Track C: Flora and Fauna: Applying Ecology to Design

Session C.1 Water Gardening and Aquatic Invasive Species. Diane Oleson, Penn State Extension, York County, Pennsylvania

Topics Covered:
- What not to plant and why not?
- Aquatic Invasive Species (AIS)
- Prevention is the best weapon

- What is an Invasive Species?
  - Examples: Zebra mussels—clog boats, water systems, remove plankton and algae
  - A species outside of its native range—(regional, local)
    - Ex. mosquito fish
  - Brought in by artificial means
  - Economic/ecological/human/plant/animal harm
    - Usually more than one harm

- Why are they so troublesome?
  - Come in all forms
  - Tolerate a wide range of conditions—spring up in disturbed areas
  - Produce a lot of offspring
  - Move-in without predators and pathogens
  - Seed banks can last 5-12 years
  - 40% of US pests are invasive
  - Cost billions of dollars of ecological damage

- “rule of 10”—out of every 100 species, 10 will naturalize, only 1 will become a problem
  - Most of our food species are non-native

- Modes of transport:
  - Hitchhiking
  - Packaging
  - Intentional,
  - Pet/trade,
  - Ballast water,

- Many countries must do a white-list approach before they will let species in (ex. NZ)

- KNOW YOUR ENEMY:
  - They can be microscopic—clean and change water, etc. so that you can protect against unwelcome invaders from packaging etc.—dispose of water down the sewer (NOT STORMDRAIN)
  - Giant Hogweed—DANGEROUS—looks like Queen Anne’s Lace on Steroids—20 ft tall—brought in for horticulture—sap can cause blindness, chemical burns, activated by sunlight—blisters can come back up to 2 years later
  - Asian Tiger Mosquito
In Water Garden: outdoor aquaria, small, self-contained, nutrient controlled, often stocked with organisms

- Animals:
  - Use carp and koi with great care—they grub in sediment for any plants—very picky and will not eat the things you want them to eat
  - Goldfish—root up vegetation
  - Chinese mystery snail—easily moved by birds, intermediate hosts for parasites

- Plants
  - Water hyacinth—reproduce quickly, weedy
  - Water lettuce—cuts off oxygen, breeds mosquitoes, double like crazy
    - Stagnant water between plants—causes mosquito breeding
  - Watermilfoils—forms mats
  - Brazilian waterweed
  - Water chestnut (caltrope)—seeds have nasty spines, restrict light and oxygen, displace other plants, bad for recreation

- Around the water (these species halt natural succession and provide poor habitat):
  - Yellow flag iris
  - Daylily
  - Purple loosestrife

- BMPs
  - Maintain
  - Pay attention to local waterways/storm drains—make sure things won’t wash out of your gardens into these
  - Do your homework when selecting plants—noxious weeds, climate appropriate
  - Get plants from a reputable source—use Latin name when searching
  - Clean and inspect before installing—tap water rinses, quarantine fish for 2 weeks, dispose of plants and rinse water
  - Avoid non-native snails
  - Go native!

- Q &A
  - Hardiness zones don’t matter much
  - Native shiners make good replacements for koi
  - Kids don’t care about colorful fish
  - Dunks are a good mosquito control that are generally safe for everything but mosquitoes
  - Look for chinks in invasive armor
  - It is sometimes easier to leave fish out of a water garden
References:

- Native Plants for Wildlife Habitat and Conservation Landscaping: Chesapeake Bay Watershed
- National Invasive Species Council Whitepaper, Pathways of Invasion
- USDA Plants Database—good for showing plants’ native ranges
- Web-resources on handout (of concern in PA)
- For PA (but could also maybe be used for other regional states): Google DCNR Invasive Plants—searchable database, management suggestions, native alternatives
- Invasive.org—pictures, species profiles, images
- Early Detection, Rapid Response Whitepaper
- PA Field Guides
- Penn State Water Resources under Pond Management
- Habitattitude
- Protectyourwaters.net
- Chicago Botanical Gardens—restoration of lakeshores
- Master Gardener Penn State Water Resources: under “Ponds”—places you can buy fish

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