

Homeowners' Sustainable Landscaping and Water Conservation Workshop

Held on Saturday, May 17, 2008
Hope Brown Center
Prudence Island , RI 02872

Participants learned about:

- Water in the News: Crisis vs. Conservation at the Local, State and National Levels
Jennifer West, Coastal Training Program Coordinator, Narragansett Bay Research Reserve
- Sustainable Landscaping for Water Conservation
Rosanne Sherry, State Master Gardener Program Coordinator
- Composting and Yard Waste Management
James Crowley, Master Composter and Recycler
- Rain Barrels and Other Backyard Water-Saving Tools
Beverly O'Keefe, RI Water Resources Board and URI Extension Master Gardener
- Composting Toilets: A great way to address septic system concerns!
Robin Weber, Natural Resources/GIS Specialist, Narragansett Bay Research Reserve

All workshop attendees had a chance to win a free rain barrel (Courtesy of Beverly O'Keefe, aka the "Water Lady")

The workshop was sponsored by the Narragansett Bay Research Reserve, the Prudence Conservancy, the Prudence Island Utility Corporation, and the Prudence Island Water District.

For more information please contact Jennifer West, CTP Coordinator, at jennifer@nbnerr.org or 401-222-4700, x 7413.

Documents

- [Agenda \(PDF\)](#)
- [Water in the News: Crisis vs. Conservation Presentation \(PDF\)](#)
- [Landscape Sustainability to Protect your Paradise Presentation \(PDF\)](#)
- [Composting Toilets Presentation \(PDF\)](#)

Prudence Island Homeowners' Sustainable Landscaping and Water Conservation Workshop

Saturday, May 17, 2008, 12:00 pm – 2:30 pm
Hope Brown Center
Prudence Island, RI

AGENDA

12:00 Introduction and Welcome

Jennifer West, Coastal Training Program Coordinator, Narragansett Bay Research Reserve

12:05 Water in the News: Crisis vs. Conservation at the Local, State and National Levels

Jennifer West

12:20 Sustainable Landscaping for Water Conservation

Rosanne Sherry, State Master Gardener Program Coordinator

12:50 Composting and Yard Waste Management

James Crowey, Master Composter and Recycler

1:20 Break

1:30 Rain Barrels and other Backyard Water-saving Tools and Techniques

Beverly O'Keefe (aka "The Water Lady"!), RI Water Resources Board and URI
Extension Master Gardener

2:00 Composting Toilets: A Great Way to Address Septic System Concerns!

Robin Weber, Natural Resources/GIS Specialist, Narragansett Bay Research Reserve

2:15 Wrap-Up and Adjourn

Water in the News: Crisis vs. Conservation

Jennifer West, Coordinator



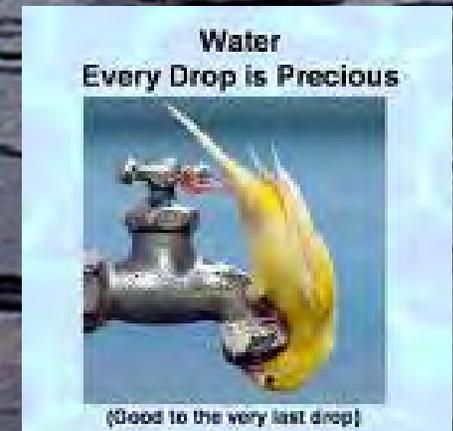
National Level

- According to the EPA,
 - Residential use accounts for more than half of publicly supplied water in the US, significantly more than is used by either business or industry
 - In the last five years, nearly every region in the US has experienced water shortages



National Level

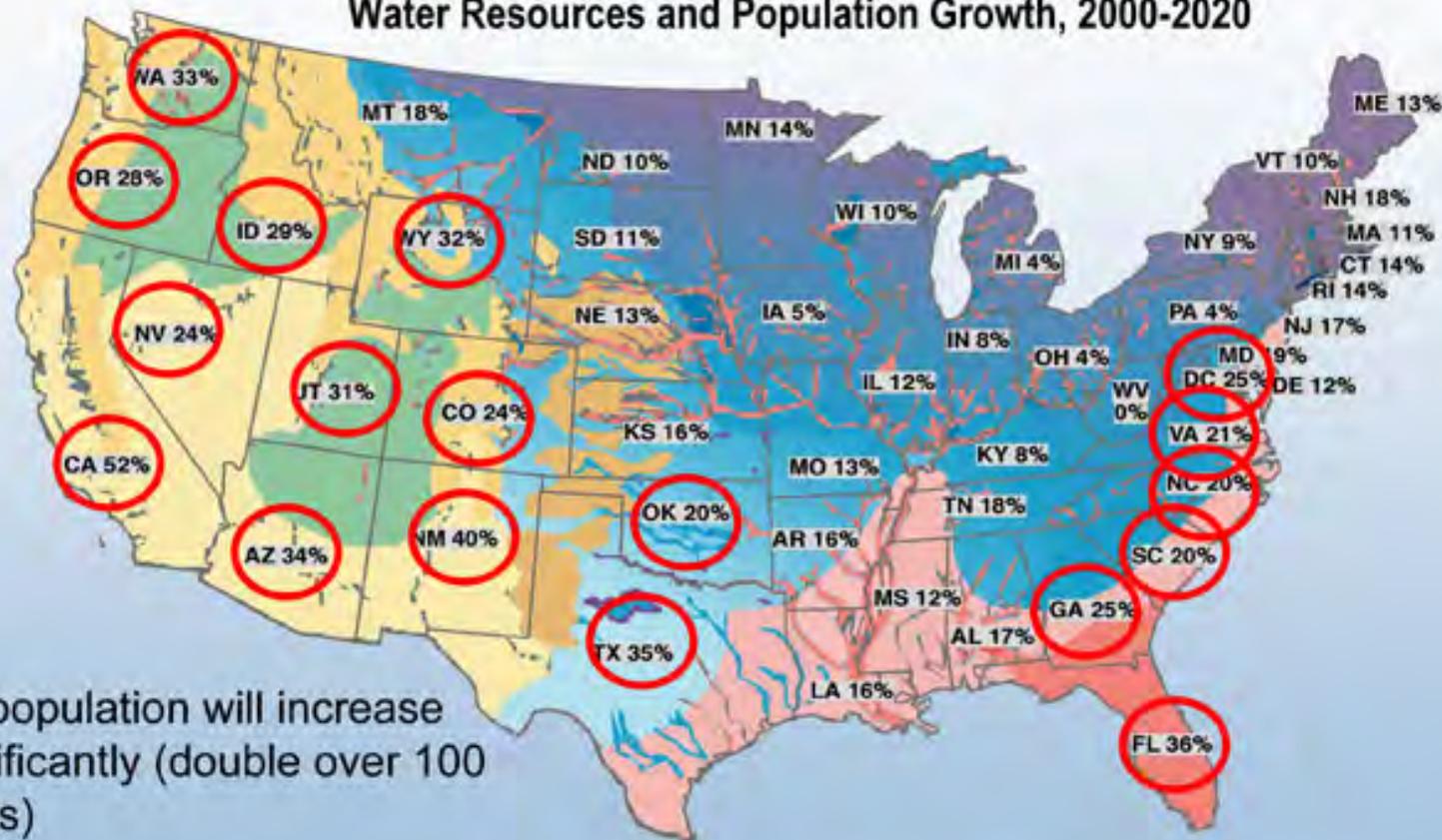
- At least 36 states are anticipating local, regional, or statewide water shortages by 2013, even under non-drought conditions
- Between 1950 and 2000, the US population nearly doubled, however in that same time period public demand for water more than tripled



Water Supplies Are Vulnerable

Population Growth is 20% to 50% in Most Water-Stressed Areas

Water Resources and Population Growth, 2000-2020



Less Water



More Water

Regional Level

- While we receive a comparatively high amount of rainfall, climate change models predict the following:

- The frequency of late summer and fall droughts will increase significantly, with short-term droughts occurring as frequently as once per year by late-century

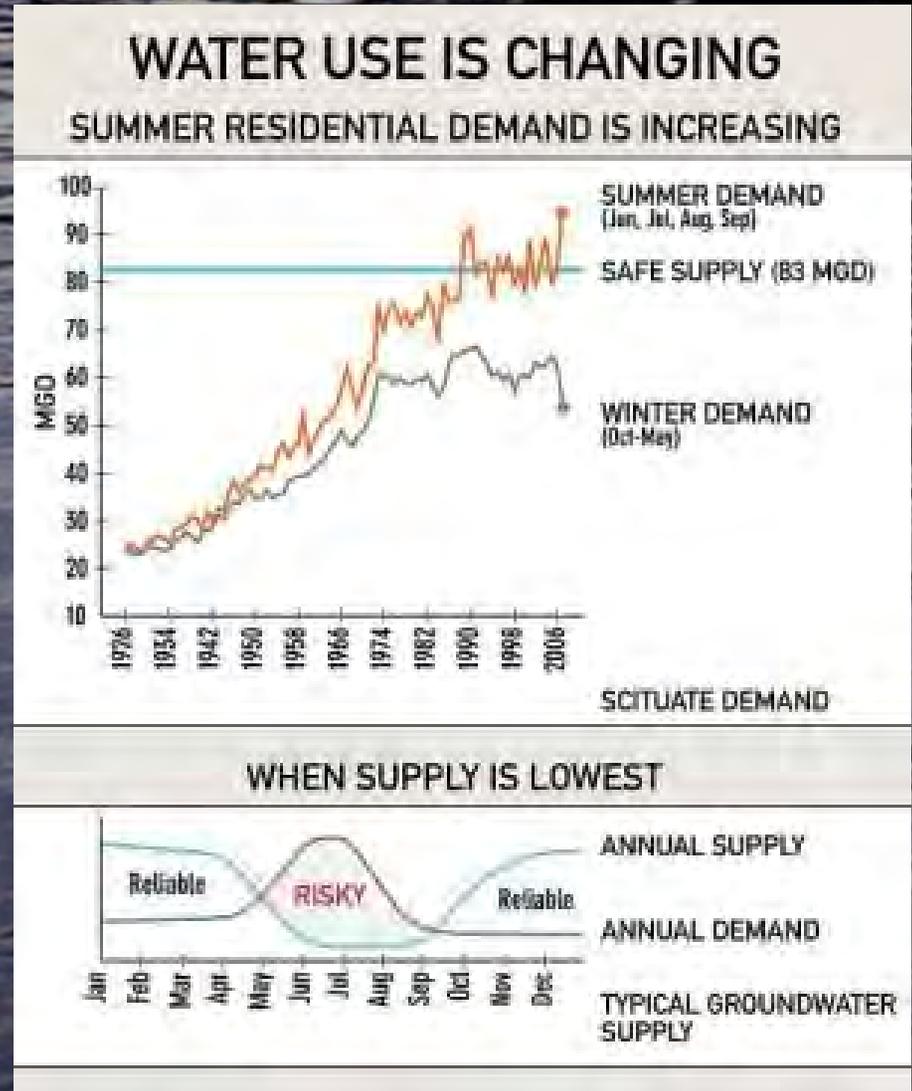
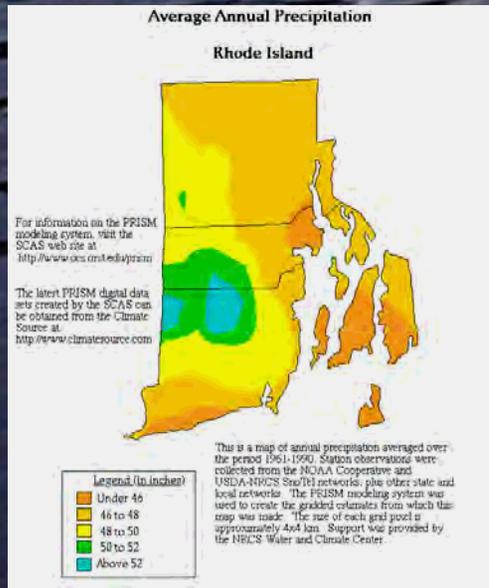
- Stressfully low water levels could occur nearly a month earlier in the summer and persist almost a month longer into the fall

(‘Climate Change in the U.S. Northeast’, NECIA, 2006)



State Level

- Increasing development in RI has added to the summertime strain of water use double what Rhode Islanders use in the winter (PBN, 6/4/07)



State Level

- Some good news: two RI Senate Committees adopted a report on RI's water supply and distribution and endorsed the **“The Water Supply Development, Planning and Protection Act of 2007”**

- ❖“taking the necessary action now will ensure that there is not a water supply crisis in the near future...”

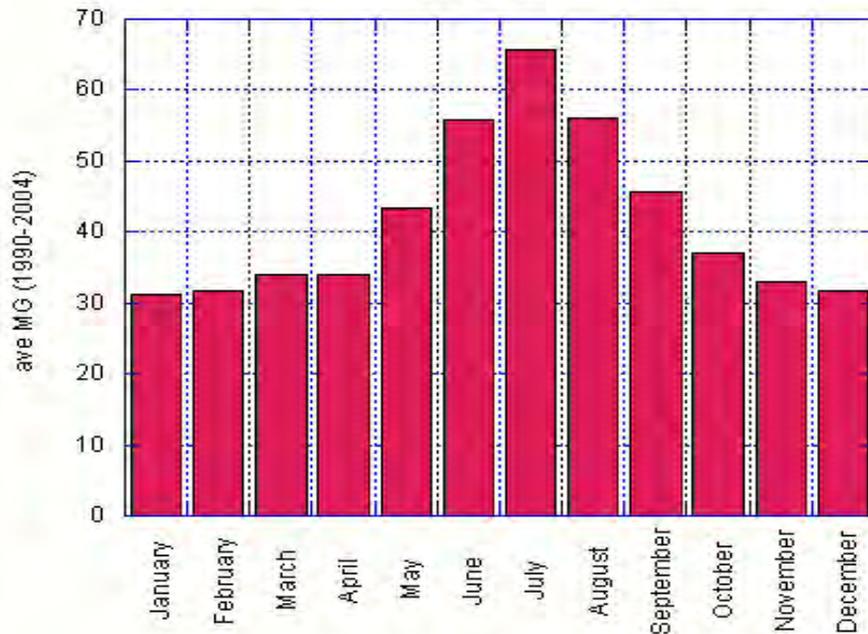
Senator J. Michael Lenihan (D – Dist. 35, East Greenwich, North Kingstown, Warwick)

- ❖“reduction in summertime usage can have a significant impact on stream and river flows, especially if conservation efforts commence at the beginning of summer, rather than when systems are already stressed...”

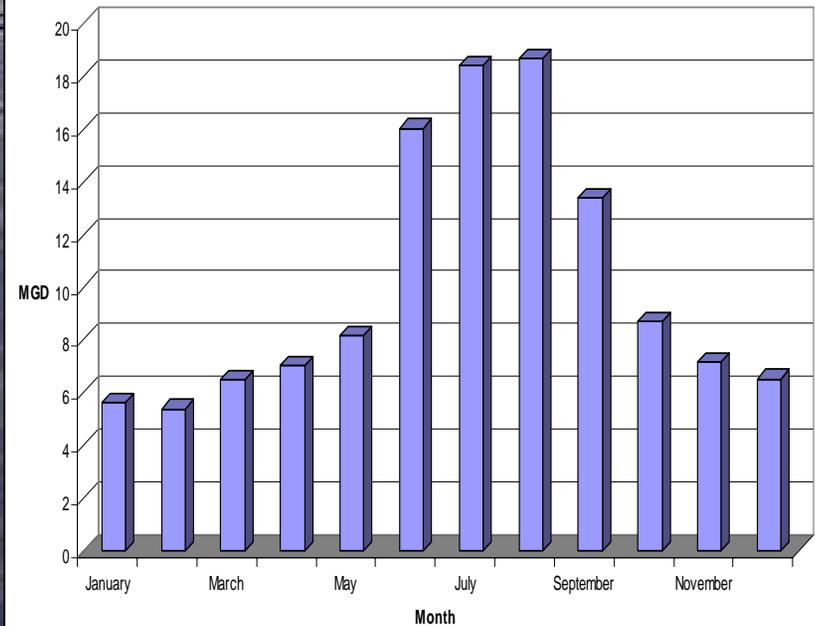
Senator V. Susan Sosnowski (D – Dist. 37, South Kingstown, New Shoreham)

How much does water use go up in the summer?

**North Kingstown Water Department
Average Monthly Pumping from Hunt River
(Wells NK6, NK9 & NK10)
1990-2004**

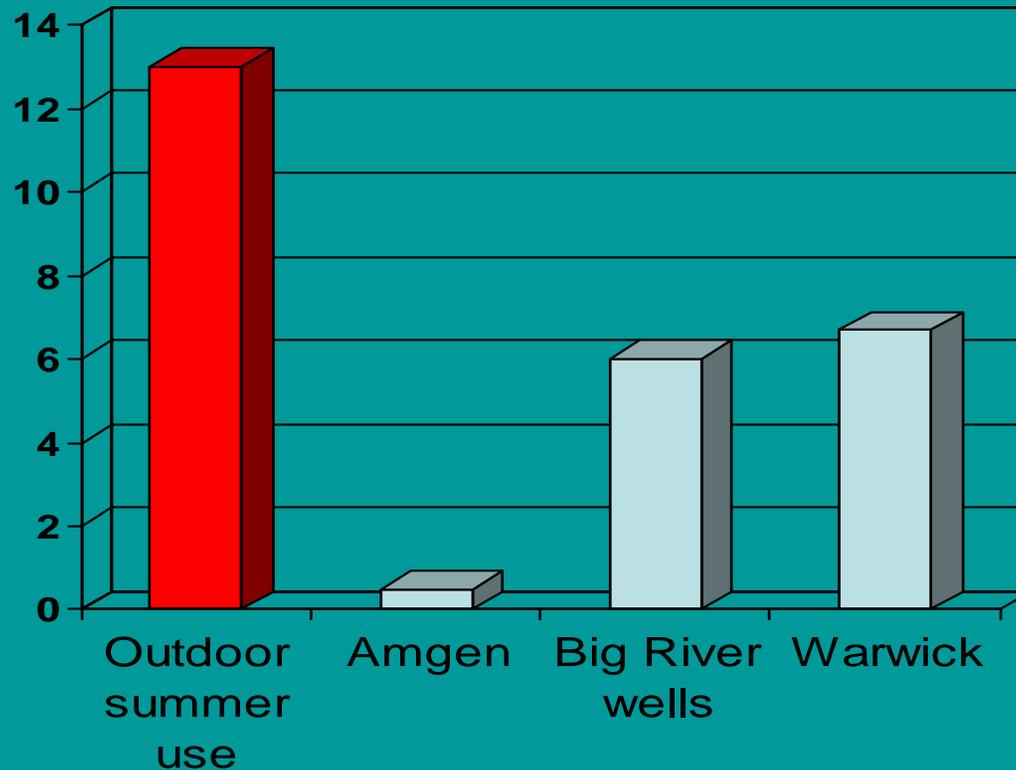


Warwick 2005



How much water is used outdoors?

MGD use



Protecting Natural Resources

A critical component of water supply management



Ipswich River dewatered by water withdrawals in the watershed

And it doesn't affect only us...

- More than 1/3 of all threatened and endangered wildlife species in the US live only in wetlands, and nearly 50% of all T and E species use wetlands at some point in their lives



Hunt River

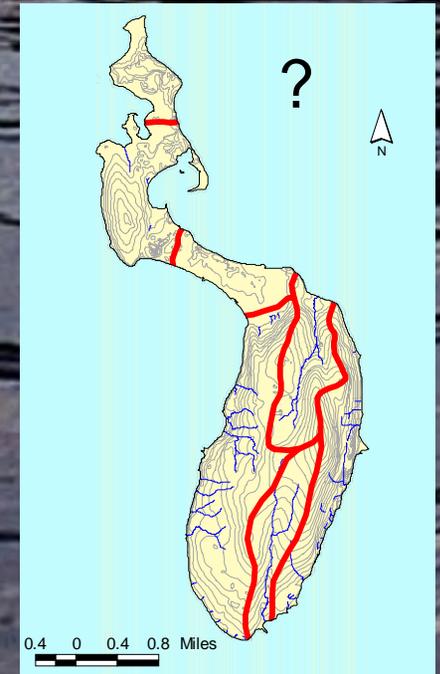


August 2005

Prudence Island

Inferences from Past Studies

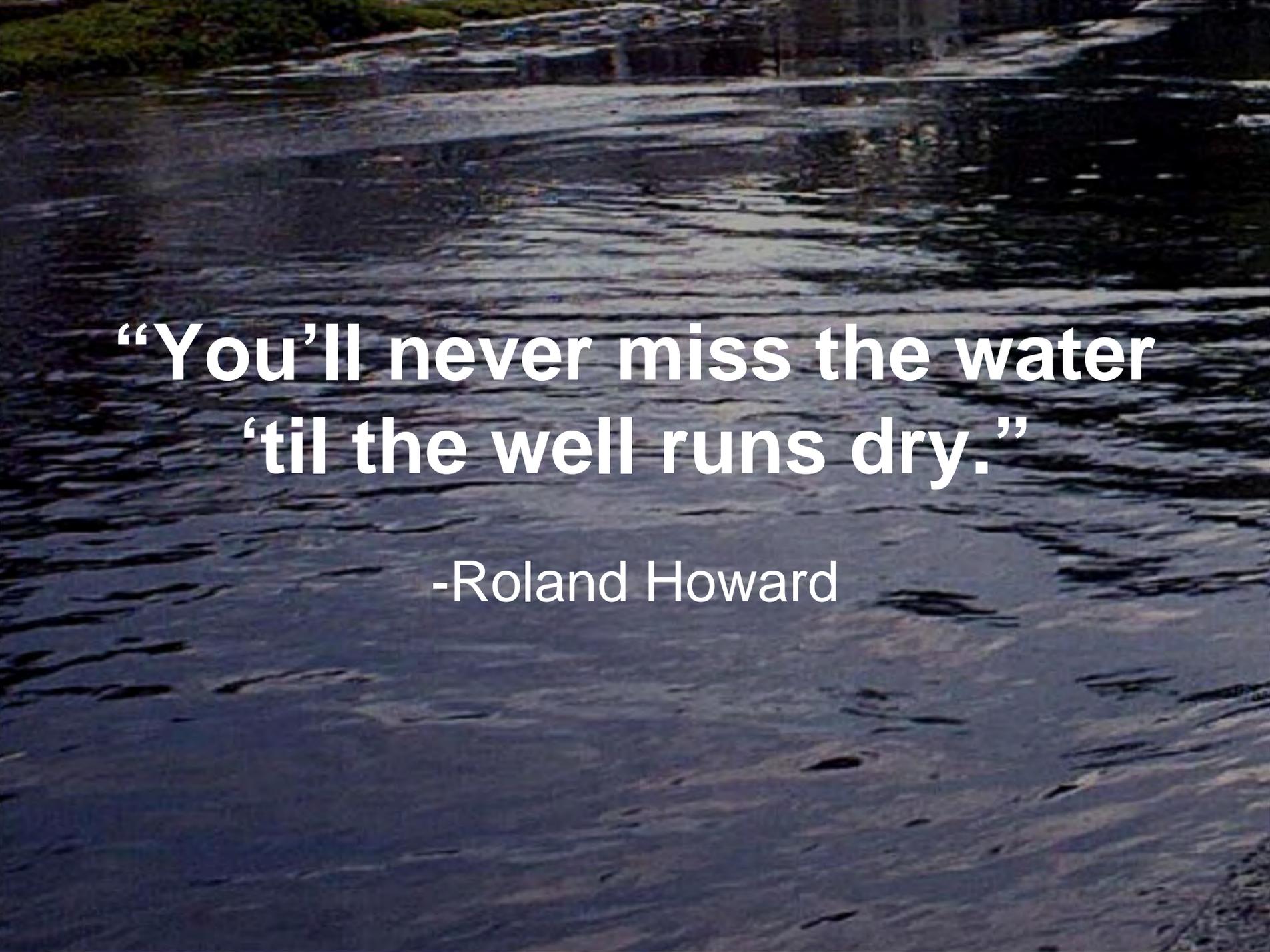
- Mill Creek basin is at or exceeding capacity
- Decline in groundwater levels
- Potential for salt water intrusion
- Expanding area of contribution



A photograph of a river with a dam in the background. The water is dark and rippling, and the dam is visible in the upper part of the image. The text is overlaid on the water.

Support the
Rhode Island Shared Water Resources Act of 2008
(H7787, S2637)

<http://www.cleanwateraction.org/ri/watersecurity.html>



**“You’ll never miss the water
‘til the well runs dry.”**

-Roland Howard

Landscape Sustainability to Protect your Paradise

Rosanne Sherry
URI CE Master Gardener Coordinator

Prudence Island Workshop May 16, 2008



What is a Sustainable Plant?

- Some characteristics
 - Adapted to the local climate, conditions
 - Low resource requirements – water, fertilizers
 - Generally free of serious pests
 - Not invasive
 - Enhance habitat for wildlife



Variability of Plants

- Interaction of plant and environment
 - Temperature
 - Sunlight
 - Soil pH
 - Drainage
 - Local pests ...
- Move a sustainable plant from Rhode Island to Florida (or Canada) – it may become non-sustainable



Invasive Plants

- Non-indigenous
- Capability for rapid and widespread dispersion
- Thrive outside of managed landscapes
- Widespread in Rhode Island and beyond
- Out-compete native species
 - Shade
 - Pollinators
- Propagate rapidly



Invasive Plants

- It may not be the plant – it may be the environment
 - Local fauna attracted to fruit, causing dispersal (e.g. *Cornus kousa*)
 - Lack of native herbivores or pathogens to control the population
 - Pollinators attracted disproportionately (e.g. Purple loosestrife)
 - Human activity (eg. Multiflora rose)



Invasive to Rhode Island

- Trees

- Norway Maple (*Acer platanoides*)
- Tree of Heaven (*Ailanthus altissima*)

- Shrubs

- Japanese Barberry (*Berberis thunbergii*)
- Autumn Olive (*Elaeagnus angustifolia*)
- Burning Bush (*Euonymus alata*)
- Honeysuckles (*Lonicera morrowii* and *L. x bella*)

- Shrubs (continued)

- Common Buckthorn (*Rhamnus cathartica*)
- Multiflora Rose (*Rosa multiflora*)
- Wineberry (*Rubus phoenicolasius*)

- Woody Vines

- Porcelain Vine (*Amphelopsis brevipedunculata*)
- Oriental Bittersweet (*Celastrus orbiculatus*)
- Japanese Honeysuckle (*Lonicera japonica*)



More Invasives

- Herbaceous Plants

- Garlic Mustard (*Alliaria petiolata*)
- Japanese Knotweed
(= Japanese Bamboo)
(*Fallopia japonica*)
- Purple Loosestrife
(*Lythrum salicaria*)
- Lesser Celandine
(*Ranunculus ficaria*)

- Water Plants

- Fanwort (*Cabomba caroliniana*)
- Watercress (*Rorippa nasturtium-aquaticum*)



Some Potentially Invasive ...

- Kousa Dogwood
- Silk Tree (“Mimosa”)
- Catalpa
- Black Locust
- Butterfly Bush
- Scotch Broom
- Russian Olive
- Privet
- Beach Rose (*Rosa rugosa*)
- Trumpet Creeper
- Autumn Clematis
- English Ivy
- Kudzu
- Periwinkle (*Vinca minor*)
- Wisteria
- Daylilies
- Ajuga
- Violets



Sustainable Trees and Shrubs

UNIVERSITY OF RHODE ISLAND
COOPERATIVE EXTENSION
LANDSCAPE HORTICULTURE
PROGRAM

Third edition, 1999

GreenShare

Sustainable Trees and Shrubs

An Introduction to the Sustainable Plant List	1
Planting for Sustainable Landscapes	3
List of Sustainable Trees and Shrubs	8
Index of Common Names	31
Appendix 1: URI Crabapple Tree Disease Evaluations	34
Appendix 2: Tree, Shrub and Vine Selections for Demanding Situations	36
Appendix 3: Cross-reference for Demanding Situations	42
Hardiness Map of New England (USDA Plant Hardiness Zones)	49

An Introduction to the Sustainable Plant List

APPENDIX THREE

Cross-reference for Demanding Situations

SPECIES	DR	LO	NA	OC	P45	P50	P75	SH	SP	SS	UR	WI	WT
<i>Abelia x grandiflora</i>						x		x					
<i>Abies cilicica</i>						x	x						
<i>Abies concolor</i>	x					x	x				x	x	
<i>Abies bomolepis</i>						x							
<i>Abies veitchii</i>						x							

Kalmia latifolia Mountain-Laurel
Zone 4-9 7-15' x similar spread

Requires acid, moist soil supplemented with organic matter, good drainage, full sun to shade. A good native plant if sited correctly. Many new cultivars available; red and pink flowered forms need full sun to develop good flower color.



MOUNTAIN-LAUREL
Kalmia latifolia

http://www.pse.uri.edu/maynard_susplants/html_sp12000/index.htm
(pdf format and interactive)

SOLUTION

ID and eliminate the problems

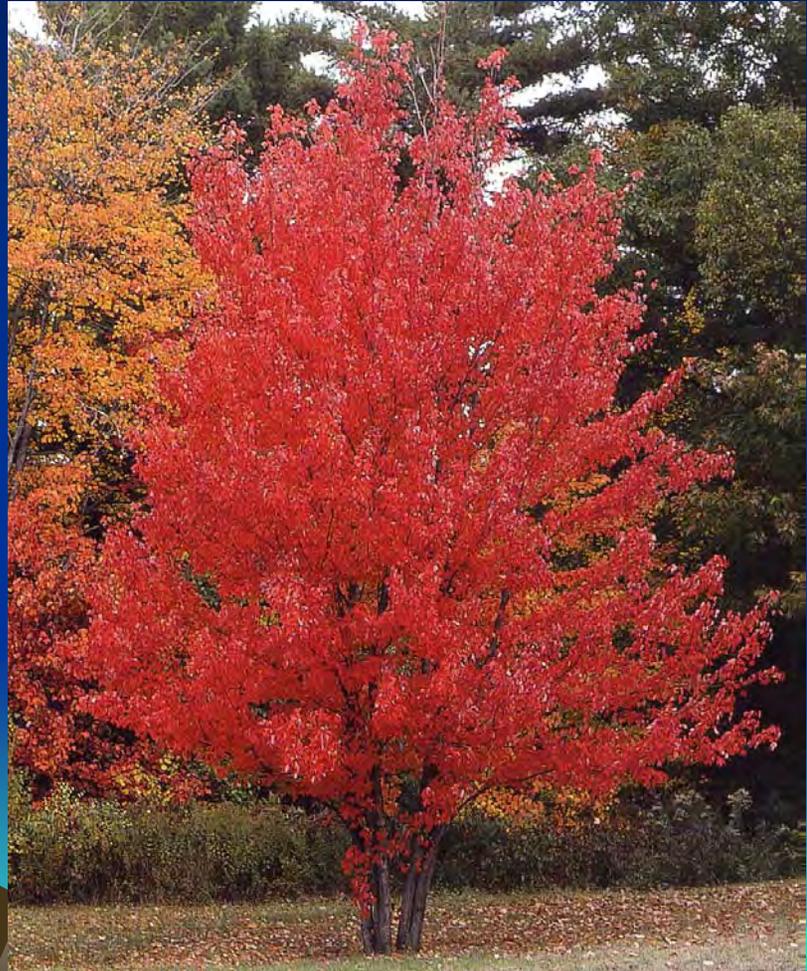
- Reduce the lawn by 25%
- Rain gardens to reduce stormwater flow into the bay
- Create a buffer of vegetation at the water's edge
- Consider xeriscaping (low water use plants)
- Mulch to retain moisture
 - but **NO** volcanoes!!



Some Alternatives

Red Maple or Sugar

- It's big enough for shade
- It's beautiful
- It's native to RI and the State Tree!



Some alternatives

- Viburnums – tree or shrub
- Highbush blueberry
- Juniper
- Arborvitae
- Spruce - but not Blue
- Scarlet honeysuckle
- Weigela
- Floribunda or shrub roses
- Crabapple
- Holly - deciduous and evergreen



Nannyberry Viburnum

(Viburnum lentago)



30' tall, and
it has white
flowers and
berries



Doublefile Viburnum

Viburnum plicatum var. *tomentosum*



Witchhazel

(*Hammamelis x intermedia*)

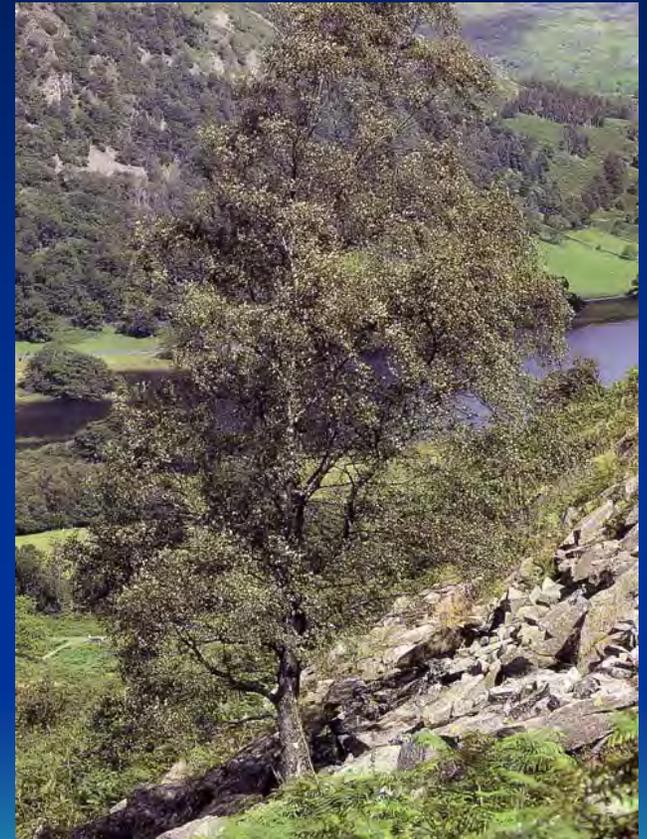


Chinese Witchhazel *H. intermedia* and *vernalis* blooms in late winter and the native *H. virginiana* blooms in late fall

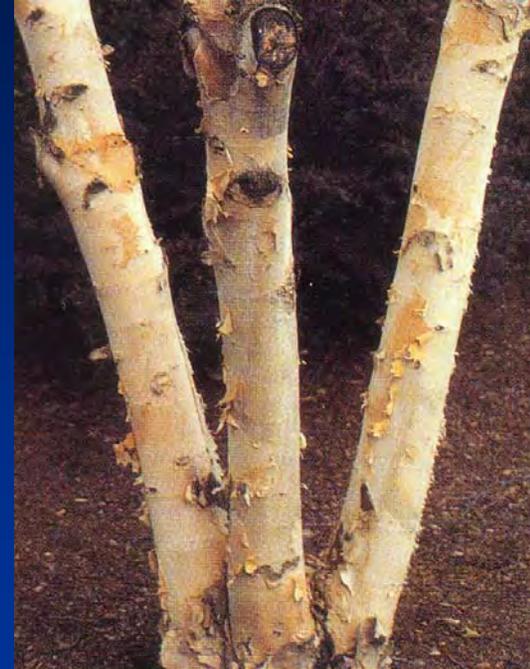
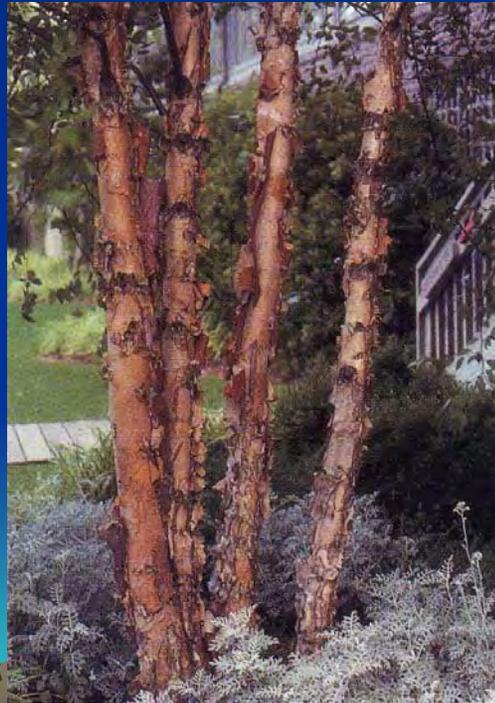
European White Birch

(*Betula pendula*)

- Not sustainable – problems with leaf miner and bronze birch borer
- Native to colder climates
- Valued for peeling, white bark



River Birch



Stewartia sp.

- Two species
 - *S. pseudocamellia*
 - *S. koreana*
- Wonderful exfoliating bark
- Summer flowers
- Fall color
- Tolerates low pH
- Variable shape



Flowering Dogwood

(*Cornus florida*)



Kousa dogwood (*C. kousa*)



Other native dogwoods

Cornelian cherry *Cornus mas*

Red and yellow twig dogwood
C. sericea and *C. alba*

Pagoda *C. alternifolia*

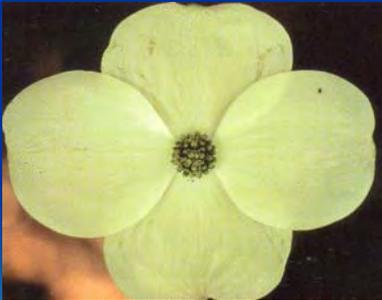
Cornus “Rutgers Hybrids”



C. florida



C. kousa



“Aurora”



“Stellar Pink”



“Constellation”

Sourwood

(*Oxydendrum arboretum*)

- Sustainable native plant
- Very Asian look
- Tolerates soil salt, low pH, drought
- Outstanding fall color
- Interesting flower



Eastern Hemlock

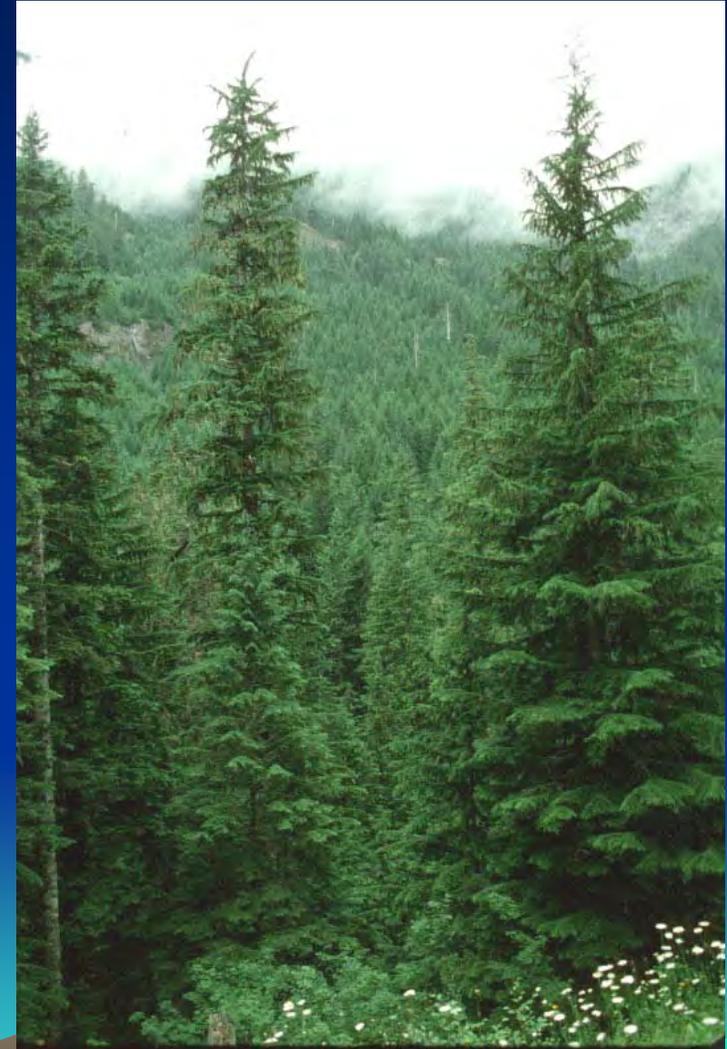
- Native, but not sustainable (wooly adelgid)
- *Tsuga canadensis*
- *Tsuga carolina*



Hemlock Woolly Adelgid



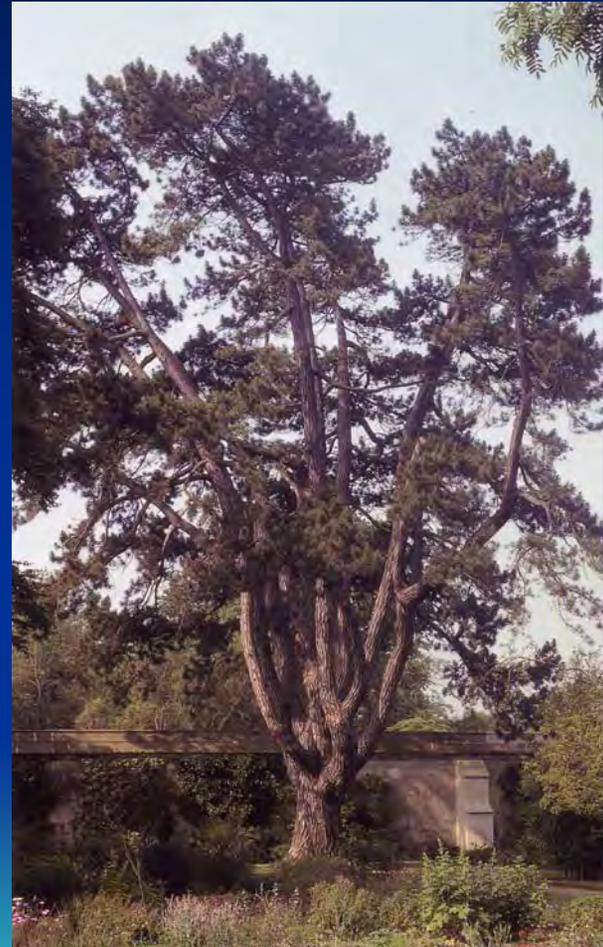
Western Hemlock (*Tsuga heterophylla*)



Black Pines



Japanese Pine
(*Pinus thunbergii*)



Austrian Pine
(*Pinus nigra*)

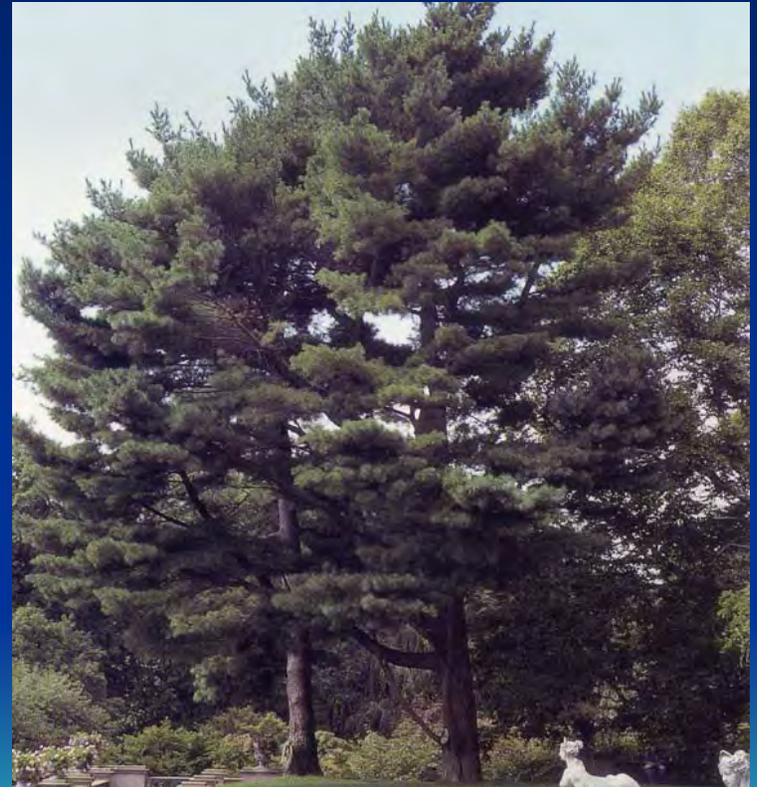
Black Pines

- All are susceptible to turpentine beetles
- Beetle enters tree low on trunk, climbs the trunk (or branch) and eventually girdles limb
- Tree dies back from outer tips in 2-4 months
- May be secondary infection involved



White Pine (*Pinus strobus*)

- Native plant
- Sustainable, but has problems
- Not salt-tolerant
- White pine blister
- White pine weevil
 - Deforms leader – forms “crookneck”
 - Train new leader
 - Tree outgrows pest



Black Pine Replacements

- No really good replacement thus far
 - Primary issue is salt tolerance
- Ongoing research at URI (Dr. Maynard)
- Testing Bosnian pine, Leyland Cypress and others
- Some of the work is at GSO
- Mother Nature plants few pine species close to the water!



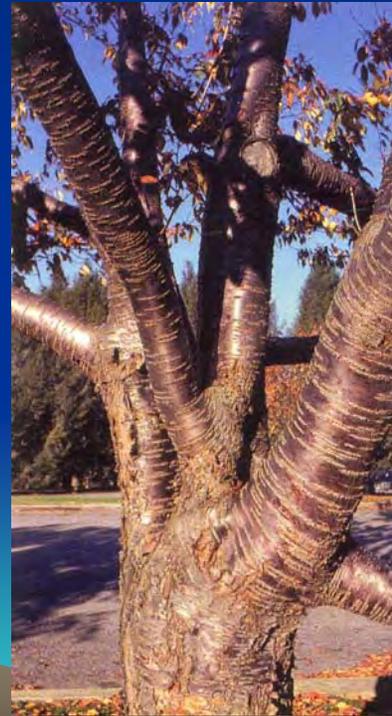
“Kwanzan” Cherry

(*Prunus serrulata*)



“Kwanzan” Cherry

- Prone to bark splitting, particularly in winter (avoid winter sun)
- Susceptible to fungus, bacterial rot
- Prone to “water sprouts” when pruning crossed branches
- Messy flowers



Better cherries if you must

- Sargent Cherry (*Prunus sargentii*)
- Amur Chokecherry
(*Prunus maackii*)
- “Higan” Cherry (*Prunus subhirtella*)



Beach Plum (*Prunus maritima*)

- Native plant
- Fine for seashore
- White flowers in spring
- Fruit in summer



Meyer Lilac

- Shrub-sized, not a tree
- Very fragrant
- Resistant to mildew
- Tolerates soil salt
- Sustainable



Serviceberry / Shadbush

- Native plant
- Three species
- One is salt-tolerant
- Berries taste like highbush blueberries
- 6'-20' tall
- *Amelanchier arborea*, *canadensis*, *laevis*



Amelanchier arborea flowers



Amelanchier arborea fruit

URI References

- <http://www.uri.edu/cels/pls/> click on Plant List to the left
- <http://www.uri.edu/ce/wq/>
- <http://www.uri.edu/ce/healthylandscapes>
- <http://www.uri.edu/cels/ceoc> click on Coastal Management programs
- URI Master Gardener Hotline
 - toll-free in RI only 1-800-448-1011
 - M-TH 9-2PM March through October
 - Email gardener@etal.uri.edu



Invasive Plant Atlas of New England (IPANE)

<http://nbii-nin.ciesin.columbia.edu/ipane/>

National Invasive Species Council

www.invasivespeciesinfo.gov

New England Wildflower Society

www.newfs.org

North American Native Plant Society

www.nanps.org

Rhode Island Natural History Survey

www.rinhs.org

Rhode Island Wild Plant Society

www.riwps.org

Composting Toilets

A great way to address
septic system concerns!



Robin Weber
Natural Resources/GIS Specialist
Narragansett Bay Research Reserve



Benefits of Composting Toilets

- Utilize less water than conventional toilets
- Allow for reduced septic system installation / replacement design flow

Basic Definitions

- Wastewater

Total water discharges within the household including (but not limited to): Bathroom sinks, bathtubs, toilets, kitchen sinks, and laundry wash-water.

- Blackwater

Liquid and solid human body waste and the carriage waters generated through toilet discharge

- Graywater

Wastewater drained from sinks, tubs, showers, dishwashers, clothes washers, and other non-toilet sources

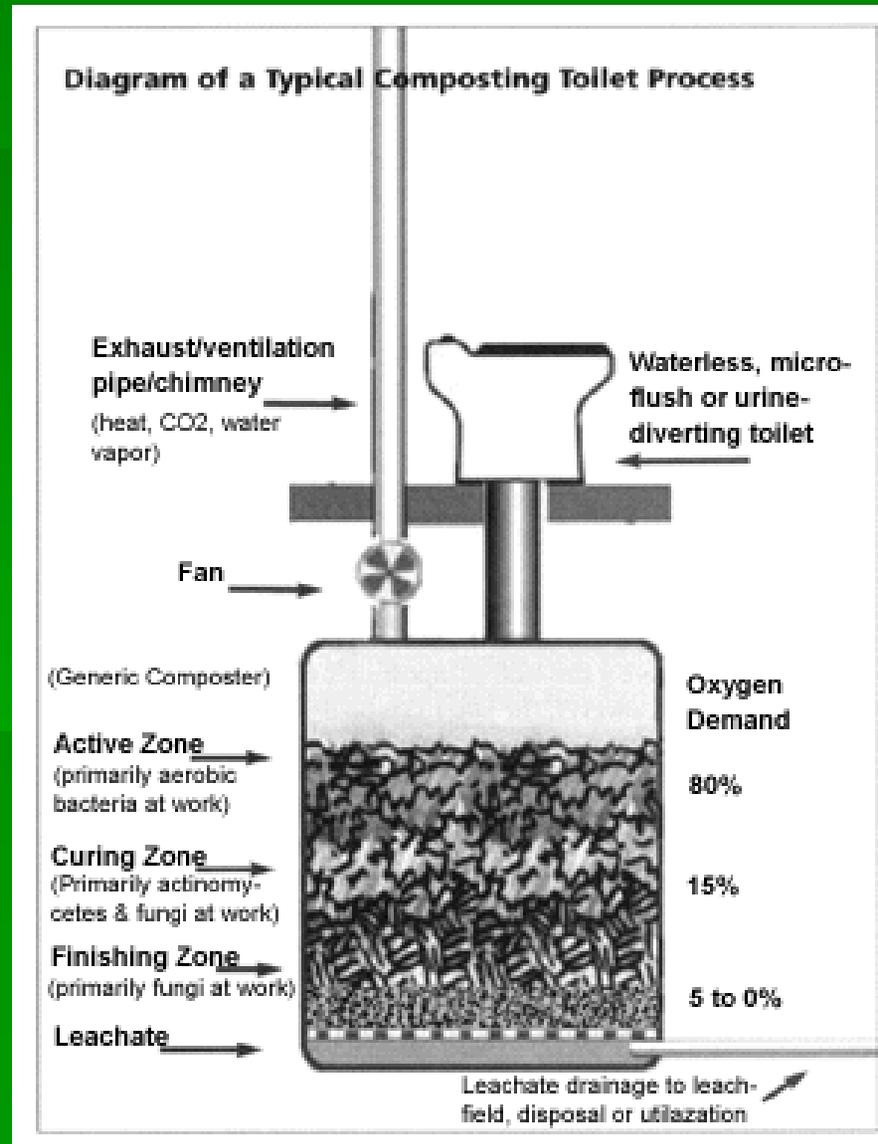
Composting

Biological decomposition of organic materials by microorganisms under controlled, aerobic, conditions to a relatively stable humus-like material called compost.

Optimal environmental conditions:

- Warm (75-100 °F)
- Moist (45-70% moisture content)
- Dark
- Aerated
- Proper balance of C:N

Anatomy of a Composting Toilet



Compost of Blackwater (Humanure) considerations

- Since pathogens (e.g. viruses, worms, amoebas, bacteria, and protozoa) can be carried in human wastes, composting toilets should either feature long retention times and/or high temperatures
- High temperatures in composting toilets, especially without supplemental heat, can be difficult to achieve
- Compost end-product must be buried or removed by a licensed septic waste hauler
- Graywater may also carry pathogens, requiring proper disposal

Compost Toilet

Any self-contained toilet from which no liquid or solid waste materials are regularly discharged and from which a humus-like end product is produced

Types:

- *Self-contained vs. Centralized (Remote)*
- *Single-chamber continuous vs. Multi-chamber batch*
- *Passive vs. Active*

Example: Waterless, Self-contained



Example: Waterless, Self-contained



Example: Waterless, Remote



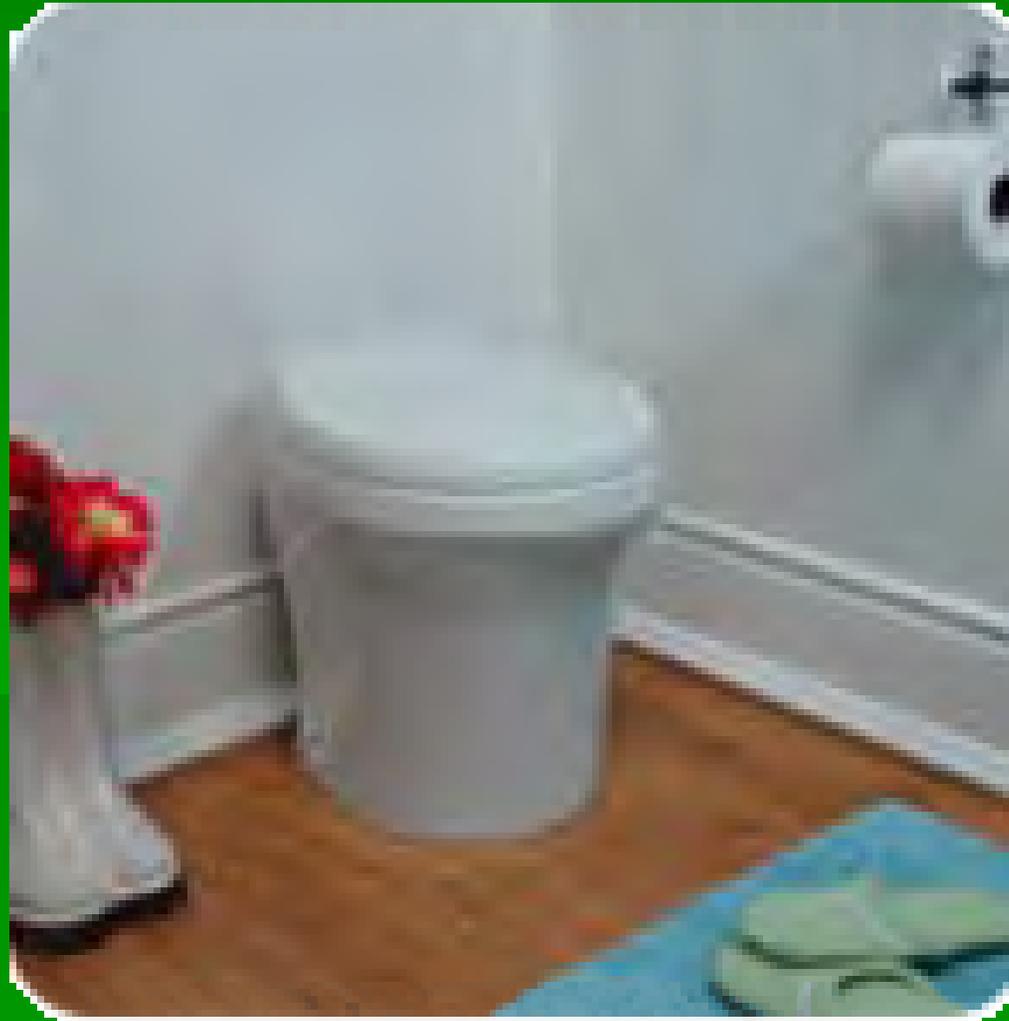
Example: Low-water, Remote



Example: Low-water, Remote



Example: Vacuum-flush, Remote



Example: Clivus Multrum compost tank



Example: Envirolet (Sancor) compost tank



Example: SunMar compost tank



End Product = Humanure



RIDEM Rules for Onsite Wastewater Treatment Systems (OWTS)

Alternative toilets include composting toilets that comply with the requirements of the National Sanitation Foundation Standard 41 “Non-Liquid Saturated Treatment Systems” and incinerator toilets

RIDEM Rules for Onsite Wastewater Treatment Systems (OWTS)

“When an alternative toilet is utilized, a separate OWTS shall be provided for the treatment of any graywater and designed on sixty percent (60%) of the normal daily design flow as determined by Rule 21.”

Thank You. And please...



...reduce, reuse, and recycle!