

A Database of Nonindigenous Species in Michigan

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Invasive species in MI

- Terrestrial and aquatic habitats
- Managed and natural lands
- What's actually in the state?
- No state-wide system for data collection or monitoring
- Likewise, no state-wide mechanism for response

Monitoring invasive species in MI

1. Collection of species distribution data – MSU research and extension (Michigan Natural Features Inventory– MNFI), TNC and other partners

2. Data analysis and database hosting – MSU Invasive Species Initiative

3. State–wide reporting and educational website (Collaboration between MNFI, partners, and researchers)

Long–term: Contribute to larger area (regional, national) databases

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A list of nonindigenous species in Michigan

- Goal: to identify and collect information about all non-indigenous species in the state
- Categories
 - Taxonomic information
 - Native range
 - Date of introduction
 - Pathway
 - Invasiveness
 - Status in MI

Methods

- Consult state-wide taxonomic lists
- Use peer-reviewed literature to identify non-indigenous species, first occurrence, distribution, origin, etc.
- Consult recognized experts within each taxonomic field for validation

Results

Taxa		Number of taxa
Plants		951
Terrestrial invertebrates		195
<i>Insects</i>	102	
<i>Earthworms</i>	18	
<i>Gastropods</i>	12	
<i>Isopods</i>	12	
<i>Spiders</i>	11	
<i>Millipedes</i>	6	
<i>Centipedes</i>	5	
<i>Ticks and mites</i>	8	
<i>Pseudoscorpions</i>	21	
Aquatic invertebrates		56
<i>Crustaceans</i>	25	
<i>Diatoms</i>	17	
<i>Gastropods</i>	27	
<i>Molluscs</i>	8	
Terrestrial vertebrates		17
<i>Mammals</i>	4	
<i>Herps</i>	6	
<i>Birds</i>	7	
Aquatic vertebrates		21
Total		1240

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Total	1240	There are over 1200 nonindigenous taxa in Michigan (likely an underestimate)

Nonindigenous plants in Michigan

- Based on amendments to Michigan Flora (Voss 1972, 1985, 1996)
- Largest group, most complete
 - Current focus of analyses based on taxonomic diversity, origin, and date of introduction

Physiognomy of nonindigenous species

Growth form	Native plant species	Non-native species	Percent non-native (of 2778 total)
<i>Perennial forbs</i>	813	333	12%
<i>Annual forbs</i>	165	293	10.5%
<i>Biennial forbs</i>	39	69	2.5%
<i>Shrubs</i>	143	62	2.2%
<i>Perennial grasses</i>	127	56	2%
<i>Trees</i>	128	54	1.9%
<i>Annual grasses</i>	28	47	1.7%
<i>Vines</i>	18	25	0.9%
<i>Annual sedges</i>	25	0	0%
<i>Perennial sedges</i>	235	11	0.4%
<i>Ferns and allies</i>	106	1	~0%
Total	1827	951	34.1%

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Origin of nonindigenous plants

Ecozone	Number of species	Percentage of total
<i>Palaearctic</i>	674	71%
<i>Palaearctic/Indomalaya</i>	9	1%
<i>Palaearctic/Afrotropic</i>	2	< 1%
<i>Nearctic*</i>	174	18%
<i>Nearctic/Neotropic</i>	19	2%
<i>Afrotropic</i>	8	1%
<i>Neotropic</i>	19	2%
<i>Indomalaya</i>	5	< 1%
<i>Australasia</i>	2	< 1%
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* denote taxa that are native in the United States but not in Michigan.

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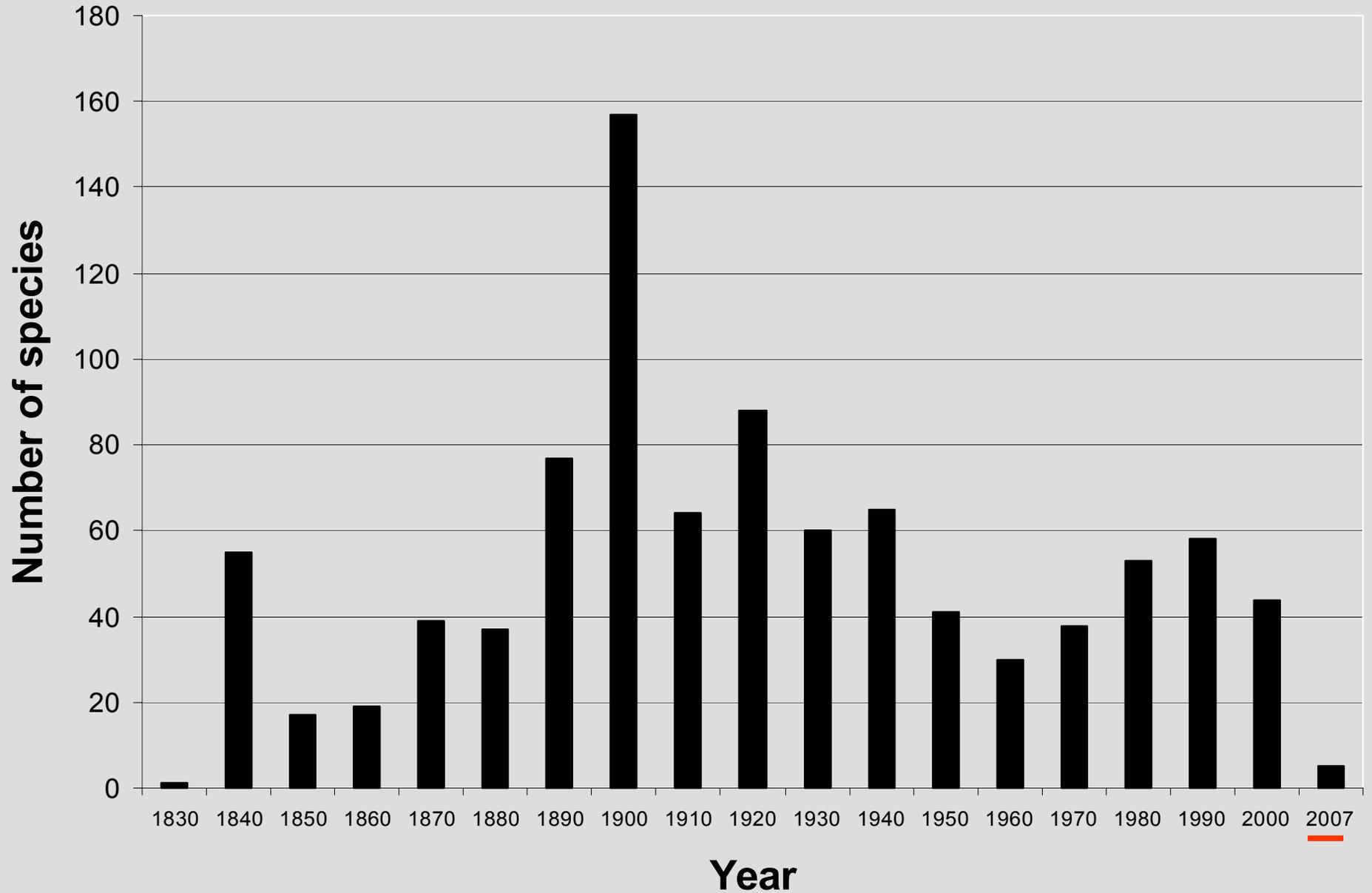
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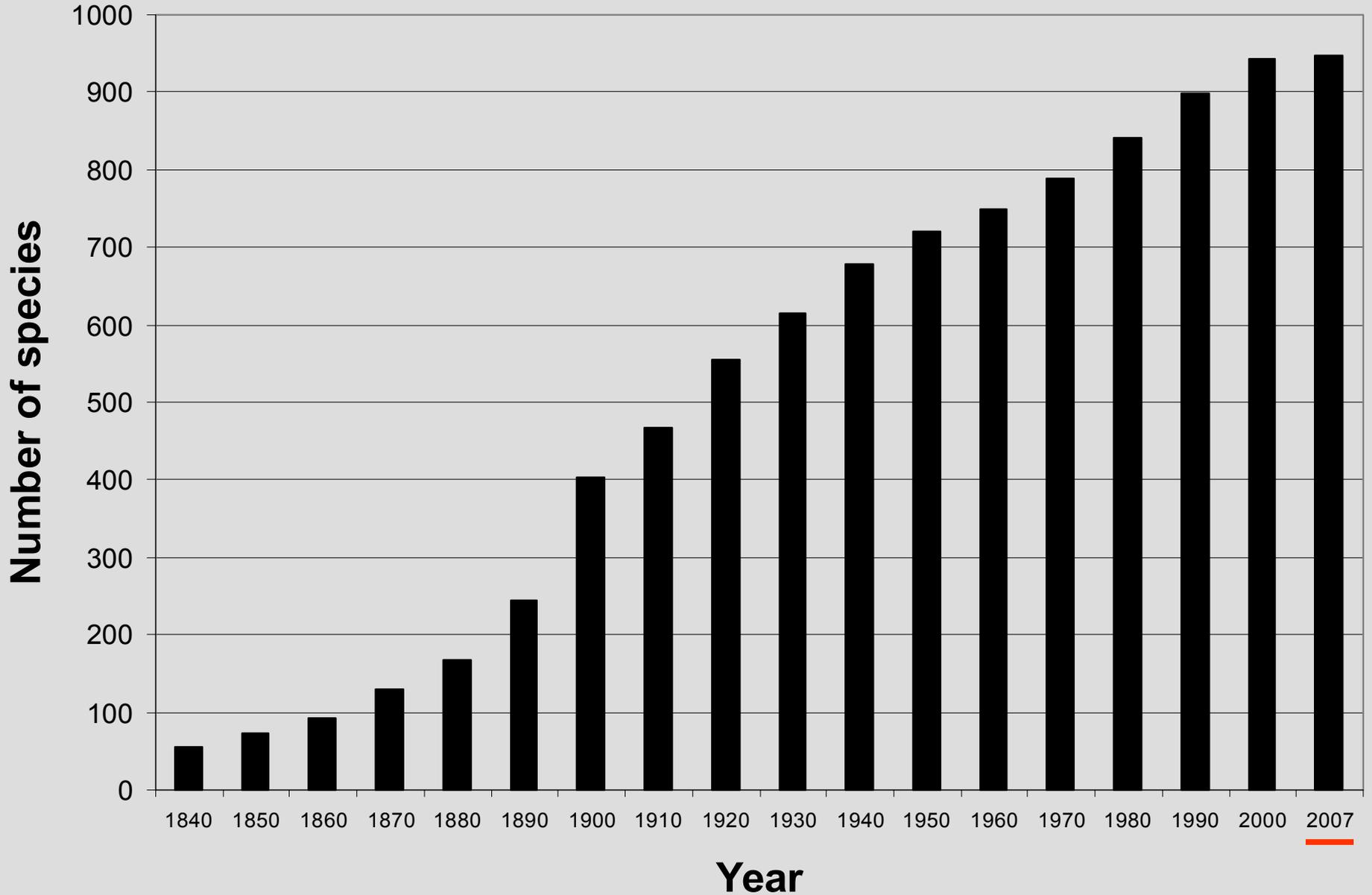
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Nonindigenous species introductions by decade



Cumulative nonindigenous plant introductions by time



Tentative Conclusions

- Over 1 / 3 of the plant species in Michigan are nonindigenous
- Many originate from the Palearctic ecozone
- The peak period of introductions occurred around the turn of the century (1890–1910)
- Cumulative introductions *appear* to be leveling off...

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- Cumulative introductions *appear* to be leveling off... not so for other taxa

Current questions

- Are there particular families or genera that are over- or underrepresented?
- Does distribution relate to time of introduction?
- Can we conduct analyses across broad taxonomic lines?

Next steps

- Continue developing state and regional partnerships
- Complete data collection for remaining taxonomic groups
- Beta test our reporting website

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(University of Michigan Herbarium)
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Michigan)

www.invasivespecies.msu.edu