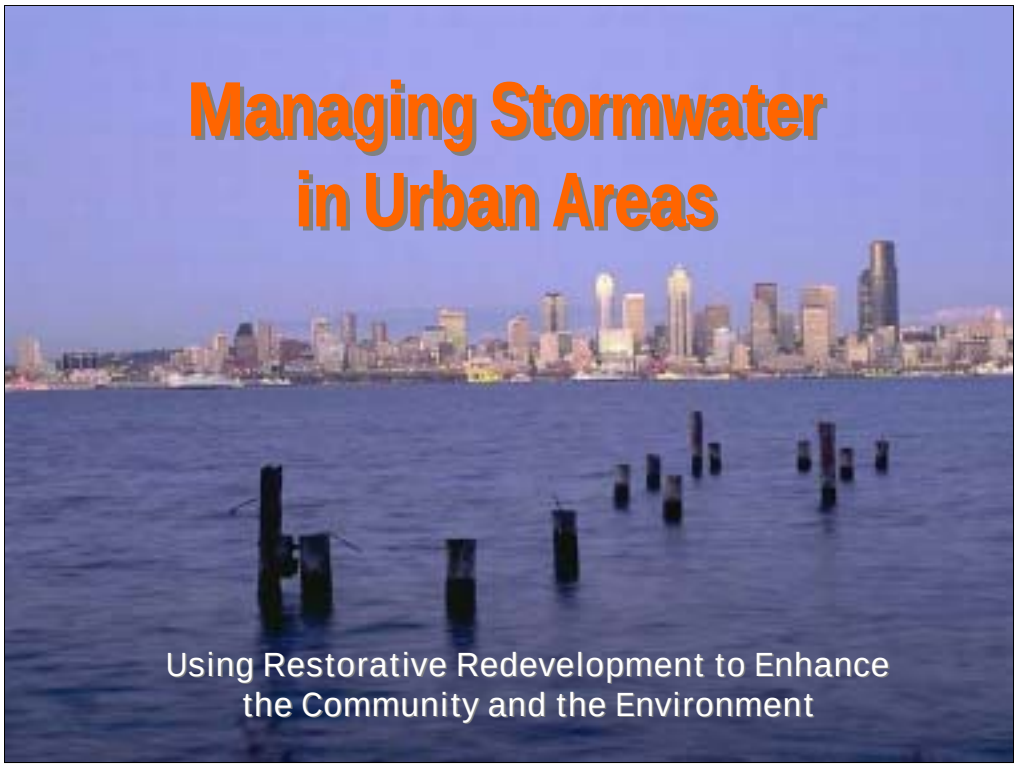


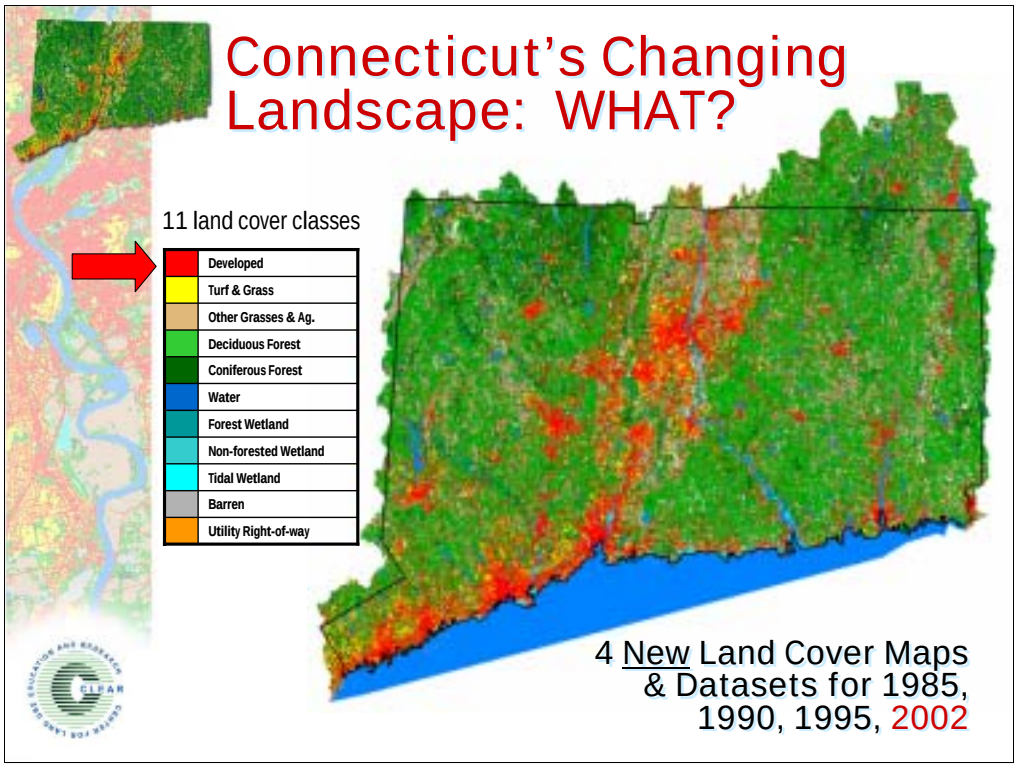
Managing Stormwater in Urban Areas, aka "Urban NEMO", is a new educational presentation that focuses on opportunities and techniques for reducing runoff in urban environments. The project, which was partially funded by EPA New England, was developed in partnership with EPA smart growth officials who were concerned that NEMO's message was focused primarily on new growth and suburban examples.

Accordingly, Urban NEMO espouses many of the same runoff management techniques as the Reducing Runoff presentation, but uses examples from cities around the country, and has a section on the relationship of water resource protection to smart growth principles like redevelopment and infill. The subtitle, "Using Restorative Redevelopment to Enhance the Community and the Environment," pretty much tells the story. The organization of the presentation owes much to Reducing Runoff, but also to the work of Dr. Bruce Ferguson of the University of Georgia, a landscape architect who is a leading proponent of infiltration of stormwater. Connecticut NEMO was greatly assisted by the Northland (Minnesota) NEMO program in the production of this module.

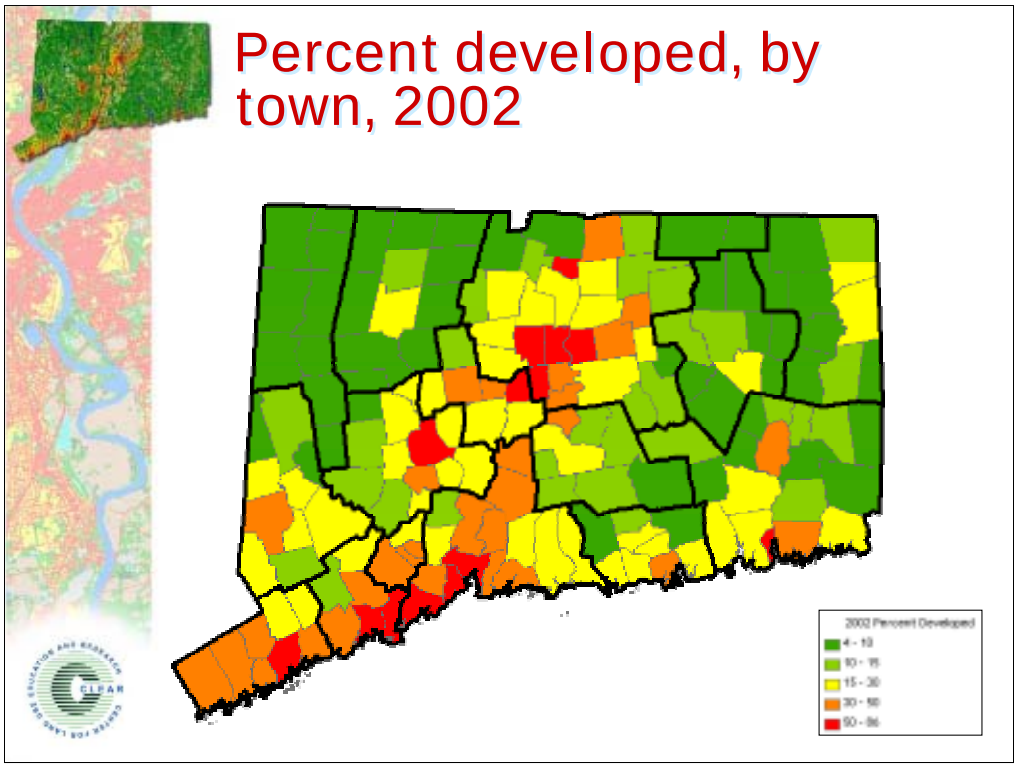
Tonight's Agenda

1. The importance of resource-based planning
2. Connecticut's changing landscape
3. Urban landscapes and their impacts on water
4. Strategies for reducing the urban impacts on water resources
5. How to get started in restoring urban environments

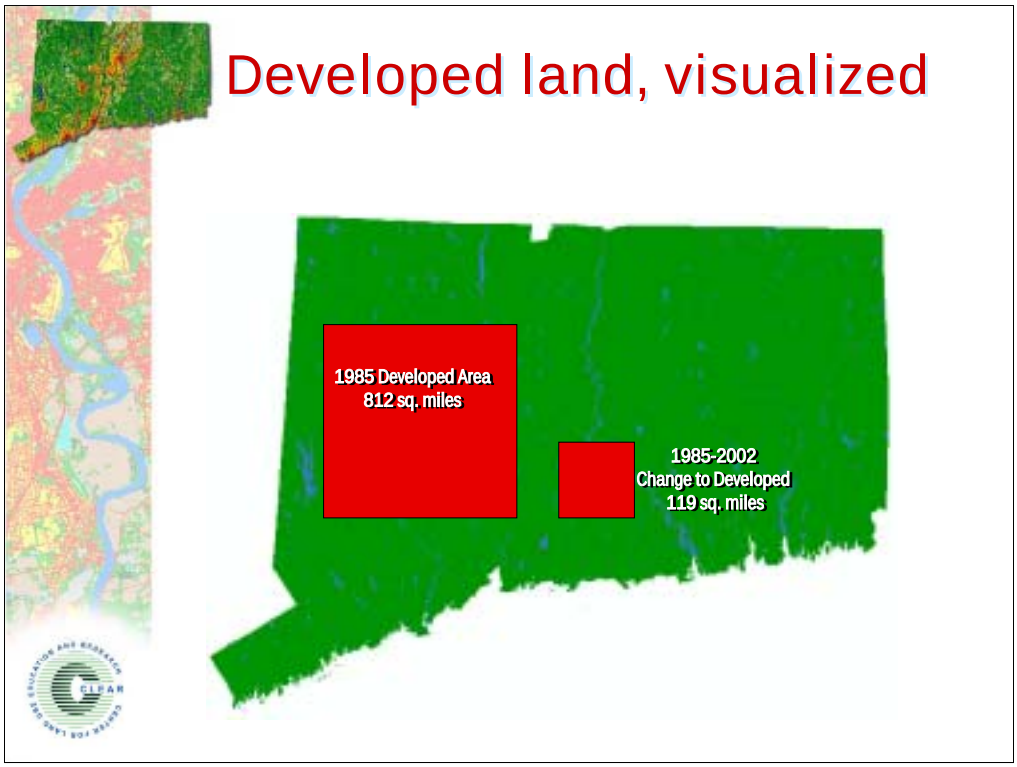
Major topics of the presentation.



We use the latest land cover and land cover change data from our "Connecticut's Changing Landscape" study, which charted land cover change over 17 years and four dates: 1985, 1990, 1995, 2002, with an emphasis on the growth of urban land.



2002 land cover data on percent "developed," averaged by town.



Visual way of depicting the 119 square miles of increased developed land added since 1985.

Impacts of Current Development Patterns

- Economic Impacts
- Social Impacts
- Environmental Impacts
  - Increased stormwater runoff & degraded water quality
  - Loss of wildlife habitat and wildlife
  - Loss of working landscapes (forest & farm)
  - Poor air quality
  - Contributes to climate change

Part of the Smart Growth section, and lead in to the emphasis of the rest of the presentation on stormwater runoff.

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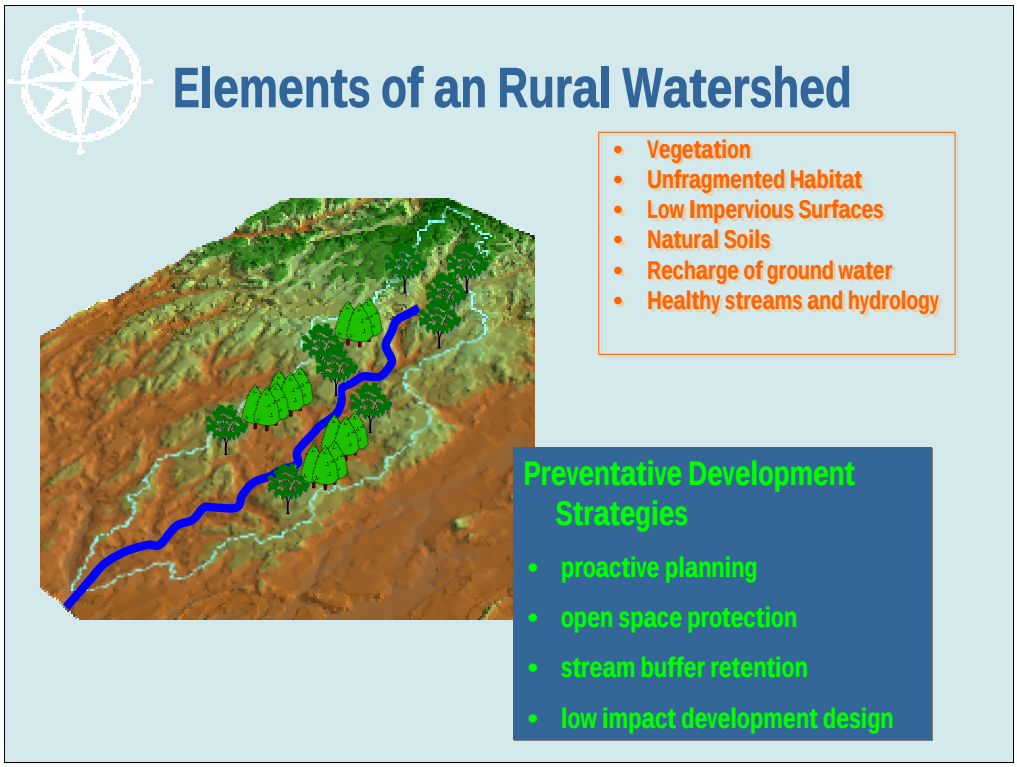
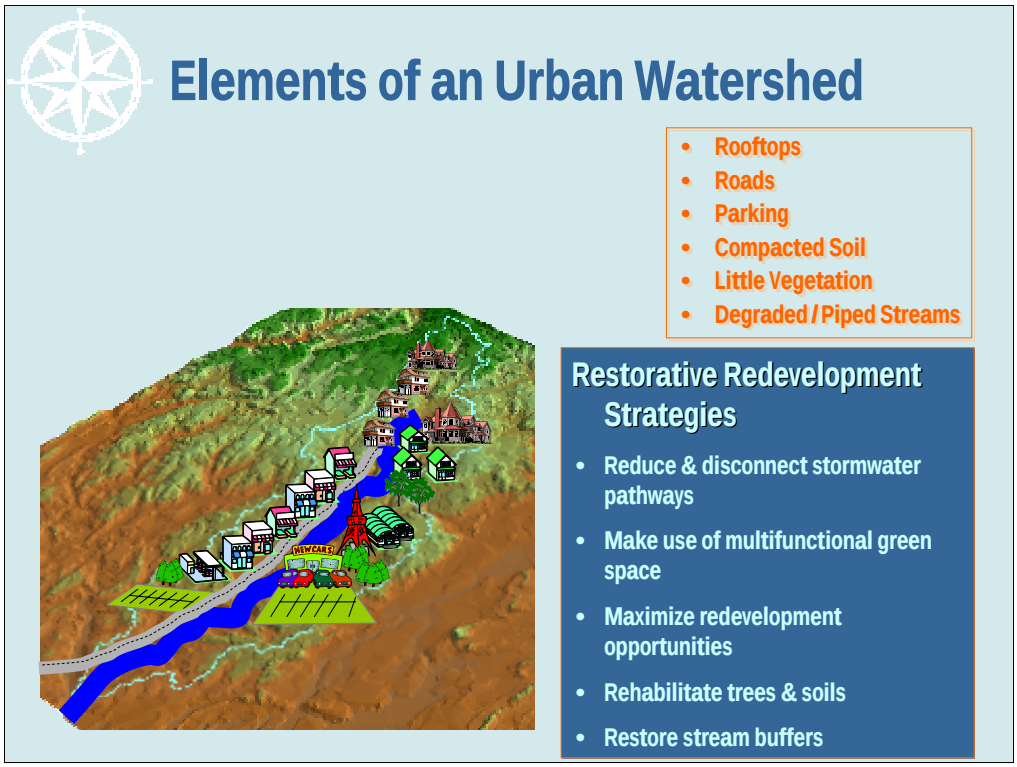
5. How to get started in restoring urban environments

Chapter 4: At long last, some recommendations!

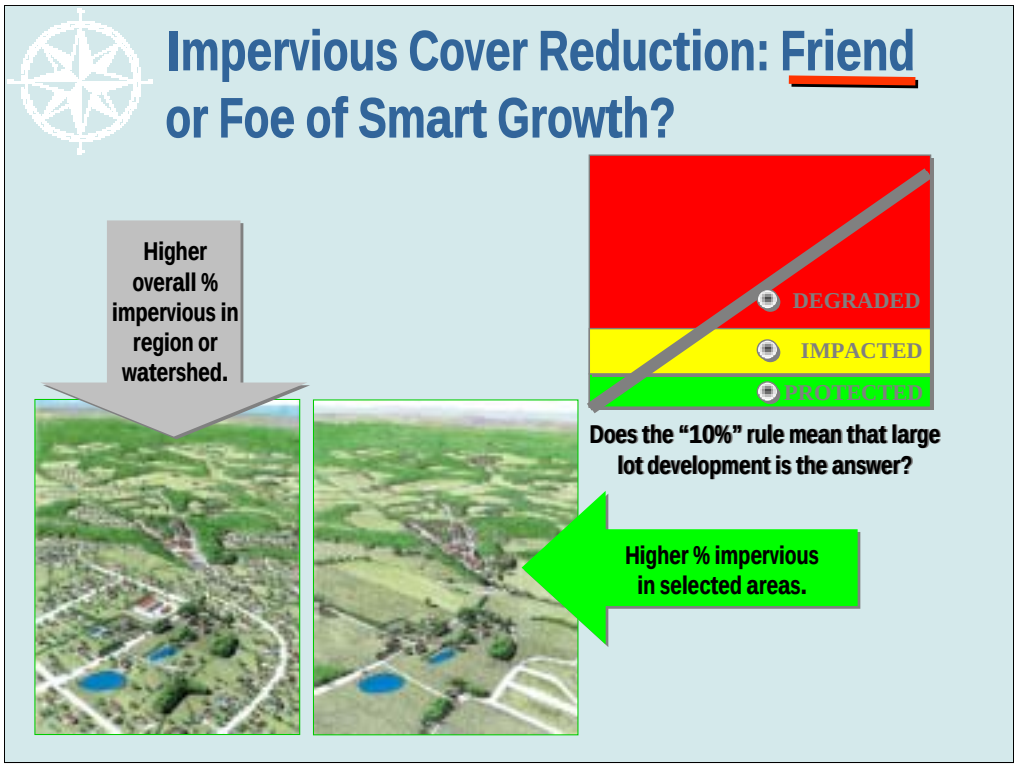


Water resource protection approaches will differ in emphasis depending on whether your town / watershed is largely undeveloped or largely developed. For rural watersheds, preventative strategies are the key.



However, for urban watersheds and towns, restorative strategies must be emphasized. These 5 major strategies will be the focus of the next 15 minutes of this talk. They are a "fusion" of typical NEMO approaches, with other considerations borrowed from Bruce Ferguson, a professor of Landscape Architecture at the University of Georgia. The term "Restorative Redevelopment" is from a paper he wrote.

Obviously redevelopment and infill are very high on the smart growth list. How do these objectives jive with NEMO's emphasis on stormwater-friendly strategies? Our feeling is that they are very compatible, as long as every consideration for "green" development and redevelopment practices are made during the creation of smart growth policies.

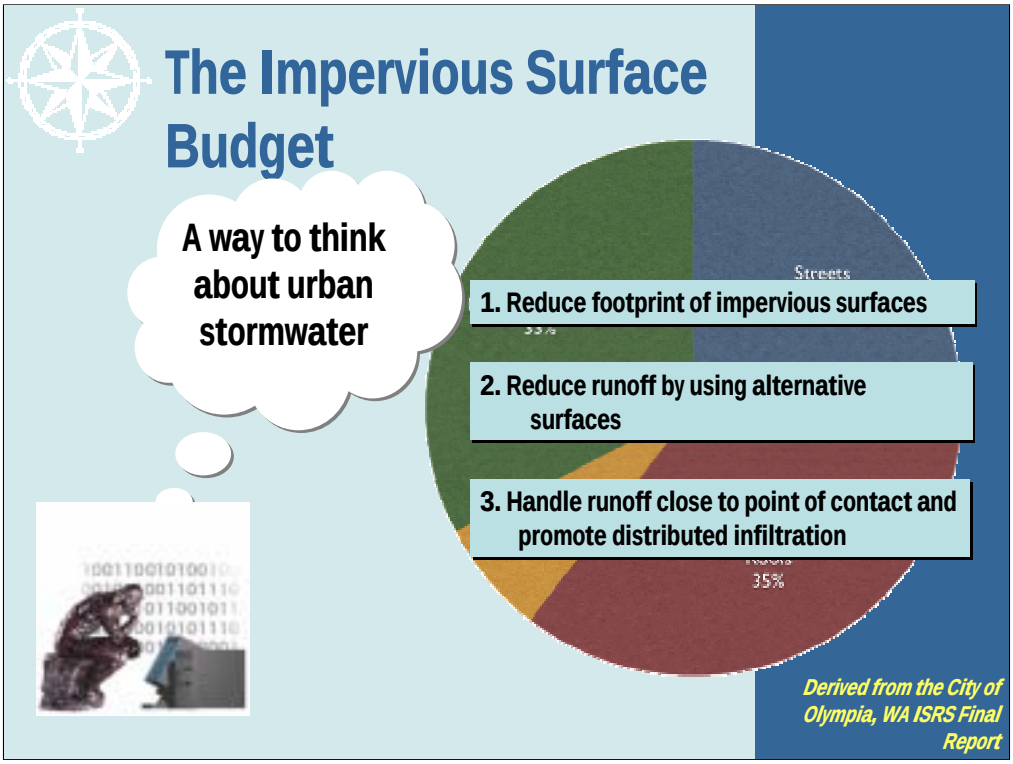


There is some unease in the Smart Growth circles that an emphasis on reducing impervious surfaces, particularly on the "10% rule," may create an argument for large lot zoning, the antithesis of smart growth. This is possible, yet the only if data and arguments about i.s. are taken out of context, and out of the proper scale. When looking at a sizeable region like a town or watershed, compact growth creates fewer roads and driveways, reducing the overall amount of impervious surfaces, and also allowing for the placement of these urban nodes in areas that may have less impact on water resources. Infill and redevelopment DO tend to create higher i.s. levels in the immediate area, which is why special care should be taken on restorative redevelopment techniques, the focus of the rest of this talk.

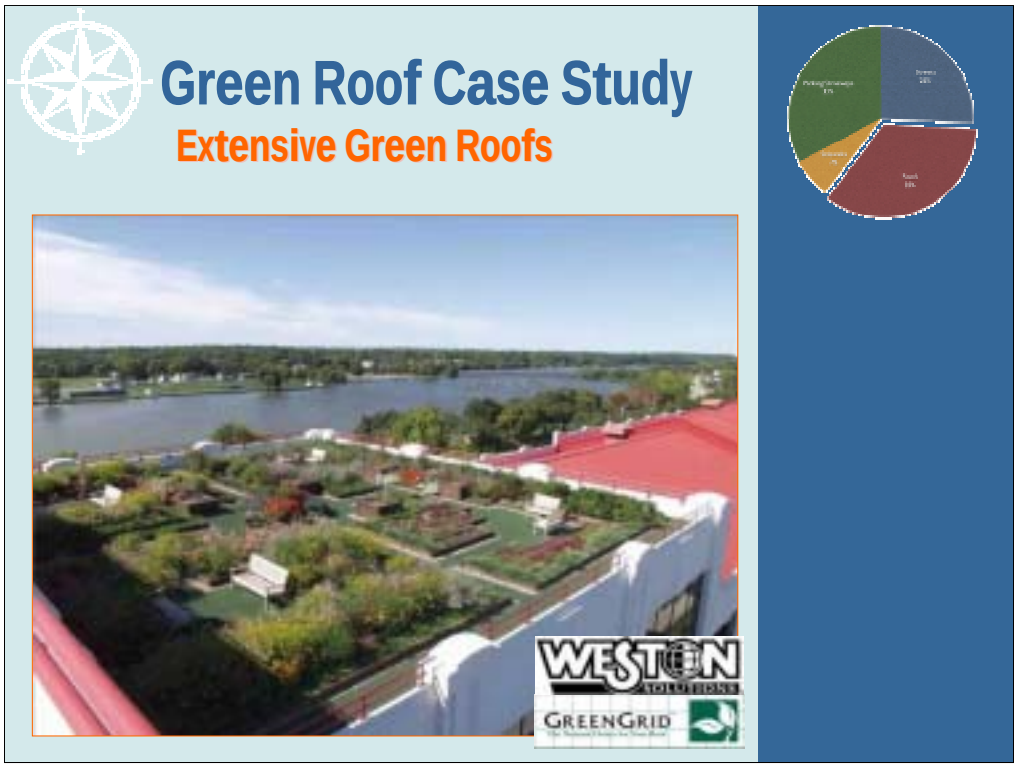
Restorative Redevelopment Strategies

- Reduce & disconnect stormwater pathways
- Emphasize multifunctional green space
- Maximize redevelopment opportunities
- Rehabilitate trees & soils
- Restore stream buffers

Here are the five major restorative redevelopment strategies for urban areas. Now we'll take each one in turn…



NEMO finds that the most logical and convenient way to grasp this strategy is through using the impervious surface "budget" as a framework. This average distribution of impervious cover on an urban landscape is from a well-known study done in Olympia, Washington about a decade ago. For the purposes of this talk, we will focus on the largest 3 components of the i.s. pie: roofs, roads, and parking. For each type of impervious surface, it might help to think of 3 nesting "tiers" of consideration: (1) Reduce the runoff coming from i.s. by reducing the footprint of the impervious area. (2) Reduce runoff by using pervious alternatives instead of the traditional surface. (3) Since runoff will still occur, promote infiltration close to the point of contact and in a distributed fashion, rather than concentrating and collecting the runoff and dealing with it off-site.



We use urban examples to illustrate many of the same principles espoused in "Reducing Runoff." One example: extensive green roofs use lighter growing substrate and a wide variety of plants. This particular system is composed of 4'X2' grids that can be planted ahead of time and arranged in a variety of ways. They also can be put on roofs with a slope up to 30%.

Porous Asphalt Playground

Penn-Alexander K-8 Public School,
West Philadelphia, PA.

From: Cahill Associates

Porous pavements (asphalt, concrete, pavers) are often considered inappropriate for cold climates and urban areas, but there is an increasing group of examples where these alternatives work very nicely. Here's an example from Philly.

Multifunctional Green Spaces

Using parks and ball fields for stormwater management

Strategies

1. Reduce & disconnect stormwater pathways
2. Multifunctional green space
3. Maximize redevelopment opportunities
4. Rehab trees & soils
5. Restore stream buffers

Hunter Park rehabilitation plan, Nine Mile Run model, PA

From Ferguson et al., Stormwater magazine July 2001

Hey, #1 was the big one but we're finally (at slide #84) moving on to Restorative Redevelopment Strategy #2: Multifunctional green space. Our slides on pervious alternatives in the previous section gave you an idea of what types of vegetated areas can be built to accept stormwater. Here's a more holistic example, taken from a charette detailed in a 2001 article by Bruce Ferguson of Univ. of Geogria in *Stormwater* magazine. This is from an urban area near Pittsburgh, PA. It shows that in addition to more conventional bioretention areas, things like ball parks and even public squares (in this case a sunken plaza) can be designed to help handle urban runoff during storm events.

Urban trees as stormwater sponges

Trees absorb about 5 gallons plus 5 gallons per inch in diameter (caliper inch) every week.

Trees soak up an incredible amount of water. It varies with climate and species, but also with size of the tree. Remember, just as with parking islands the trees need to have access to the stormwater, not have it channeled away.

It's not an easy job but expertise, materials and methods exist to reclaim urban streams. Of course, if nothing is done to reduce the runoff that is overwhelming these streams, it can be a losing effort to restore them. We need to shore more urban examples here – surprising how hard these are to find!!

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Wrapping up: a few points on process.

Restorative Redevelopment

1. It is still a PLANNING issue!
2. Make use of nature's restorative power
3. Cooperate among disciplines / departments
4. Educate and engage the community

Planning is not only applicable to areas that have yet to be developed. Planning is still the first and best tool to protect against the environmental impacts of development. If anything, creative redevelopment and infill takes more planning, not less.

Contact Information

- For more information on this presentation or permission to use the entire presentation, contact the CT NEMO Program:

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