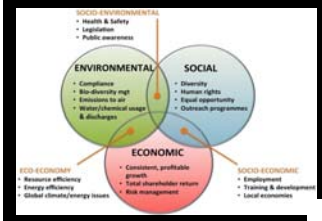
University of Nebraska Omaha

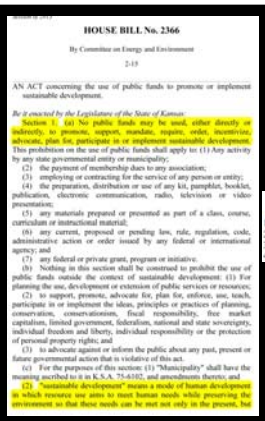
Overview

- Define sustainability/application to landscapes
  - General principles/applications
  - Drought
  - Stormwater
- Design with nature
  - Look
  - Feel
  - Function
- Local examples
- Questions

Sustainability

Sustainability – the triple bottom line





HOUSE BILL No. 2366

By Committee on Energy and Environment

2-15

AN ACT concerning the use of public funds to promote or implement sustainable development.

Be it enacted by the Legislature of the State of Kansas:

Section 1. (a) No public funds may be used, either directly or indirectly, to promote, support, mandate, require, order, incentivize, advocate, plan for, participate in or implement sustainable development. This prohibition on the use of public funds shall apply to: (1) Any activity by any state governmental entity or municipality;

(2) the payment of membership dues to any association;

(3) employing or contracting for the service of any person or entity;

(4) the preparation, distribution or use of any kit, pamphlet, booklet, publication, electronic communication, radio, television or video presentation;

(5) any materials prepared or presented as part of a class, course, curriculum or instructional material;

(6) any current, proposed or pending law, rule, regulation, code, administrative action or order issued by any federal or international agency; and

(7) any federal or private grant, program or initiative.

(b) Nothing in this section shall be construed to prohibit the use of public funds outside the context of sustainable development: (1) For planning the use, development or extension of public services or resources;

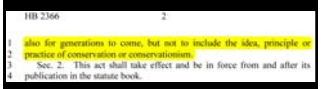
(2) to support, promote, advocate for, plan for, enforce, use, teach, participate in or implement the ideas, principles or practices of planning, conservation, conservationism, fiscal responsibility, free market capitalism, limited government, federalism, national and state sovereignty, individual freedom and liberty, individual responsibility or the protection of personal property rights; and

(3) to advocate against or inform the public about any past, present or future governmental action that is violative of this act.

(c) For the purposes of this section: (1) "Municipality" shall have the meaning ascribed to it in K.S.A. 75-6102, and amendments thereto; and

(2) "sustainable development" means a mode of human development in which resource use aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but

Prohibit sustainable development?

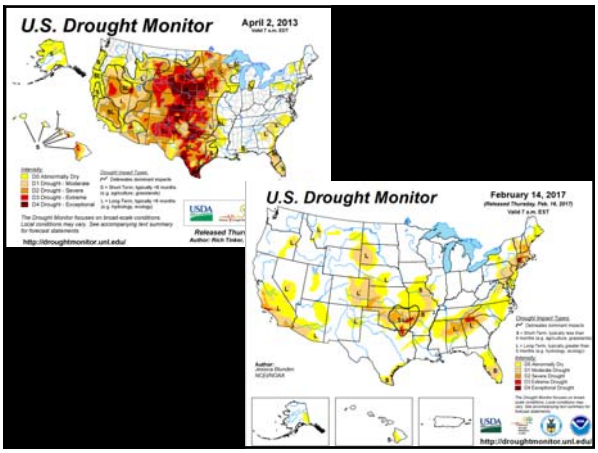


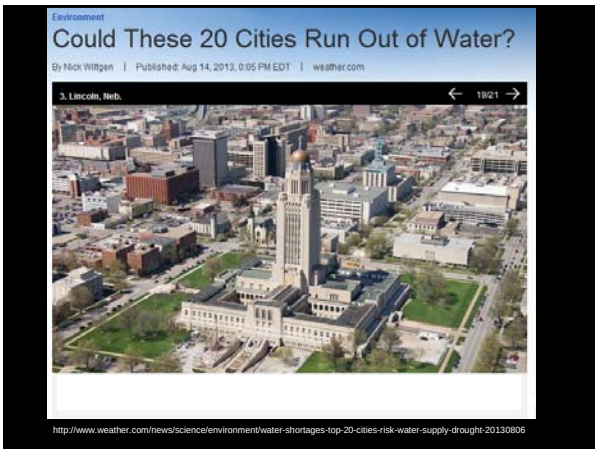
HB 2366 2

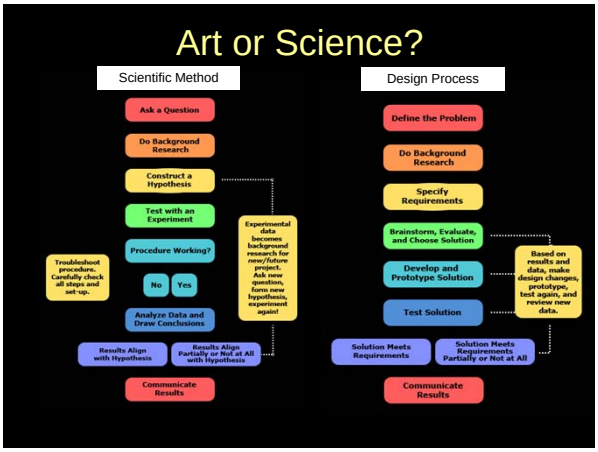
also for generations to come, but not to include the idea, principle or practice of conservation or conservationism.

Sec. 2. This act shall take effect and be in force from and after its publication in the statute book.

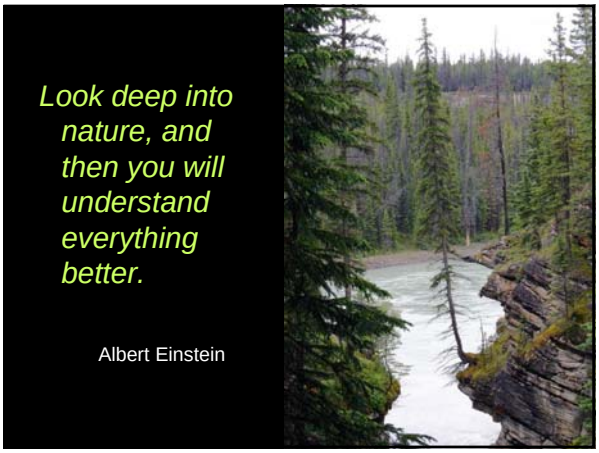
Missouri River Summer, 2011

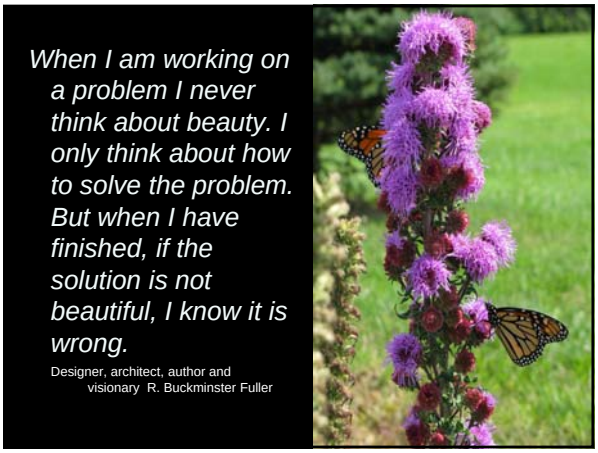

U.S. Drought Monitor
April 2, 2013
U.S. Drought Monitor
February 14, 2017
http://droughtmonitor.unl.edu/


Environment
Could These 20 Cities Run Out of Water?
By Nick Wiltgen | Published: Aug 14, 2013, 0:05 PM EDT | weather.com
3. Lincoln, Neb.
19/21
http://www.weather.com/news/science/environment/water-shortages-top-20-cities-risk-water-supply-drought-20130806


Art or Science?
Scientific Method
Ask a Question
Do Background Research
Construct a Hypothesis
Test with an Experiment
Procedure Working?
No
Yes
Troubleshoot procedure. Carefully check all steps and set-up.
Analyze Data and Draw Conclusions
Experimental data becomes background research for new/future project. Ask new question, form new hypothesis, experiment again!
Results Align with Hypothesis
Results Align Partially or Not at All with Hypothesis
Communicate Results
Design Process
Define the Problem
Do Background Research
Specify Requirements
Brainstorm, Evaluate, and Choose Solution
Develop and Prototype Solution
Test Solution
Based on results and data, make design changes, prototype, test again, and review new data.
Solution Meets Requirements
Solution Meets Requirements Partially or Not at All
Communicate Results

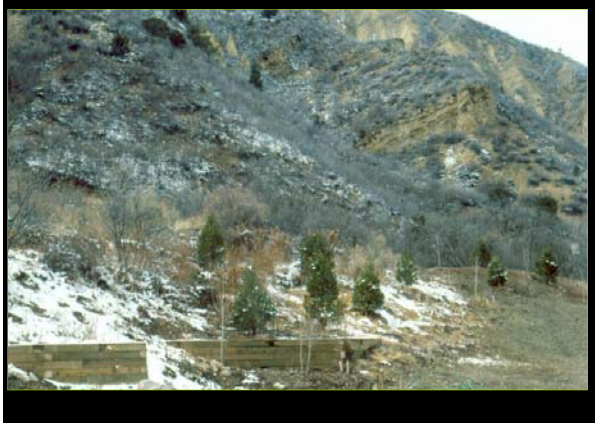

Sustainable Landscape Context


Look deep into nature, and then you will understand everything better.
Albert Einstein

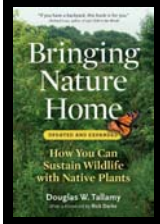

When I am working on a problem I never think about beauty. I only think about how to solve the problem. But when I have finished, if the solution is not beautiful, I know it is wrong.
Designer, architect, author and visionary R. Buckminster Fuller

Landscapes Designed by "Nature"

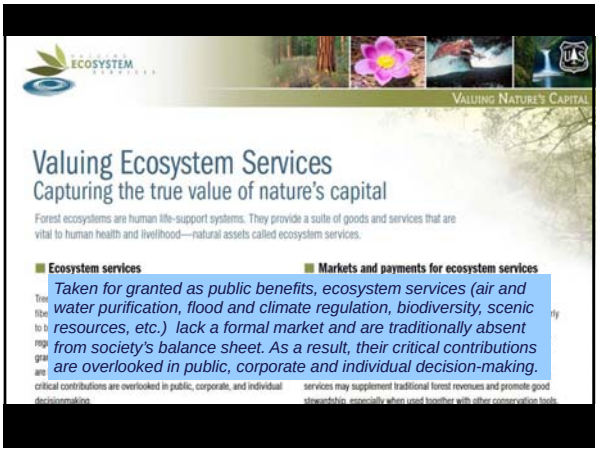
- Combinations of plants in communities
- Diverse selection of plant materials
- Mix of fast growth/slow growth
- Plant layering -- forests as well as prairies
- Landscapes are never completed
- Many subtle characteristics
- Mulch used extensively
- Minimized plant stress--correct plant placement



Sustainability:
Habitat Value and Ecosystem Services





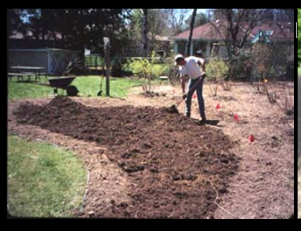


Sustainability: Vegetation Management

- Avoid turfgrass growing right up to a waters edge
- Plant riparian buffers

Sustainability: Soil Management

- Conserve/ keep topsoil
- Amend soils - incorporate organic matter
- Prevent/relieve compaction



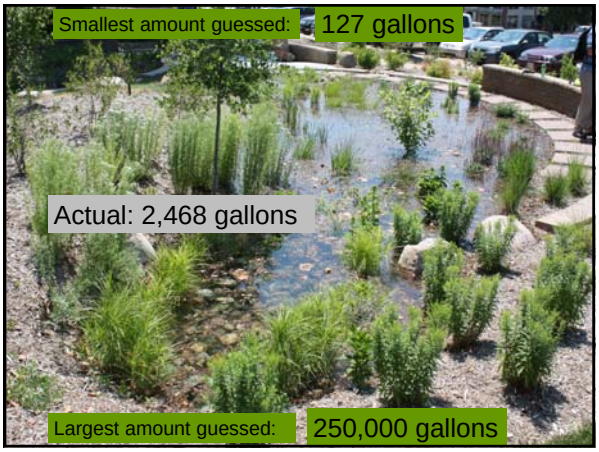

Sustainability: Irrigation

…"the fewer the heads, the less the system costs…." (on the day it was put in, anyway…..)

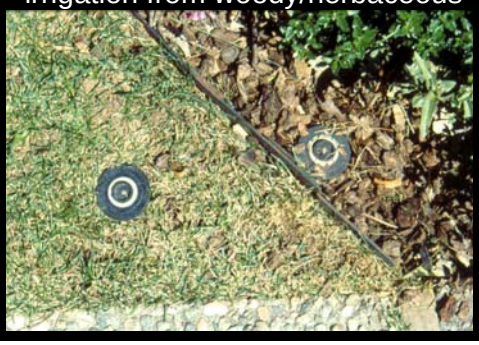
An American family of four can use 400 gallons of water per day, and about 30 percent of that is devoted to outdoor uses. More than half of that outdoor water is used for watering lawns and gardens. Nationwide, landscape irrigation is estimated to account for almost one-third of all residential water use, totaling more than 7 billion gallons per day.

Some experts estimate that more than 50 percent of irrigation water is wasted.

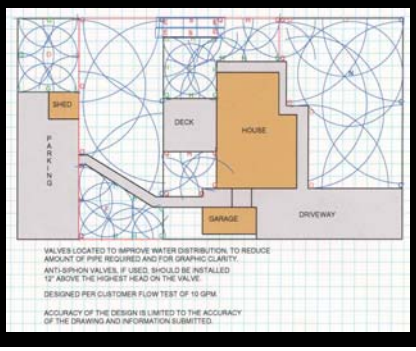
http://www.epa.gov/WaterSense/pubs/outdoor.html

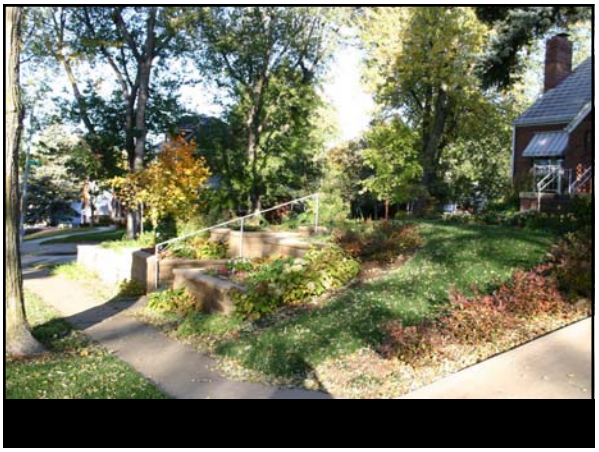


Whenever possible, separate turf irrigation from woody/herbaceous



Irrigation design should create overlaps to minimize dry areas and maximize watering efficiency

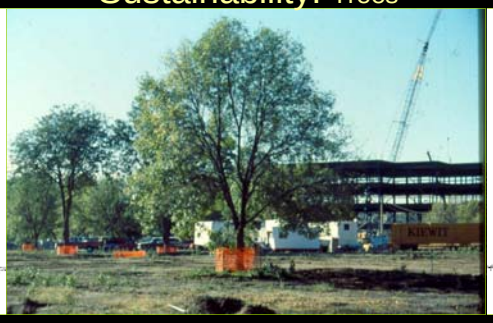


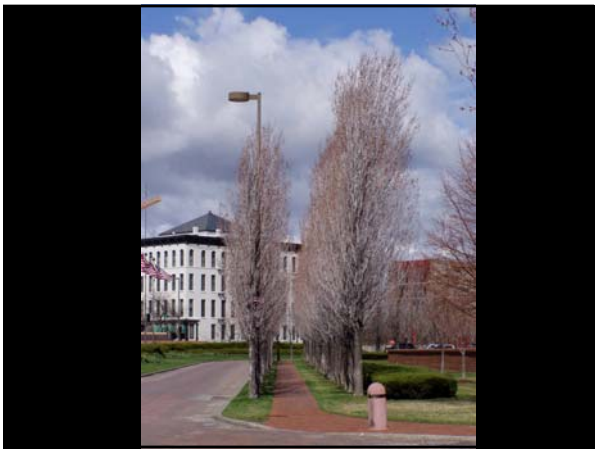


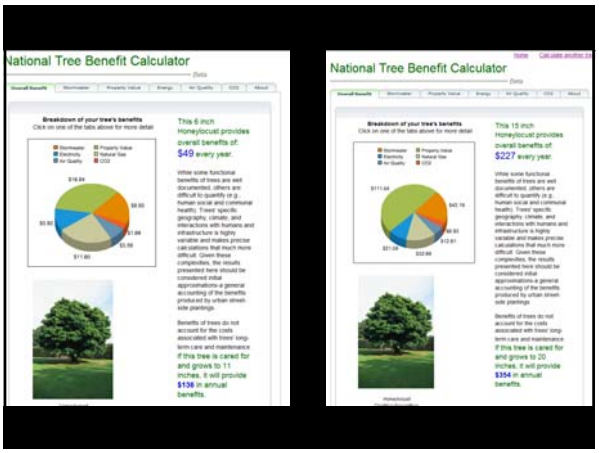
Sustainability: Xeriscape ?

- Xeriscape coined by Denver Water Board in 1981
  - About 1,820,000 hits (Google 2/23/17)
- Xeroscape? Or Zeroscape?

Sustainability: Trees

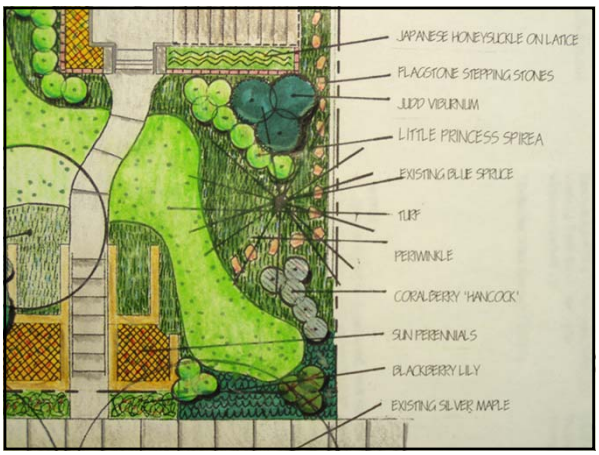


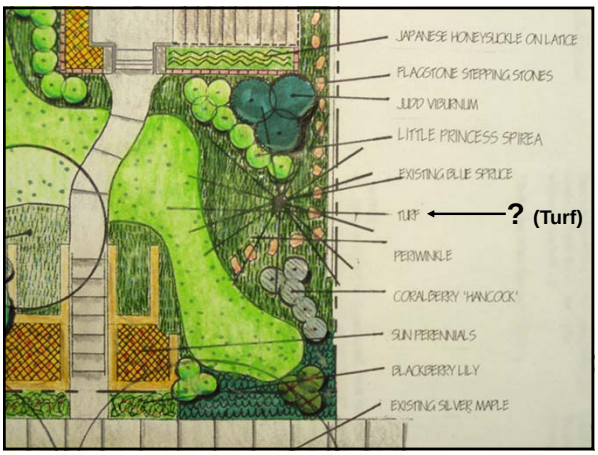




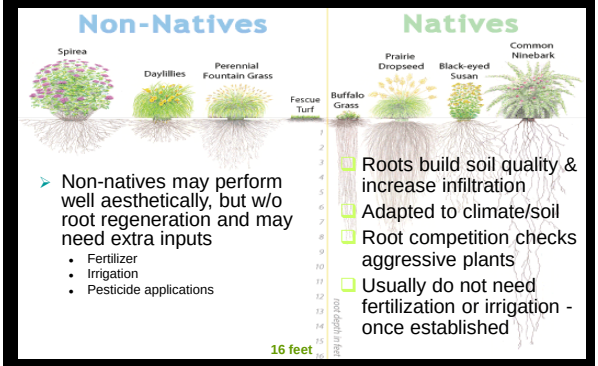
Sustainability: Pick Your Battles

Before investing in irrigation, consider alternatives to "high water use" turf and other landscape plants





Native and Deep Rooted



- Non-natives may perform well aesthetically, but w/o root regeneration and may need extra inputs
  - Fertilizer
  - Irrigation
  - Pesticide applications

- Roots build soil quality & increase infiltration
- Adapted to climate/soil
- Root competition checks aggressive plants
- Usually do not need fertilization or irrigation - once established

Adapted is also OK

- **NEWANIP***
  - Native *[AND]*
  - Ecologically well-adapted
  - Non-invasive
  - Plants

*from City of Omaha Environmental Element

Look Like Nature…..
but not too much…..

- **Critical to understand client and public biases and expectation for natural landscape character**
- "Well-behaved" nature
  - physically possible?
  - potentially high maintenance and inputs
- "Natural nature" – no maintenance not an option

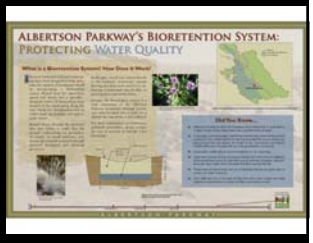

Omaha World-Herald

SEARCHING FOR NEW HOMES? LET'S START! CBSHOME

UNO professor ditches his lawn, builds smarter yard with home-grown species

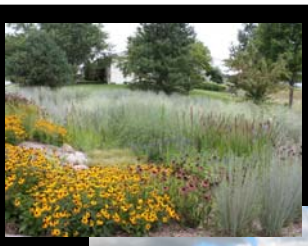
Intelligent Care

- Interpretive signage and labeling
- Provides context
- Educational value



Vivid Care

- Massing creates structure and framework
- Defined edges reflect care; also lessen maintenance



Drought and Landscape Sustainability

Drought - Lawns

- One inch of water required/week for turf-type fescue and Kentucky bluegrass under 90 F degrees; one and one-half inches between 90-100 F degrees
- Sharp mower blade; increase height
- Mulch the lawn with clippings
- Turf dormancy (buffalograss and bluegrass)

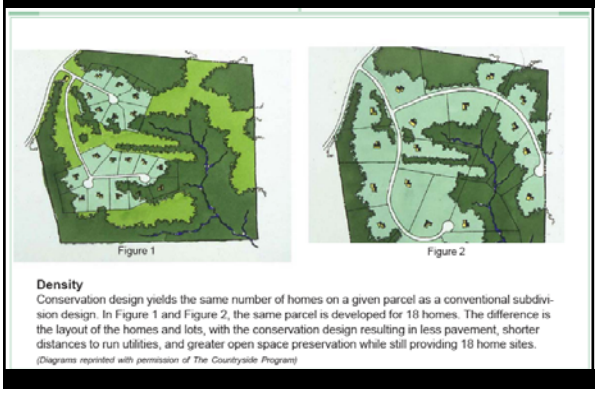
Drought – Trees/Shrubs/Herbaceous

- Susceptibility to insect pests and diseases
- A drought-stressed tree may take 3-5 years to recover full vigor
- Place water in root zone, and water infrequently
- Mulch with a 3-4 inch layer and replenish when required
- Initial establishment = supplemental irrigation

Stormwater and Landscape Sustainability

Low Impact Development (LID)

is an innovative stormwater management approach …modeled after nature: manage rainfall at the source using uniformly distributed decentralized micro-scale controls. LID's goal is to mimic a site's predevelopment hydrology.



*The EPA defines a storm water **Best Management Practice** as a "technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of storm water runoff in the most cost-effective manner."*

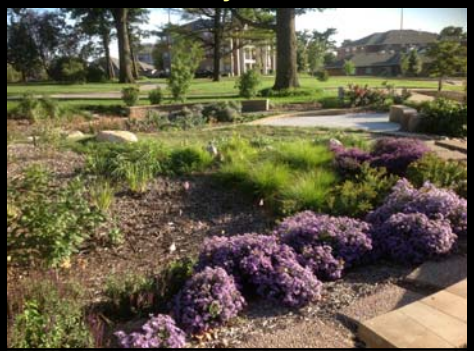
Rain Gardens

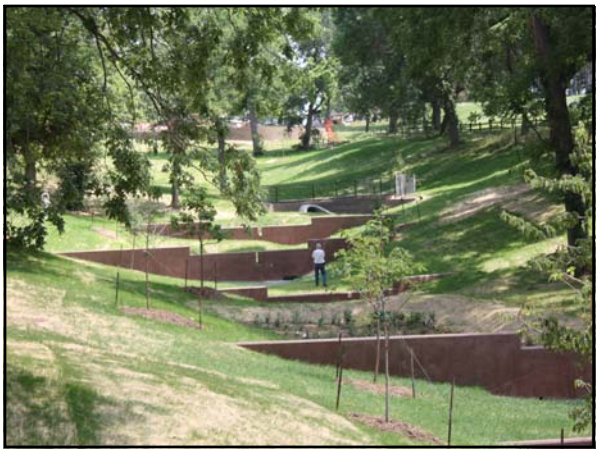
Rain Barrels and Cisterns

Direct Roof Water into Cisterns

- 1500 gallon cistern, underground
- Water reused to drip irrigate landscape

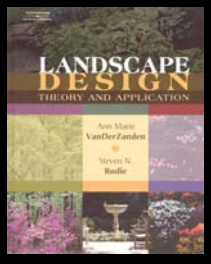
Local and Regional Case Study Projects



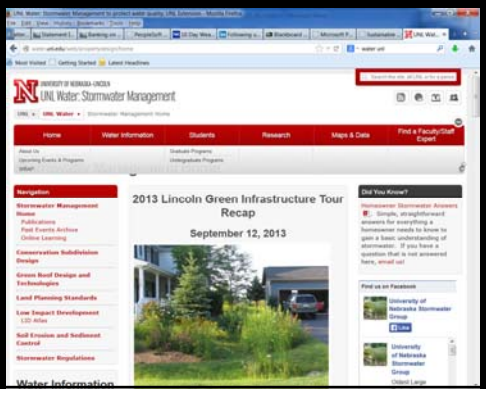


http://youtu.be/HfzVv7BNyjk

Additional Resources



//water.unl.edu



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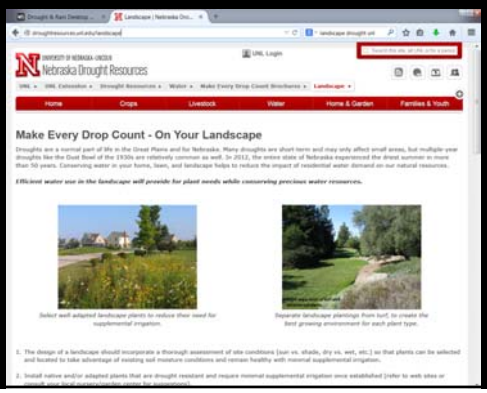
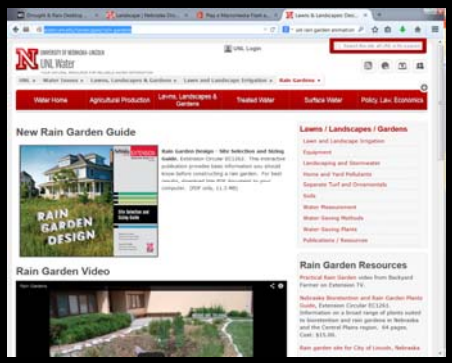


Rain Garden Information



http://water.unl.edu/landscapes/rain-gardens


Questions?