

Stormwater as Resource, Workshop Tool-Kit

Summary.

Introduction

State purpose: This workshop is part of a larger effort to change public awareness of stormwater and to encourage people to use stormwater as a valuable resource.

Part I: Water

- describe runoff in Chicago, general background
- describe atypical runoff from urban agricultural sites in Chicago
- quantify runoff from agricultural sites in Chicago (sample calculations)
- calculate catchment requirements (sample calculations)

Part II: Soils

- identify the high variability and high unpredictability of Chicago soils
- develop working definitions of “safe” and “unsafe” levels of soil contaminants
- develop criterion for land use (immediate cropping, near-future cropping, other)

Part III: Management of Soils and Stormwater in Catchment Zones

- describe techniques for remediation and use of contaminated soils
- fit remediation techniques to particular sites
- identify environmental value of stormwater catchment *without* soil remediation for cropping
- do an assessment exercise (using sample data, determine the best option for a particular site)
- present soil testing and plant tissue testing protocols for assessment, monitoring, and management

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Information Sources

Sources for Introduction

1. CMAP, Go To 2040, Stormwater Management Strategy Report
<http://www.goto2040.org/ideazone/forum.aspx?id=850>
2. MWRD stormwater management plan
<http://www.mwr.org/irj/portal/anonymous/stormwateroverview>
3. Storm Water Management Workshop, Village of Glenview
<http://www.glenview.il.us/departments/capital/swtaskforce/reports/stormwaterworkshop.pdf>

4. Chicago's Water Agenda

http://egov.cityofchicago.org/webportal/COCWebPortal/COC_EDITORIAL/wateragenda.pdf

5. Green Roofs: Best Management Practices

http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?blockName=Water%2fGreen+design%2fI+Want+To&deptMainCategoryOID=-536892335&channelId=0&programId=0&entityName=Water&topChannelName=Dept&contentOID=536911037&Failed_Reason=Session+not+found&contentTypeName=COC_EDITORIAL&com.broadvision.session.new=Yes&Failed_Page=%2fwebportal%2fportalContentItemAction.do&context=dept

6. Deb Shore's web page

<http://www.debrashore.org/>

<http://www.debrashore.org/pdf/shore2008report.pdf>

7. Smarty pants are Leaders

smartypantsareleaders.org

8. Greencorps Chicago

<http://www.wrdenvironmental.com/projects/greencorps.html>

9. Chicago Department of Transportation (go to CDOT programs)

http://egov.cityofchicago.org/city/webportal/portalEntityHomeAction.do?BV_SessionID=@ @ @ @0785616048.1267218883 @ @ @ @&BV_EngineID=ccccadejk

[ejhkecefecelldffhdfif.0&entityName=Transportation&entityNameEnumValue=42](http://egov.cityofchicago.org/city/webportal/portalEntityHomeAction.do?BV_SessionID=@ @ @ @0785616048.1267218883 @ @ @ @&BV_EngineID=ccccadejk&ejhkecefecelldffhdfif.0&entityName=Transportation&entityNameEnumValue=42)

Sources for Part I (Water)

1. from CMAP, Go To 2040, Stormwater Management Strategy Report

Fig. 1 Percent estimate, by components, of water balance (diagram)

Fig. 2 Hydrographs of runoff

2. Overview of aquifer recharge in Northeastern Illinois

http://www.isws.illinois.edu/iswsdocs/wsp/ppt/GW_Recharge_NE_IL.pdf

3. Overview of groundwater system in Chicago

<http://www.encyclopedia.chicagohistory.org/pages/555.html>

4. Contours of aquifer water-level declines in the Chicago-Milwaukee area

<http://ga.water.usgs.gov/edu/gwdepletion.html>

5. Wetland buffer size parameters

<http://www.georgewright.org/65skerl.pdf>

6. The structural barrier between growing layer and subsoil in urban agriculture
fig 3.2-1 (p 57), in Processes, Methods, and Procedures to Control Pollution from
Mining Activity

EPA-430/9-73-011

go to: nepis.epa.gov/Exe/ZyPURL.cgi?Dockkey=2000WIYF.txt

then select "get a copy"

7. Naturalized detention pond design

<http://egov.cityofchicago.org> --> depart. of water management --> conservation -->
stormwater conservation issues --> green design --> Naturalized Detention Basins

8. Conversion tool for cubic feet to gallons (eg, 300 ft³ = 2244 gal)

<http://www.metric-conversions.org/volume/cubic-feet-to-us-liquid-gallons.htm>

Sources for Part II (Soils)

1. Urban Agriculture and Soil Contamination: An Introduction to Urban Gardening

http://cepm.louisville.edu/Pubs_WPapers/practiceguides/PG25.pdf

2. Urban Soil Contamination: An Obstacle to Successful Urban Agriculture, Zhogqi Cheng et alia

http://gsa.confex.com/gsa/2010NE/finalprogram/abstract_169603.htm

3. USDA National Resource Conservation Services Soil Survey (including surveys for Cook and
collar counties)

<http://websoilsurvey.nrcs.usda.gov/app/>

<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

4. Mineral Tolerance in Domestic Animals

<http://www.nap.edu/openbook.php?isbn=0309030226>

5. Ecological Soil Screening Levels for Lead

http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf

6. Human Health Risk Assessment, Region 3

<http://www.epa.gov/reg3hwmd/risk/human/index.htm>

7. Regional Screening Level (RSL) Master Table DECEMBER 2009

[http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/
master_sl_table_bwrun_DECEMBER2009.pdf](http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_bwrun_DECEMBER2009.pdf)

8. Ecological Risk Assessment Screening Benchmarks, Region 5

<http://www.epa.gov/R5Super/ecology/html/screeningbench.html>

9. Region 5 brownfields

<http://www.epa.gov/R5Brownfields/>

Sources for Part III (Management of Soils and Stormwater in Catchment Zones)

1. Brownfields Remediation: Solutions for Urban Agriculture

http://mse-research.mcgill.ca/envr401_2002/brownfields/report.pdf

http://mse-research.mcgill.ca/envr401_2002/brownfields/

2. Environmental and Phytoremediation uses of Poplar

http://hybridpoplar.com/home/sr1/uses_main.html

3. Study of Phytoremediation by Use of Willow and Rape

<http://ttkde4.sci.u-szeged.hu/ABS/2005/Acta%20HP/4973.pdf>

4. Phytoremediation of heavy metal polluted soils and water: Progresses and perspectives

Mohammad Iqbal Lone et alia

"The hyperaccumulation of metals in various plant species has been extensively investigated and to date substantial progress has been made. It becomes clear that different mechanisms of metal accumulation, exclusion and compartmentation exist in various plant species."

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2266886/>

5. Variation in heavy metal uptake by crop plants

Hans Bergmann et alia

"Relative to heavy metal (HM) excluder plants (French bean, lupin, maize, cereals), HM sequestering crops (buckwheat, beet root species) accumulate up to the 18-fold concentrations of As, Cd, Cr, Cu, Ni, Pb, and Zn as a sum in their shoot tissue."

<http://www.springerlink.com/content/n3344g68j4060683/>

6. Comparative Lead Uptake and Responses of Some Plants Grown on Lead Contaminated Soils

Gregorio B. Begonia

"Results indicated that the five plant species tested exhibited differential sensitivity to toxic levels of lead. Based from the magnitudes of reduction in leaf area and dry tissue biomass, radish was the most sensitive while black mustard was the most tolerant to lead. Among the five species evaluated, sunflower had the greatest ability to accumulate lead in the roots, but it translocated the least amount to its shoots. On the other hand, morningglory absorbed the smallest amount of lead in its roots, but it was the most efficient translocator of lead to its shoots. Sunflower is the most suitable

species for phytoextraction of soil lead if the whole plant biomass is harvested. However, morningglory is the preferred species if only the above-ground biomass is harvested. The high lead accumulation by both sunflower and morningglory suggests that these plants should be evaluated further for their potential use in cleaning up toxic metals from contaminated soils. "

<http://www.msstate.edu/org/MAS/ejour3.html>

7. Diagram of detention basin:

http://www.ecn.purdue.edu/runoff/ubmp0/bmp_pic/detbasin.jpg

--from: http://www.ecn.purdue.edu/runoff/ubmp0/detention_systems.htm

8. Aquifer Recharge Mapping

<http://www.state.nj.us/dep/njgs/enviroed/aqfrchrg.htm>

9. Soil and plant tissue testing

<http://www.aasl.psu.edu/DefaultA.htm>

10. Plant tissue sampling description

<http://westmoreland.extension.psu.edu/Agriculture/DairyDigest/2007%20PDF%20Files/Aug07FieldCrops.pdf>

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List of Actions

1. <http://egov.cityofchicago.org> --> depart. of water management --> conservation --> stormwater conservation issues --> green design --> Naturalized Detention Basins

2. <http://egov.cityofchicago.org> --> depart. of water management --> conservation --> stormwater conservation issues --> green design --> Bioinfiltration: Rain Gardens

3. <http://egov.cityofchicago.org> --> depart. of water management --> conservation --> stormwater conservation issues --> green design --> Drainage Swales

4. <http://egov.cityofchicago.org> --> depart. of water management --> conservation --> stormwater conservation issues --> green design --> Filter Strips

5. <http://egov.cityofchicago.org> --> depart. of water management --> conservation --> stormwater conservation issues --> green design --> Chicago's Water Agenda

6. <http://egov.cityofchicago.org> --> depart. of water management --> conservation --> stormwater conservation issues --> green design --> Green Roofs: Best Management Practices