

1 Water Quality for Virginia Master Gardeners

- ▲ *What you should know*
- ▲ *What you can do*
- ▲ *What you should be able to teach*

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3 Shameless Commercial

- ▲ *Have you joined VMGA?*
 - ▲ *The Voice of VA Master Gardeners*
 - ▲ *Promote fellowship, training & communication*
 - ▲ *State Coordinator's Endowment.*

4 Outline

- ▲ *Factors that contribute to water quality and pollution*
- ▲ *Lawn and garden activities can impact water quality*
- ▲ *Information about pond water quality issues*
- ▲ *Role of MGs in protecting water quality*
- ▲ *VCE's role in homeowner water quality*

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6 Why is Water Quality Important

- ▲ ?
- ▲ ?
- ▲ ?

7 Why is Water Quality Important

- ▲ *Life is water-based*
- ▲ *Federal Law*
 - ▲ *Clean Water Act*
 - ▲ *FIFRA*
 - ▲ *Rivers and Harbors*
 - ▲ *Clean Air Act*
- ▲ *State Law*

▲ *VA Constitution (Article XI sec1)*

8 **Hydrologic Cycle**

- ▲ *Precipitation*
- ▲ *Runoff*
- ▲ *Infiltration*
- ▲ *Evaporation*

9 **Factors that affect runoff**

- ▲ ?

10 **Factors that affect runoff**

- ▲ *Slope*
- ▲ *Vegetation*
- ▲ *Previous moisture*
- ▲ *Infiltration rate*

11 **Infiltration**

12 **Groundwater**

13 **Watersheds**

- ▲ *What is a watershed?*
- ▲ *What is your watershed?*
- ▲ *How can you find out?*

14 **Chesapeake Bay Watershed**

15

▲ <http://www.albemarle.org/department.asp?department=planning&relpage=5720>

16 **Types of surface water**

- ▲ *Ephemeral streams – vernal pools*
- ▲ *Puddles*
- ▲ *Streams*
- ▲ *Ponds*
- ▲ *Lakes*
- ▲ *Rivers*
- ▲ *Estuaries*
- ▲ *Oceans*

17 **Pollution Sources**

- ▲ *Point Source*
 - ▲ *Name some sources*
- ▲ *Non-Point Source*

▲ *Name some sources*

18 **Pollution: Types**

Sources

- ▲ *Sediment*
- ▲ *Nutrients*
- ▲ *Animal Waste*
- ▲ *Pesticides*
- ▲ *Salts*
- ▲ *Toxicants*
- ▲ *Thermal*

19 **Nutrients**

- ▲ *N-P-K*
- ▲ *Sources?*
- ▲ *Air is the major source!*
- ▲ *Sinks*

20 **Which are the Biggies for us?**

- ▲ *Sediment*
- ▲ *Nutrients*
- ▲ *Animal Waste*
- ▲ *Pesticides*
- ▲ *Salts*
- ▲ *Toxicants*
- ▲ *Thermal*

21 **Chesapeake Bay Pollutants**

22 **Chesapeake Bay Pollutants**

23 **Pollution Impacts**

- ▲ *Sediment*
- ▲ *Nutrients*
- ▲ *Animal Waste*
- ▲ *Pesticides*
- ▲ *Salts*
- ▲ *Toxicants*
- ▲ *Thermal*

- 24 **Types of Toxicity**
 - ▲ *Acute*
 - ▲ *Cancer*
 - ▲ *Birth Defects*
 - ▲ *Endocrine Disruptors*
 - ▲ *Chronic*
 - ▲ *Bioaccumulation*
 - ▲ *Biomagnification*

- 25 **Measuring Pollution**
 - ▲ *Chemistry/Laboratory/Bioassay*
 - ▲ *Effects*
 - ▲ *Global effects*
 - ▲ *Less fish landings – global warming*
 - ▲ *Ecological assays*
 - ▲ *Macroinvertebrate assays - surveys*
 - ▲ *Secondary effects*
 - ▲ *Low DO – Cloudy water*

- 26 **Chesapeake Bay - How's It Doing**
 - ▲ *Lets look at some systems indicative of condition:*
 - ▲ *SAV submerged aquatic vegetation*
 - ▲ *Striped Bass*
 - ▲ *Blue crabs*
 - ▲ *Oysters*

- 27 **Chesapeake Bay - How's It Doing**
 - ▲ *SAV IS recovering*

- 28 **Chesapeake Bay - How's It Doing**
 - ▲ *Striped Bass*

- 29 **Chesapeake Bay - How's It Doing**
 - ▲ *Blue Crabs*

- 30 **Chesapeake Bay - How's It Doing**
 - ▲ *Oysters*

- 31 **Impacts of Pollution**
 - ▲ *Toxicity*
 - ▲ *Food contamination*
 - ▲ *Habitat destruction*
 - ▲ *Habitat degradation*
 - ▲ *Cascading Effects*

32 **Habitats at risk**

- ▲ *Clear water habitats*
- ▲ *SAV*
- ▲ *Wetlands*
- ▲ *Oyster reef*

33 **Water Quality**

Healthy vs. Unhealthy

34 **Impaired Waters**

- ▲ *Watershed approach – 10 major tributaries*
- ▲ *Tributary Strategy – crosses political boundaries*
- ▲ *The states (and counties) adopt the Chesapeake Bay Restoration Plan*
- ▲ *Find yours <http://gisweb.deq.virginia.gov/>*
- ▲ *http://cfpub.epa.gov/surf/county.cfm?fips_code=51003*

35 **Virginia Master Gardener Association**

VMGA is the state association of VCE-MGs
VMGA's mission is to support the VCE-MG program
VMGA is the voice of VCE-MGs

36 **VMGA - The Voice of VCE-MGs**

VMGA represents all VCE-MGs
Officers meet with VT & VCE leadership
Local units have representation in VMGA
Officers welcome input

37 **Virginia Master Gardener Association, Inc.**

***The State Master Gardener
Coordinator Endowment***

***Ensuring the Future
of Master Gardening in Virginia***

38 **The Role of the State Coordinator**

The size of the administrative job...
▲ 51 units across the state
▲ 4,000+ certified VCE-MGs
▲ 800 – 1,000 trainees each year
(Training MG leaders, ordering and mailing Handbooks, creating & mailing

certificates, maintaining hours reporting system, creating & sending newsletters, maintaining the web site & list services, resolving conflicts, managing service awards...)

39 **Beyond Administration**

- ▲ Develops new training materials, improves the current ones*
- ▲ Collects and disseminates impacts*
- ▲ Facilitates networking*
- ▲ Liaison about our needs to VCE, the College of Ag and to other colleges*
- ▲ Coordinates with state and federal agencies*
- ▲ Conducts Master Gardener College and Leadership Training*

40 **When the Position is Vacant**

Connection is neglected and compromised
Lack of consistent directives
Collective results weakened

41 **State Coordinator Funding**

USDA Grant

Department of Horticulture

Funds are not in jeopardy...yet

42 **Funding through an Endowment**

Master Gardener originated idea

Support from the university

\$1,000,000 endowment partially funds

More likely that VT will fund the remainder than funding a program that has no such funding

Ensures Master Gardening in perpetuity

43 **Raising \$1,000,000**

Foundations, corporations

Units

Individuals

44 **Raising \$1,000,000**

"\$50 for 5"

\$50 x 5 years = \$250

\$250 x 4,000 = \$1,000,000!!

Identify potential donors

Food Lion, Silent Auction

45 **Current Status**

\$50K challenge grant

Silent Auction and wine tasting

Unit donations

Individual donations & pledges

46 **Contact Us**

www.VMGA.net

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dclose@vt.edu

mbales@vt.edu

47 **No contribution is more important than yours**

Won't you make a pledge today?

VMGA Thanks You!

48 **A Brief Break**

49 **Outline**

▲ *Factors that contribute to water quality and pollution*

▲ *Lawn and garden activities can impact water quality*

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▲ *Role of MGs in protecting water quality*

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50 **How can we affect
water quality?**

▲ *How much property do you have?*

▲ *What is on it?*

▲ *What do you do to it?*

51 **Multiply that by all the neighbors in your watershed**

- ▲ *Add in cheating*
 - ▲ *Gasoline in the ditch – on the ground*
 - ▲ *Pesticide disposal*
- ▲ *Add in yard waste*
 - ▲ *In the ditch, taking up landfill capacity*
- ▲ *Add in doing nothing and thinking THAT is better*
 - ▲ *Erosion thermal /pollution*

52 **Impervious Surfaces**

- ▲ *Loss of groundwater*
- ▲ *Erosion*
- ▲ *Flashiness of flooding*
- ▲ *Contaminant transfer*
- ▲ *This is why there are stormwater utility fees – that are going up!*

53 **How much impervious surface do you have?**

- ▲ *1/3rd Acre ~ 14,000 sq feet*
- ▲ *House ~ 20 X 80 = 1600 square feet*
- ▲ *Drive ~ 10 X 20 = 200 Square feet*
- ▲ *Detached garage ?*
- ▲ *Husband house ?*
- ▲ *Lawn mower shed ?*
- ▲ *Pool ?*
- ▲ *At least 1800/14000 or almost 13%!*

54 **Impervious Surface Solutions**

- ▲ *Storm Water Structures*
- ▲ *Retain water on-site*
- ▲ *Rain gardens*
- ▲ *Slow down flow at gutters*
- ▲ *Decrease impervious surfaces percentage*

55 **Hydrograph**

56 **Use Gardening**

- ▲ *Ensure complete cover*
 - ▲ *Reduces runoff*
 - ▲ *Reduces erosion*
 - ▲ *Increases infiltration*
- ▲ *Make it healthy*
 - ▲ *Less fertilizer need*
 - ▲ *Less pesticides use*
 - ▲ *Less yard waste*
- ▲ *Use Mulch*
 - ▲ *Retains water*
 - ▲ *Keeps soil temperature more moderate*

57 **Run Off**

- ▲ *Flooding*
- ▲ *Erosion*
- ▲ *Potential pollutants*

58 **Home Damage**

59 **Puddles**

- ▲ *Mosquitoes*
- ▲ *Mud*
- ▲ *Further damage*

60 **Eroded topsoil, rills, gullies**

61

62 **How can we make residential developments
function hydrologically like natural systems?**

63 **Pervious Pavement**

- ▲ *Here is how well some of this works*
- ▲ *Here is how good some of this looks*

64 **Rain Gardens**

65

66 **Amended Soils**

Benefits:

- ▲ *Increases soil permeability, enabling greater storage capacity and infiltration, reducing overall runoff from development site.*
- ▲ *Can effectively filter and treat pollutants.*
- ▲ *Reduces the need for extensive use of irrigation and fertilizers.*

67 **Green Roofs**

Benefits:

- ▲ *Improves a building's energy performance (both heating and cooling) by adding a thermal layer.*
- ▲ *Provides significant stormwater storage and evapotranspiration – reducing need for other SW practices on site.*
- ▲ *Improves air quality (filters large percentage of particulates in the air).*
- ▲ *Provides wildlife habitat.*
- ▲ *Increases lifespan of conventional roof (can double lifespan of roof).*

68 **Roof Top Rainwater Harvesting**

69 **Disconnect**

Benefits:

- ▲ *Retains water on site*
- ▲ *Available systems for almost any density*
- ▲ *Can be retrofitted*
- ▲ *Can help attain stormwater goals at lower cost*

- 70 Splash Blocks by Myersculpture
- 71 Flow-through Planter
- 72 Moderate Cost Alternatives
- 73 Retrofitable on a neighborhood or personal scale
- 74 Comparison of Conventional and LID Site Conditions
- 75 An Be Aesthetically done – even in suburban NOVA
- ▲ *Tree conservation*
 - ▲ *Rain gardens*
 - ▲ *Narrower streets*
 - ▲ *Open drainage*
 - ▲ *On-lot detention storage and infiltration*
- 76 Water Quantity
- ▲ *Right plant right place – resist irrigation*
 - ▲ *Place plants with similar irrigation needs*
 - ▲ *Time your irrigation*
 - ▲ *Summer dormancy*
 - ▲ *High winds and temperatures waste water*
 - ▲ *Design gardens/lawns to save water*
 - ▲ *Odd shapes*
 - ▲ *The devil strip*
- 77 Pesticides
- ▲ *Only if you need them*
 - ▲ *IPM*
 - ▲ *Scouting*
 - ▲ *Timing – effective control strategies*
 - ▲ *Natural controls/patience*
 - ▲ *Least intrusive approach*
 - ▲ *Safety for you and the environment*
 - ▲ *Rain – wind – sun - temperature*
 - ▲ *More isn't better – or even legal*
- 78 Pesticides continued
- ▲ *Read the label*
 - ▲ *Dispose of carefully*
 - ▲ *Mix accurately*
 - ▲ *Prevent spills*
 - ▲ *Watch out for siphon effect!*
 - ▲ *Remember you are a MG –*
 - ▲ *call Peter & use the PMG*

79 Pesticide Problems

- ▲ *Spray drift*
- ▲ *Groundwater pollution*
- ▲ *Surface water pollution*
- ▲ *Sediment transport*
 - ▲ *Adsorption*
 - ▲ *Absorption*
 - ▲ *Solution*
 - ▲ *Breakdown*

80 Fertilizer Basics

- ▲ *Use it*
- ▲ *If you need it*
- ▲ *Check to make sure*
 - ▲ *VCE soil test – sample –paperwork*
 - ▲ *Remember to pay attention in class*

81 Fertilizer Basics continued

- ▲ *Calibrate*
- ▲ *Avoid putting it on the driveway and walks*
- ▲ *Use it when time is right*
 - ▲ *Growing season for most*
 - ▲ *SON for turf*

82 Yard Waste

- ▲ *Right plant reduces trimming*
- ▲ *Right plant reduces disease*
- ▲ *Avoid planting near power lines*
- ▲ *Walks, drives, etc.*
- ▲ *Over septic and drainfields*

83 Turf

- ▲ *Manage pests*
 - ▲ *Crabgrass or *Poa annua**
 - ▲ *Or other weeds*
- ▲ *Ensure health*
- ▲ *Mow high and mulch*
 - ▲ *>2.5inches – less than 1/3rd of height – free fertilizer.*
- ▲ *Pick the right grass*
 - ▲ *Turf-type tall fescue, bluegrass, rye – mix.*

84 **Turf continued**

- ▲ *Aerify*
 - ▲ *Core aerator*
 - ▲ *Not spike*
- ▲ *Overseed*
 - ▲ *Every year is best*
 - ▲ *Every lawn needs it*
- ▲ *Water properly or not at all.*

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86 **The Pond Part**

- ▲ *Farm ponds*
- ▲ *Natural ponds*
- ▲ *Storm Water features*
- ▲ *Ornamental Water Features*

87 **How does a Pond Work**

- ▲ *Water*
- ▲ *Sediment*
- ▲ *Air*

88 **Water Quality**

- ▲ *Nutrients the most important issue*
- ▲ *The source of most problems you hear*

89 **Algae Growth**

- ▲ *Water*
- ▲ *Nutrients*
- ▲ *Light*
- ▲ *The right temperature*

90 **Algae Control**

- ▲ *Remove one of:*
 - ▲ *Water*
 - ▲ *Nutrients*
 - ▲ *Light*
 - ▲ *The right temperature*

- 91 **Aquatic Weeds**
- ▲ *Navigational problem*
 - ▲ *Unightly*
 - ▲ *Odors*
- 92 **Aquatic Weed Control**
- ▲ *Advise nutrient reduction*
 - ▲ *Carp – permit required*
 - ▲ *Winter dredging – permit probably required*
 - ▲ *Chemical control – requires a license (category 5a) – don't make Recommendations*
- 93 **Questions**
- ▲ *Turtles/snakes and birds Oh My!*
 - ▲ *Green water*
 - ▲ *Cloudy water*
 - ▲ *Leaks*
 - ▲ *Skeeters*
- 94 **Animals**
- ▲ *Visitors*
 - ▲ *Design changes – elevation*
 - ▲ *Netting*
 - ▲ *Reality check*
 - ▲ *snails*
 - ▲ *examine your plant material*
 - ▲ *Fish*
 - ▲ *goldfish koi others*
 - ▲ *be careful with exotic species*
- 95 **Green Water**
- ▲ *Emergency*
 - ▲ *Chemical flocculation*
 - ▲ *Dyes*
 - ▲ *Poisons*
 - ▲ *Patience*
 - ▲ *Long Term*
 - ▲ *Better practices*
 - ▲ *Resignation-Adaptation*
 - ▲ *Give up or change the design*
 - ▲ *Planting*
- 96 **Cloudy Water**
- ▲ *Emergency*
 - ▲ *Filters*
 - ▲ *Flocculation*
 - ▲ *Patience*
 - ▲ *Planting*

97 **Skeeters**

▲ *Moving water*

▲ *Fish*

▲ *Dunks*

98 **Chemical Recommendations**

▲ *Don't make any!*

▲ *Most all aquatic formulations require applicators permit*

▲ *Recommend that they ask to see the permit – Category 5A*

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100 **VCE's role in homeowner water quality**

▲ *Liaison with DCR*

▲ *Soil & Water Conservation District*

▲ *Many farm programs – CREP etc.*

▲ *MG programs like*

▲ *Lawn Knowers*

▲ *Great Scapes*

▲ *Water Stewards*

▲ *You – the front line*