

Teacher resource

I	Stream Conditions	Possible Causes	Possible Action Projects	NOTES; other ideas; what else might need to happen for this to get done?
1	Nitrogen and Phosphorous levels are high.			
2	pH of the water is low.			
3	Dissolved oxygen is very low.			
4	Nitrates are high and the banks are bare of vegetation			
5	The stream scores low in embeddedness and bank stability.			
6	The banks of the stream are steep and bare from erosion.			
7	There is a lot of trash and debris in the water.			
8	Conductivity levels are very high			
9	The water looks like chocolate milk and is running very fast.			
10	Mostly pollution-tolerant macroinvertebrates were found.			
11				
12				
13				
14				

	Possible Causes / Problems		Possible Solutions/ Action Projects
A	There is a large farm just upstream, the stream runs through the pasture and there are lots of hoofprints along the banks.	a	Outreach to community about pet waste. Students make posters, PSAs for local tv, write an editorial for the local paper, etc.
B	Every house in the neighborhood surrounding the stream has at least one dog.	b	Construct drainage swales or rain gardens around the community and/or school to help increase storm water infiltrating into the ground.
C	A large housing development is being built nearby, and there was just a huge rainstorm.	c	Disconnect the downspouts around buildings and direct them into rain barrels or rain gardens. Reach out to the community to encourage more of these stewardship practices.
D	Many members of the community spend time on the weekends tending beautiful gardens, washing their cars and doing home improvement projects.	d	Students/citizens encourage the local government to develop a watershed improvement plan. The plan could include stream restoration and measures that can be taken by citizens and others to reduce impervious surface and slow the flow of runoff throughout the watershed (e.g., rain gardens, more planting areas, drainage swales, etc.).
E	The surrounding watershed is 83% impervious surface.	e	Outreach to community about value of a healthy stream and how to keep it in balance.
F	Climate Change is changing the weather patterns and your area has had larger than usual storms with historic levels of rain.	f	Paint messages on storm drains to remind community members that everything that flows into storm drains goes directly into streams and eventually into the Chesapeake Bay
G	Dumpsters in the community and behind a shopping center near the stream are always over-full. Trash blows out and around the parking lot.	g	Report problems to Maryland Department of the Environment (410 – 537-3510) so they can ensure the company controls the sediment flowing off of their construction site.
H	There have been a lot of new houses built in the community.	h	Plant a buffer of trees and shrubs along stream corridor
I	The stream flows through a residential neighborhood. Grass in many of the yards is mowed right to the edge of the stream, so there are no plants growing along the stream.	i	Install fences in livestock areas so the animals cannot access the stream.
J	People in the neighborhood dump their leaves and grass clippings in the stream.	j	Host trash clean up events and invite the community to participate. Also ask shopping center management to empty dumpsters more frequently, or to get more containers.
K		k	

ACTIVITY CARDS

possible causes / problems

<p>There is a large farm just upstream, the stream runs through the pasture and there are lots of hoofprints along the banks.</p> <p>A</p>	<p>Many members of the community spend time on the weekends tending beautiful gardens, washing their cars and doing home improvement projects.</p> <p>D</p>
<p>Every house in the neighborhood surrounding the stream has at least one dog.</p> <p>B</p>	<p>The surrounding watershed is 83% impervious surface.</p> <p>E</p>
<p>A large housing development is being built nearby, and there was just a huge rainstorm.</p> <p>C</p>	<p>Climate Change is changing the weather patterns and your area has had larger than usual storms with historic levels of rain.</p> <p>F</p>

possible causes / problems (continued)

<p>G Dumpsters in the community and behind a shopping center near the stream are always over-full. Trash blows out and around the parking lot.</p>	<p>J People in the neighborhood dump their leaves and grass clippings in the stream.</p>
<p>H There have been a lot of new houses built in the community.</p>	<p>I The stream flows through a residential neighborhood. Grass in many of the yards is mowed right to the edge of the stream, so there are no plants growing along the stream.</p>

stream conditions

<p>1 Nitrogen and Phosphorous levels are high.</p>	<p>4 Nitrates are high and the banks are bare of vegetation.</p>
<p>2 pH of the water is low.</p>	<p>5 The stream scores low in embeddedness and bank stability.</p>
<p>3 Dissolved oxygen is very low.</p>	<p>6 The banks of the stream are steep and bare from erosion.</p>

stream conditions (continued)

<p>7 There is a lot of trash and debris in the water.</p>	<p>11</p>
<p>8 Conductivity levels are very high.</p>	<p>12</p>
<p>9 The water looks like chocolate milk and is running very fast.</p>	<p>13</p>
<p>10 Mostly pollution-tolerant macroinvertebrates were found.</p>	<p>14</p>

possible solutions/ action projects

<p>Outreach to community about pet waste. Students</p> <p>a make posters, PSAs for local tv, write an editorial for the local paper, etc.</p>	<p>e Outreach to community about value of a healthy stream and how to keep it in balance.</p>
<p>Construct drainage swales or rain gardens around the</p> <p>b community and/or school to help increase storm water infiltrating into the ground</p>	<p>Paint messages on storm drains to remind community members that everything</p> <p>f that flows into storm drains goes directly into streams and eventually into the Chesapeake Bay</p>
<p>Disconnect the downspouts around the buildings and direct them into rain barrels</p> <p>c or rain gardens. Reach out to the community to encourage more of these stewardship practices.</p>	<p>Report problems to Maryland Department of the Environment (410 – 537-3510) so they can</p> <p>g ensure the company controls the sediment flowing off of their construction site.</p>
	<p>h Plant a buffer of trees and shrubs along stream corridor.</p>

possible solutions/ action projects (continued)

<p>i Install fences in livestock areas so the animals cannot access the stream.</p>	<p>d Students/citizens should encourage the local government to develop a watershed improvement plan. The plan could include stream restoration as well as measures that can be taken by citizens and others to reduce impervious surface and slow the flow of runoff throughout the watershed (e.g., rain gardens, more planting areas, drainage swales, etc.).</p>
<p>j Host trash clean up events and invite the community to participate. Also ask shopping center management to empty dumpsters more frequently, or to get more containers.</p>	

Answer Key:

Note* this is one possible answer key but this activity is primarily about fostering good discussion and linking action projects with stream conditions. More than one restoration action can benefit the different stream conditions found.

A – 4 – i

C – 9 – g

B – 1 – a

G – 7 – j

E – 8 – d

I – 3 – h

F – 6 – b

J – 2 – e

D – 10 – f

H – 5 – c