Plant-based Research & Application in the Northwest

constructed wetlands

PROJECT	Arcata Marsh and Wildlife Sanctuary
START/ COMPLETION	Pilot projects started in 1979. Construction on the marsh was completed in 1986.
LOCATION	Arcata, Humboldt County, California
OWNER/ AGENCY	City of Arcata

DESCRIPTION 100 acre constructed wetland that serves as secondary and tertiary treatment for the city's wastewater. Secondary treatment utilizes oxidation via algae and bacteria. A visitors' center and nature trails provide information about the marsh and its wildlife inhabitants.

PERFORMANCE

The AMWF serves Arcata's population of 15,000 people and the marsh has become a widely recognized success story of effective wastewater treatment. The marsh has also been recognized for its value as habitat for over 200 species of birds.

LINKS:
EPA's website on constructed wetlands:
http://www.epa.gov/owow/wetlands/construc/arcata/11intro.html
City of Arcata:
http://www.arcatacityhall.org/arcata_marsh.html
History of the Arcata Marsh Project:
http://sorrel.humboldt.edu/~ere_dept/marsh/history.html

Plant-based Research & Application in the Northwest

SPROUT
SUSTAINABLE PLANT RESEARCH AND OUTREACH

constructed wetlands

PROJECT	Bureau of Environmental Services Water Pollution Control Laboratory
START/ COMPLETION	1995 1997
LOCATION	Portland Oregon
OWNER/ AGENCY	City of Portland, Bureau of Environmental Services

DESCRIPTION Integrated stormwater treatment ponds and swales filter stormwater from 50 acres of pervious and impervious surfaces. Planted with native and non-native species including oreogn Ash, Red Alder, Red Maple, Redtwig Dogwood, Douglas Spirea, Oregon Grape, and wetland perennials and grasses.

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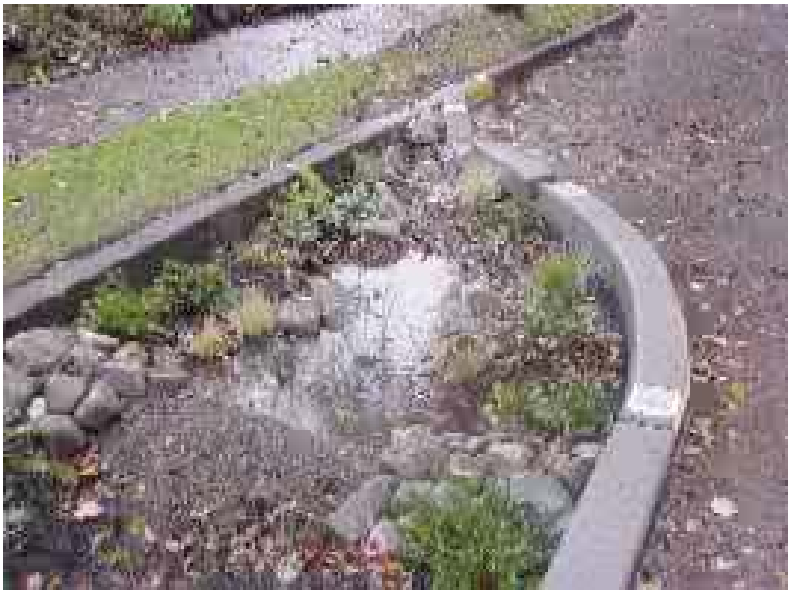
PERFORMANCE

Accurate information on performance is hampered by additional surface and sub-surface flows. P and N are occasionally high, possibly from neighboring residential areas.

LINKS: EPA's website on constructed wetlands:
http://www.epa.gov/owow/wetlands/construc/arcata/11intro.html
City of Portland, Bureau of Environmental Services
http://www.portlandonline.com/bes/

Plant-based Research & Application in the Northwest



PROJECT	Northeast Siskiyou Green Street
START/ COMPLETION	
LOCATION	NE 35th and Siskiyou Street, Portland, Oregon
AGENCY	City of Portland, Bureau of Environmental Services

DESCRIPTION Integrating stormwater capture and filtration in a street curb extension (traffic calming) project. Curb extensions are planted with native species. Stormwater flows into the planted areas, is slowed, allowing it to seep into the ground or be filtered by the plants before it enters the storm drain..

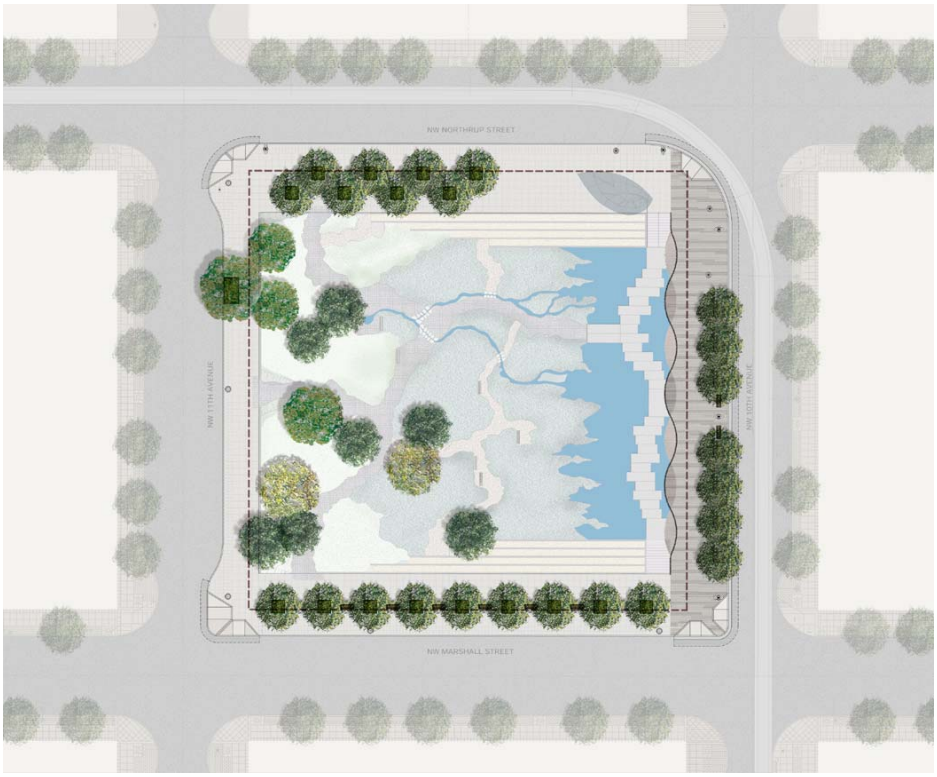
PERFORMANCE

tba

LINKS: Portland's Bureau of Environmental Services
www.portlandonline.com/bes/

stormwater management

Plant-based Research & Application in the Northwest



North Park Square, Portland Oregon

PROJECT START/ COMPLETION	North Park Square Design: 2003 Construction: 2004
LOCATION	NW 11th and Marshall Street, Portland, Oregon
AGENCY	Waterscapes, Inc.; Greenworks, PC (landscape architects) City of Portland

DESCRIPTION "Cleansing biotopes" in this urban park filter stormwater as it flows through each section of the park. A progression of plant communities from lawn (on the west side)to native and wetland emergent plants (on the east side) allows for heavy uses as well as more passive participation in the park. A shallow pond recirculates water captured during winter months and will be augmented with additional water during the summer months.

PERFORMANCE
tba

LINKS: www.

stormwater management

Plant-based Research & Application in the Northwest

Buckman Terrace Stormwater Swales, Portland Oregon

PROJECT START/ COMPLETION	Stormwater swales at Buckman Terrace Apartments 1997 1999
LOCATION	303 NE 16th St. Portland, Oregon
AGENCY	City of Portland, Bureau of Environmental Services Prendergast Associates, developer

DESCRIPTION Landscaped swales capture stormwater from roof drains. Swales are planted with sedges, miscanthus, spirea, Oregon grape, and Japanese iris. Swale is 300' long, 6' wide and 3" deep with rock check dams every 15'. The swale gradient is 2% for the first 200', then increases to 4%. All flows that exceed filtration capacity of the swale, are discharged the into a catchbasin. Pea gravel mulch slows the flow and allows for increased infiltration and settling of sediments.

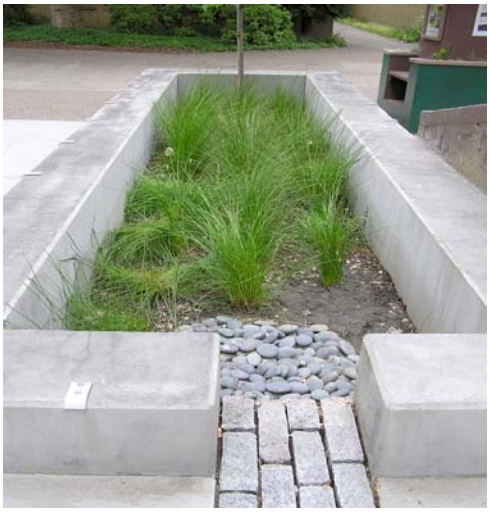
PERFORMANCE

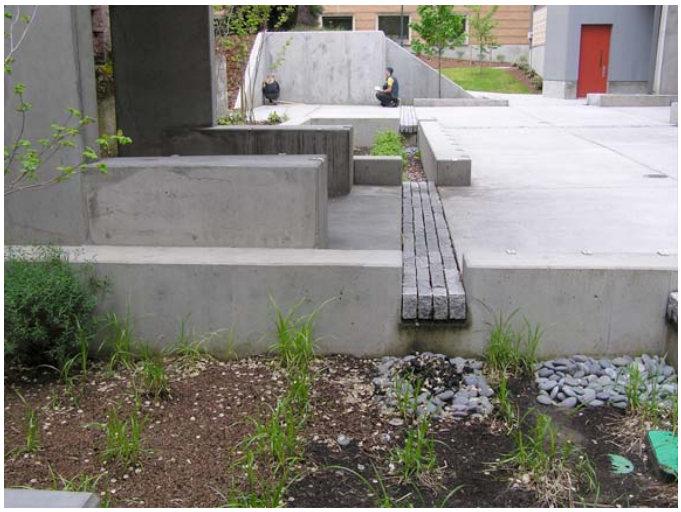
Most flows successfully infiltrated into the soil except in the steeper section where it entered the catch basin. Pea gravel is an effective mulch and has successfully protected the swale and assisted in filtering water flows. Construction quality is critical to the success of stormwater projects; some elements were incorrectly installed resulting in poor swale performance.

LINKS: Portland's Bureau of Environmental Services
www.portlandonline.com/bes/

stormwater management

Plant-based Research & Application in the Northwest





Eppler PSU, Portland Oregon

PROJECT Stormwater gardens at Eppler/Portland State University, Portland Oregon
START/ 1997
COMPLETION 1999
LOCATION
AGENCY City of Portland, Bureau of Environmental Services
Portland State University

DESCRIPTION Landscaped swales capture stormwater from roof drains. Swales are planted with sedges, miscanthus, spirea, Oregon grape, and Japanese iris. Swale is 300' long, 6' wide and 3" deep with rock check dams every 15'. The swale gradient is 2% for the first 200', then increases to 4%. All flows that exceed filtration capacity of the swale, are discharged the into a catchbasin. Pea gravel mulch slows the flow and allows for increased infiltration and settling of sediments.

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LINKS: Portland's Bureau of Environmental Services website
www.portlandonline.com/bes/

stormwater management

Plant-based Research & Application in the Northwest

SPROUT
SUSTAINABLE PLANT RESEARCH AND OUTREACH

carbon sequestration

PROJECT START/ COMPLETION	Arlecho Creek Watershed conservation easement 2002 Ongoing/100-year lifespan
LOCATION	Mt. Vernon, Washington
OWNER/ AGENCY	Lummi Indian Tribe The Climate Trust; Klamath Cogeneration Project
DESCRIPTION	1654 acres of northwest forest will be reforested, preserved through a conservation easement and used as a laboratory by Northwest Indian College of the Lummi Indian Tribe.
RESULTS	Anticipated to sequester 350,000 metric tons of CO_2 over the next century (equivalent to CO_2 of 50,000 cars traveling 15,000 miles.
LINKS	The Climate Trust www.climatetrust.org Lummi Indian Tribe www.lummi.nsn.org Northwest Indian College www.nwic.edu

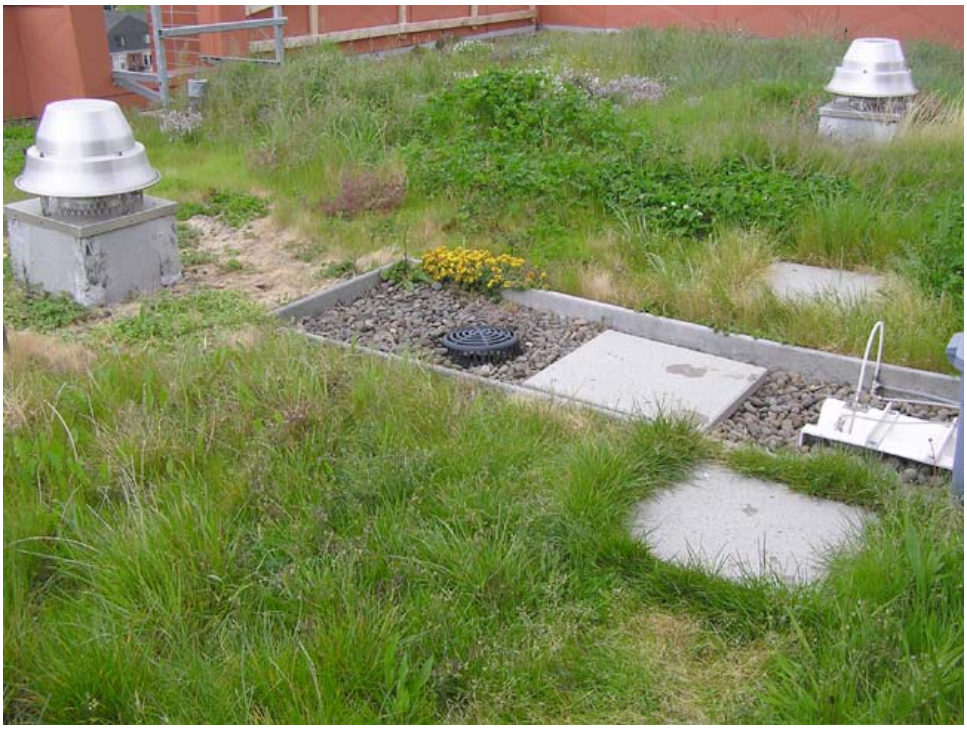
Plant-based Research & Application in the Northwest

SPROUT
SUSTAINABLE PLANT RESEARCH AND OUTREACH

carbon sequestration

PROJECT	Deschutes Riparian Reforestation and Carbon Offset Project
START/ COMPLETION	By 2008; 52-year duration
LOCATION	Deschutes River Basin, Oregon
OWNER	Private landowners
AGENCY	Deschutes Resource Conservancy; The Climate Trust; Klamath Cogeneration Project
DESCRIPTION	1500 to 1800 acres of riparian habitat along the Deschutes River will be restored with native vegetation. Financial incentives will be offered to private landowners in the Deschutes river Basin to encourage them to restore riparian areas on their property. Additional benefits include improved wildlife habitat, improved water quality and improved aesthetics.
RESULTS	Anticipated to sequester 233,333 metric tons of CO_2 over the next century (equivalent to removing 43 ,000 from the road for one year).
LINKS	The Climate Trust www.climatetrust.org Deschutes Resource Conservancy http://www.deschutesrc.org/

Plant-based Research & Application in the Northwest



Hamilton West Apartments Green Roof, Portland Oregon

PROJECT Hamilton West Apartments Green Roof, Portland Oregon

START/ COMPLETION 1999

LOCATION Portland Oregon

AGENCY Portland Bureau of Environmental Services
Housing Authority of Portland

DESCRIPTION Hamilton West Apartments is a ten-story mixed use building in downtown Portland. The roof is 8700 square feet of which 5100 sguare feetare planted in sedums, delosperma, sempervivum, native and non-native wildflowers. Two different substrate depths were used: 3" and 5". The roof ifs irrigated during the summer. Weeding is done once/year. Water quality, stormwater detention and attenuation are monitored.

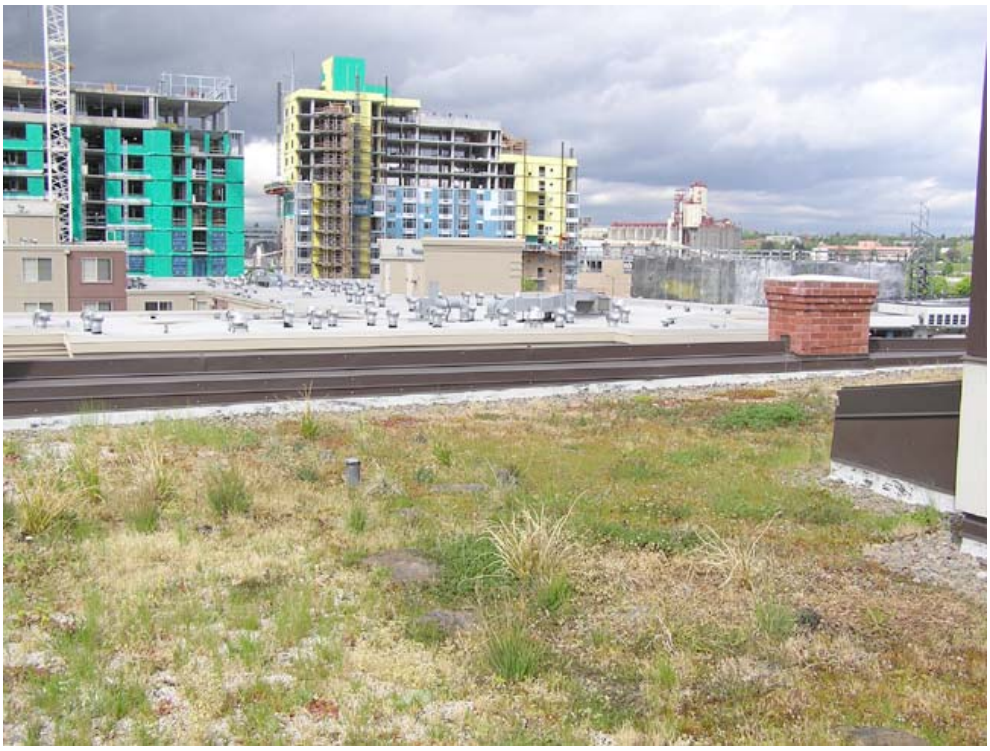
PERFORMANCE

100% retention for summer storm events; 53.5% over a 27-month period. Some grasses and weeds have established themselves on the roof.

LINKS: Portland's Ecoroof website
www.portlandonline.com/bes/

green roofs

Plant-based Research & Application in the Northwest



green roofs

PROJECT START/ COMPLETION	Ecotrust/Jean Vollum Natural Capital Center Green Roof 1999 2001
LOCATION	Portland, Oregon
OWNER/ AGENCY	Ecotrust City of Portland, Office of Sustainable Development

DESCRIPTION 6500 square foot green roof initially planted with grasses, sedums, and a wildflower mix. Substrate is 2" deep; slope is 2%. Supplemental irrigation during summer months. Overflow drains through downspouts to parking lot bioswales (See SPROUT Stormwater Cases).

PERFORMANCE

Poor performance of plant material.
Subsequent planting of wetland prairie species.

LINKS:

Portland's Ecoroof website
www.portlandonline.com/bes/
Ecotrust website
www.ecotrust.org

Plant-based Research & Application in the Northwest

green roofs

PROJECT	Native American Student and Community Center, PSU Green Roof
START/ COMPLETION	2003
LOCATION	710 SW Jackson Street, Portland, Oregon
OWNER/ AGENCY	Portland State University Native American Student and Community Center
DESCRIPTION	4000 square foot green roof planted with native evergreen and deciduous shrubs, sedum, bulbs, grasses, and perennials. Substrate is 6-30" deep. Automatic irrigation is installed. Overflow drains into city stormwater system after filtering.
PERFORMANCE	tba
LINKS:	Bureau of Environmental Services Ecoroof website www.portlandonline.com/bes/ Native American Students Center, Portland State University www.nativecenter.pdx.edu/index.htm