level.

- The NJ ISST Target Species list is available here:  
<http://njisst.org/documents/SpeciesListandControlRecommendations14.xlsx>
- (2) Connecticut - We also share a border with Connecticut along our eastern side (Westchester, Putnam, Dutchess Co.) Connecticut through the Connecticut Invasive Plant Working Group (CIPWG) and through legislation has a prohibited list and a list of species considered invasive or potentially invasive. In addition, a separate list calls out early detection and priority species.
- The Connecticut invasive plant list is available here:  
<http://cipwg.uconn.edu/wp-content/uploads/sites/244/2014/03/CTInvasivePlantList2013ScientificName.pdf>
  - The Connecticut early detection and research list is available here:  
<http://cipwg.uconn.edu/wp-content/uploads/sites/244/2013/10/CT-Invasive-Plant-Early-Detection-and-Research-List-July-2014.pdf>  
Research species are those about which more information is desired.
- (3) Long Island /Staten Island - The Long Island Invasive Species Management Area (LIISMA) is our neighboring PRISM to the south-east sharing the waters of the Long Island Sound and the Hudson Bay. LIISMA began species evaluations many years ago, focused on plants, prior to the NY State effort and provided the template for state evaluations. Consequently, LIISMA has its own invasiveness rankings for some species.
- LIISMA's species lists are found here:  
[http://www.liisma.org/index.php?action=liisma\\_pages&page=species\\_lists](http://www.liisma.org/index.php?action=liisma_pages&page=species_lists)
  - They include Prevention Plants list – those approaching the region, a Horticulture watch list, Early Detection Plants list, and Established Plants list, and Animal, Insect and Pathogen list.
- (4) Catskills - Catskills Regional Invasive Species Program (CRISP) is our neighboring PRISM along our western border in Ulster, Sullivan, and Orange counties. CRISP is currently working on drafting their priority species list but has supplied us with their Approaching Region (AR) and Early Detection (ED) species lists.
- (5) Capitol / Mohawk - Our northern neighbor is the Capitol / Mohawk PRISM sharing the northern border of Dutchess county. As one of the more recently funded PRISMs, Capitol /Mohawk PRISM has just begun working on its strategies. They have not yet identified priority species, but this information should be taken into account when it becomes available.

## Current Distributions

Our next sources were used to determine current distributions and abundances, recognizing that many species are likely underreported compared to their actual number of occurrences.

- (1) iMapInvasives – for determining occurrences in the Lower Hudson PRISM, the Catskills PRISM (CRISP), and Long Island PRISM (LIISMA). <http://www.nyimainvasives.org/>

- (2) EDDMaps – for determining occurrences in Connecticut and New Jersey.  
<http://eddmaps.org>

We also used occasional information found in each region's reports of occurrence or non-occurrence of certain species in their region.

### **Compiling all the Information Together**

We used the above sources to compile all the information together in one spreadsheet, focusing first on plants since the most information was available about them from the various sources.

We organized this information into 3 worksheets within the spreadsheet. The first sheet lists all the species on the NY State prohibited and regulated list (Part 575), the second sheet lists all the additional species which have NYS invasiveness assessments, and the third sheet lists all other species which were mentioned within one of the other sources as of concern.

The first focus was to look at the NY State Part 575 species within the context of the Lower Hudson PRISM, then move on to looking at the other two sets of species.

### **Categorizations for Lower Hudson Species**

There is a PRISM Invasive Plant Ranking Form (Widespread, Common, Restricted, and Not Present) that may be used by individual PRISMs to further rank species already evaluated by NY State.  
([http://nyis.info/pdf/PRISM\\_Invasive\\_Plant\\_Ranking\\_Form\\_Rev\\_2012.doc](http://nyis.info/pdf/PRISM_Invasive_Plant_Ranking_Form_Rev_2012.doc))

Widespread – present in more than 10 minimally managed areas

Common - Present in 4-10 natural areas, or with one occupied location greater than 1 acre or containing more than 100 individuals.

Restricted - Occurs in 3 or few natural areas (locations that are at least ¼ mile apart) with no infested area greater than 1 acre or containing more than 100 individuals

Note: We have the option of simply using this form to rank plants rather than making our own method. The above method takes into account the distribution of species within the PRISM, the likelihood of introduction or spread and then weights this score based on the NY State ranking. This method does not allow rankings to be higher than state-wide rankings and also does not include unranked species. It also does not address other taxa besides plants.

Since the Lower Hudson PRISM is a likely first introduction site for many new invasives due to our proximity to and inclusion of a major metropolitan area, we are putting forward methods that may be used for all species and the independent evaluation of species based on the Lower Hudson PRISM viewpoint and experiences. We also take a broader view of the numbers of populations during the categorization to avoid having most species end up in the Widespread category. We find it is useful to further evaluate species that might be considered Widespread in the above evaluation.

The first step was to look at the distribution of candidate species within the Lower Hudson valley and also in neighboring regions and to categorize the species into the following buckets which are loosely based on the categories in the above evaluation form.

Widespread – these are species that are abundant throughout the Lower Hudson valley and also in most or all of the surrounding regions.

Established – these species are common or abundant through most of the Lower Hudson valley but not in most of the surrounding regions.

Emerging – these species are just starting to become established in localized parts of the Lower Hudson region.

Threat – these are species that occur in very few locations or not at all within the Lower Hudson region.

In addition, as we have looked at the distributions, personal knowledge has led us to note that certain species are under-reported and this lack of reporting would lead to that species being placed in a different category when it should be placed in a category for more abundant distribution. Therefore, we started marking species Underreported.

We also considered a Report list or Watch list of species that might be considered to have moderate invasiveness that we want to encourage reporting to get a better idea of what is happening with that species.

These categories can facilitate selection of management strategies. For example,

- Widespread – lower priority for management *unless* it is to protect conservation targets or to contain spread to areas where it does not currently exist.
- Established – Focus on containment and spread prevention with special attention to borders with areas uninvaded by this species and threatened conservation targets. Surveys should detect this species to help prevent spread.
- Emerging – Eradication, or Containment and spread prevention along with restricting the area of invasion by focusing on removing outlying and border populations. These species should be a high priority for surveys, prevention, and education and outreach.
- Threat – Focus on surveys in likely introduction areas. Prioritize prevention, education and outreach. Eradication of all detected populations where practical.
- Under-Reported, and Report – Focus on survey and reporting

### The Lower Hudson Species Spreadsheet

All of the above documentation has been gathered together into the following spreadsheet.

<http://lhprism.org/document/lower-hudson-prism-species-spreadsheet>

This spreadsheet should be considered INCOMPLETE. We focused on trying to gather all the information on species that had been assessed for invasiveness at the state level. Obviously more work will need to be done.

### Proposed Species Categorizations

THREAT				
<i>Gambusia affinis</i>	Western Mosquitofish	Fish	NA	Threat
<i>Gymnocephalus cernuus</i>	Ruffe	Fish	NA	Threat

<i>Hypophthalmichthys nobilis</i>	Bighead Carp	Fish	NA	Threat
<i>Misgurnus anguillicaudatus</i>	Oriental Weatherfish	Fish	NA	Threat
<i>Scardinius erythrophthalmus</i>	Rudd	Fish	NA	Threat
<i>Achyranthes japonica</i>	Japanese Chaff Flower	Plants	H	Threat
<i>Dioscorea polystachya</i> ( <i>D. batatas</i> )	Chinese Yam	Plants	H	Threat
<i>Dipsacus laciniatus</i>	Cut-leaf Teasel	Plants	H	Threat
<i>Glyceria maxima</i>	Reed Manna Grass	Plants	H	Threat
<i>Hydrocharis morus-ranae</i>	Frogbit	Plants	VH	Threat
<i>Imperata cylindrica</i> ( <i>I. arundinacea</i> , <i>Lagurus cylindricus</i> )	Cogon Grass	Plants	H	Threat
<i>Lepidium latifolium</i>	Broad-leaved Pepper-grass	Plants	H	Threat
<i>Lespedeza cuneata</i>	Chinese Lespedeza	Plants	H	Threat
<i>Ludwigia hexapetala</i> ( <i>L. grandiflora</i> )	Uruguayan Primrose Willow	Plants	VH	Threat
<i>Ludwigia peploides</i>	Floating Primrose Willow	Plants	VH	Threat
<i>Lysimachia vulgaris</i>	Garden Loosestrife	Plants	H	Threat
<i>Murdannia keisak</i>	Marsh Dewflower	Plants	H	Threat
<i>Myriophyllum aquaticum</i>	Parrot-feather	Plants	H	Threat
<i>Myriophyllum heterophyllum</i> x <i>M. laxum</i>	Broadleaf Water-milfoil Hybrid	Plants	VH	Threat
<i>Nymphoides peltata</i>	Yellow Floating Heart	Plants	H	Threat
<i>Oplismenus hirtellus</i>	Wavyleaf Basketgrass	Plants	H	Threat
<i>Reynoutria sachalinensis</i> ( <i>Fallopia sachalinensis</i> , <i>Polygonum sachalinensis</i> )	Giant Knotweed	Plants	VH	Threat
<i>Reynoutria x bohémica</i> ( <i>Fallopia x bohémica</i> , <i>Polygonum x bohémica</i> )	Bohemian Knotweed	Plants	VH	Threat
<i>Salix atrocinerea</i>	Gray Florist's Willow	Plants	VH	Threat
<i>Silphium perfoliatum</i>	Cup-plant	Plants	H	Threat
<i>Vitex rotundifolia</i>	Beach Vitex	Plants	H	Threat
<i>Acer palmatum</i>	Japanese Maple	Plants	M	Threat
<i>Carex kobomugi</i>	Japanese Sedge; Asiatic Sand Sedge	Plants	M	Threat
<i>Euphorbia lathyris</i>	Caper Spurge (Mole Plant)	Plants	M	Threat
<i>Anoplophora glabripennis</i>	Asian Longhorned Beetle	Terrestrial invertebrates	NA	Threat

EMERGING				
<i>Channa argus</i>	Northern Snakehead	Fish	NA	Emerging
<i>Anthriscus sylvestris</i>	Wild Chervil	Plants	H	Emerging
<i>Arthraxon hispidus</i>	Small Carpgrass (Hairy Jointgrass)	Plants	VH	Emerging
<i>Brachypodium sylvaticum</i>	Slender False Brome	Plants	VH	Emerging
<i>Clematis terniflora</i>	Japanese Virgin's Bower	Plants	H	Emerging
<i>Cynanchum rossicum</i> ( <i>C. medium</i> , <i>Vincetoxicum medium</i> , <i>V. rossicum</i> )	Pale Swallow-wort	Plants	VH	Emerging
<i>Cytisus scoparius</i>	Scotch Broom	Plants	NA	Emerging
<i>Egeria densa</i>	Brazilian Waterweed	Plants	H	Emerging
<i>Euonymus fortunei</i>	Winter Creeper	Plants	H	Emerging
<i>Ficaria verna</i> ( <i>Ranunculus ficaria</i> )	Lesser Celandine	Plants	VH	Emerging
<i>Heracleum mantegazzianum</i>	Giant Hogweed	Plants	H	Emerging
<i>Humulus japonicus</i>	Japanese Hops	Plants	H	Emerging
<i>Hydrilla verticillata</i>	Hydrilla, Water Thyme	Plants	VH	Emerging
<i>Iris pseudacorus</i>	Yellow Iris	Plants	H	Emerging
<i>Myriophyllum heterophyllum</i>	Broadleaf Water-milfoil (Variable Leaf Milfoil)	Plants	VH	Emerging
<i>Phellodendron amurense</i>	Amur Cork Tree	Plants	H	Emerging
<i>Photinia villosa</i>	Oriental photinia	Plants	NA	Emerging
<i>Pueraria montana</i>	Kudzu	Plants	VH	Emerging
<i>Lymantria dispar</i>	Asian and European Gypsy Moth	Terrestrial invertebrates	NA	Emerging
<i>Acer ginnala</i>	Amur Maple	Plants	M	Emerging
<i>Actinidia arguta</i>	Hardy Kiwi (Hardy Kiwifruit)	Plants	M	Emerging
<i>Aegopodium podagraria</i>	Bishop's Goutweed (Goutweed, Bishop Weed)	Plants	M	Emerging
<i>Akebia quinata</i>	Five-leaf Akebia (Chocolate vine)	Plants	M	Emerging
<i>Alnus glutinosa</i>	European Alder (Black Alder)	Plants	M	Emerging

<i>Berberis vulgaris</i>	Common Barberry (European Barberry)	Plants	M	Emerging
<i>Bromus tectorum</i>	Cheatgrass (Drooping Bromegrass)	Plants	M	Emerging
<i>Buddleja davidii</i>	Orange-eye Butterfly-bush	Plants	L	Emerging
<i>Elaeagnus angustifolia</i>	Russian Olive	Plants	M	Emerging
<i>Euonymus europaeus</i>	European Spindle-tree (Spindle-tree)	Plants	M	Emerging
<i>Hedera helix</i>	English Ivy	Plants	M	Emerging
<i>Rhodotypos scandens</i>	Black Jetbead (Jetbead)	Plants	M	Emerging
<i>Rubus laciniatus</i>	Cutleaf Blackberry (Evergreen Blackberry)	Plants	M	Emerging
<i>Viburnum dilatatum</i>	linden viburnum	Plants	M	Emerging
<i>Viburnum sieboldii</i>	Siebold's viburnum	Plants	M	Emerging
<i>Cardamine impatiens</i>	Narrowleaf Bittercress	Plants	H	Emerging, ?Underreported
<i>Acer pseudoplatanus</i>	Sycamore Maple	Plants	H	Emerging, Underreported
<i>Cabomba caroliniana</i>	Fanwort	Plants	H	Emerging, Underreported
<i>Cirsium arvense</i> ( <i>C. setosum</i> , <i>C. incanum</i> , <i>Serratula arvensis</i> )	Canada Thistle	Plants	H	Emerging, Underreported
<i>Ligustrum obtusifolium</i>	Border Privet	Plants	H	Emerging, Underreported
<i>Miscanthus sinensis</i>	Chinese Silver Grass	Plants	H	Emerging, Underreported
<i>Pyrus calleryana</i>	Bradford Pear	Plants	M	Emerging, Under-reported

**ESTABLISHED**

<i>Orconectes rusticus</i>	Rusty Crayfish	Aquatic invertebrates	NA	Established
<i>Ampelopsis brevipedunculata</i>	Porcelain Berry	Plants	H	Established
<i>Aralia elata</i>	Japanese Angelica Tree	Plants	VH	Established
<i>Cynanchum louiseae</i> ( <i>C. nigrum</i> , <i>Vincetoxicum nigrum</i> )	Black Swallow-wort	Plants	VH	Established
<i>Frangula alnus</i> ( <i>Rhamnus frangula</i> )	Smooth Buckthorn	Plants	H	Established
<i>Persicaria perfoliata</i> ( <i>Polygonum perfoliatum</i> )	Mile-a-minute Weed	Plants	VH	Established
<i>Potamogeton crispus</i>	Curly Pondweed	Plants	H	Established
<i>Trapa natans</i>	Water Chestnut	Plants	VH	Established
<i>Wisteria sinensis</i>	Chinese Wisteria	Plants	M	Established
<i>Adelges tsugae</i>	Hemlock Woolly Adelgid	Terrestrial invertebrates	NA	Established
<i>Agilus planipennis</i>	Emerald Ash Borer	Terrestrial invertebrates	NA	Established
<i>Centaurea stoebe</i> ( <i>C. biebersteinii</i> , <i>C. diffusa</i> , <i>C. maculosa misapplied</i> , <i>C. xpsammogena</i> )	Spotted Knapweed	Plants	H	Established, Underreported
<i>Euphorbia cyparissias</i>	Cypress Spurge	Plants	H	Established, Underreported
<i>Euphorbia esula</i>	Leafy Spurge	Plants	H	Established, Underreported
<b>WIDESPREAD</b>				
<i>Acer platanoides</i>	Norway Maple	Plants	VH	Widespread
<i>Ailanthus altissima</i>	Tree-of-heaven	Plants	M	Widespread
<i>Alliaria petiolata</i>	Garlic Mustard	Plants	VH	Widespread
<i>Berberis thunbergii</i>	Japanese Barberry	Plants	VH	Widespread
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Plants	VH	Widespread
<i>Elaeagnus umbellata</i>	Autumn Olive	Plants	VH	Widespread
<i>Euonymus alatus</i>	Burning Bush	Plants	VH	Widespread
<i>Lonicera japonica</i>	Japanese Honeysuckle	Plants	VH	Widespread
<i>Lonicera maackii</i>	Amur Honeysuckle	Plants	VH	Widespread



<i>Lonicera morrowii</i>	Morrow's Honeysuckle	Plants	VH	Widespread
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Plants	VH	Widespread
<i>Lonicera x bella</i>	Fly Honeysuckle	Plants	VH	Widespread
<i>Lythrum salicaria</i>	Purple Loosestrife	Plants	VH	Widespread
<i>Microstegium vimineum</i>	Japanese Stilt Grass	Plants	VH	Widespread
<i>Reynoutria japonica (Fallopia japonica, Polygonum cuspidatum)</i>	Japanese Knotweed	Plants	VH	Widespread
<i>Rosa multiflora</i>	Multiflora Rose	Plants	VH	Widespread
<i>Rubus phoenicolasius</i>	Wineberry	Plants	VH	Widespread
<i>Artemisia vulgaris</i>	Mugwort	Plants	H	Widespread, Underreported
<i>Myriophyllum spicatum</i>	Eurasian Water-milfoil	Plants	VH	Widespread, Underreported
<i>Phragmites australis</i>	Common Reed Grass	Plants	VH	Widespread, Underreported
<i>Rhamnus cathartica</i>	Common Buckthorn	Plants	VH	Widespread, Underreported
<i>Robinia pseudoacacia</i>	Black Locust	Plants	VH	Widespread, Underreported

### Proposed Prioritization Hierarchy

For that are on the Lower Hudson PRISM Widespread species list, prioritize according to threat posed to conservation target or invasive species prevention zones.

For species that are not on the Lower Hudson PRISM Widespread list,

First look at those with VH or H invasive rank by NYS,

Threat gets highest attention

Next Emerging

Next Established

Treat those populations closer to a neighboring region that has low levels of that species

Then look at Species that have a High invasiveness rank in a neighboring region or which is on the Early Detection list of a neighboring region

First deal with those where the Geographic region in question is near that neighboring region

Then for those in a Geographic region that is not near that neighbor

Treat those which are at Low levels of populations in LH PRISM (Threat, Emerging)

Then look at Species that are not in either of the above categories (Not VH or H Invasive rank in NYS or High or ED status in neighboring region)

Treat species with Moderate invasive rank with low population numbers (Threat, Emerging)

All others record and monitor