



Marin County Stormwater Pollution Prevention Program (MCSTOPPP)
 (www.mctoppp.org)

PRBO Conservation Science's Students and Teachers Restoring a Watershed (STRAW) (<http://www.prbo.org/cms/192>)

2011-2012 MCSTOPPP/STRAW Collaboration

In-Class presentations: MCSTOPPP staff assisted members of the STRAW faculty (retired teachers and naturalists) to give in-class presentations to approximately 29 classes on stormwater pollution prevention and riparian restoration. The presentations prepared 879 students for their restoration days and connected riparian restoration concepts to stormwater pollution prevention and to creek habitat protection. Working off of the improved MCSTOPPP/STRAW PowerPoint for the in-class presentations from 2010-11, the PowerPoint was further developed into 3 separate and distinct presentations to better emphasize the importance of maintaining a healthy and diverse riparian corridor and the aspects of stormwater pollution prevention for each grade level. An in-class worksheet was also developed to accompany the presentation to further engage the students with the material being covered. The main concepts of the PowerPoint presentations focus on helping students to understand that they all live in a watershed by teaching them the anatomy of the watershed (headwaters, valley floor, estuary/wetland, and bay/ocean); that there are storm drain networks through everyone's neighborhood and they all lead straight to a creek or bay; the types of pollutants that can get into a storm drain and what the students and community can do to prevent stormwater pollution; the importance of pollution free riparian habitat for native and endangered species and how pollutants diminish aquatic habitat; and how they will get to improve the riparian habitat with their creek restoration project.

2011-12 MCSTOPPP-STRAW RESTORATIONS	TOTALS
Number of Major East Marin Watersheds	2
Number of Major West Marin Watersheds	0
Number of Restoration Sites	2
Number of Restoration Days	5
Number of Schools	2
Number of Teachers	10
Number of Students	879
Number of Parents	4
Number of Volunteers	12
Square Feet (pulled and/or planted)	6,515
Total Number Planted (riparian native plants)	98
Total Square Feet of Seeded Area (native grasses)	4,395
Total cubic yards of non-native plants removed	65

2011-2012 Miller Creek Watershed

In the Miller Creek Watershed, students performed restorations and maintenance at Marinwood Park adjacent to Miller Creek Middle School (MCMS). The Marinwood Community Services District granted access so that students could maintain the MCSTOPPP/STRAW restoration sites. A special thanks to the Marinwood Community Services District who also provided assistance with hauling and mulching of the removed invasive vegetation. This was the 9th year of restoration at this site.

At the Marinwood Park/MCMS site approximately 600 students from Miller Creek Middle School's 6th, 7th, and 8th grade classes, were accompanied by 6 teachers, 4 parents, and 8 volunteers. They helped to remove approximately 42 cubic yards of Himalayan blackberry, English ivy, Cape ivy, fennel, and broom. They also planted 137 native riparian plants which included Red alder, White alder, Snowberry, California fescue, and the transplanting of Santa Barbara sedge. The MCSTOPPP/STRAW team completed 3 days of student restorations at this site.



Photos Above: Miller Creek Middle School students remove non-native, invasive species and load them in the truck.

Photo Below (left): Students transplant native Santa Barbara Sedge and Arroyo willow sprigs into a small tributary that was heavily covered with invasive, non-native English Ivy, Cape Ivy, and Himalayan Blackberry.

Photo Below (right): After 9 years, an entire floodplain, once completely choked with non-native, invasive species is now one of the areas students are planting with native trees, shrubs, sedges and grasses!



2011-2012 San Rafael Watershed

In Mahon Creek, 282 students and 4 teachers from Davidson Middle School's 6th grade classes, were joined by 4 volunteers to complete 2 days of restorations in the tributary that runs through Davidson Middle School. The students removed 23 cubic yards of Himalayan Blackberry, Acacia, Pampas grass, Fennel, English ivy, and French broom. After planting 48 native riparian plants including Box Elder, Oregon Ash, Valley Oak, California Black Walnut, Blue Elderberry, and Juncus, they mulched around the plants and installed deer fencing to help the new plants become established, and seeded 1,884 sq. ft. with native grass seed. A special thanks to the City of San Rafael Department of Public Works for arranging the removal of the invasive vegetation.

Photo Left: In this section of the creek students are removing a thicket of Himalayan blackberry and planting native juncus, trees, and shrubs that will provide shade and habitat.



Photo Left: A new native plant complete with mulch and a deer cage. Juncus has planted along the waterline, and newly exposed areas have been seeded and covered with straw.



Photo Right: Students assemble deer fencing that will protect the new plants until they are large enough to become established.



Photo Right: In this section of the creek students removed Himalayan blackberry, Pampus grass, and French broom, then planted, mulched, and seeded with natives.



MCSTOPPP/STRAW Collaboration

MCSTOPPP is honored to partner with Point Reyes Bird Observatory (PRBO) Conservation Science's STRAW Project, as well as the teachers, students, parents, and volunteers who take part in these projects. The restorations are partially funded by MCSTOPPP (a partnership of all cities, towns and unincorporated areas of Marin) and by grants and other funding obtained by PRBO Conservation Science's STRAW Project. The members of the STRAW faculty help develop and organize the in-class presentations, and STRAW Restoration staff organizes restoration days, perform maintenance and site monitoring, and procure most of the supplies and plants needed to conduct the restorations. MCSTOPPP assists with the in-class presentations, restoration days, and select maintenance days, and also conducts the photo-monitoring for all of the partnered sites.



1



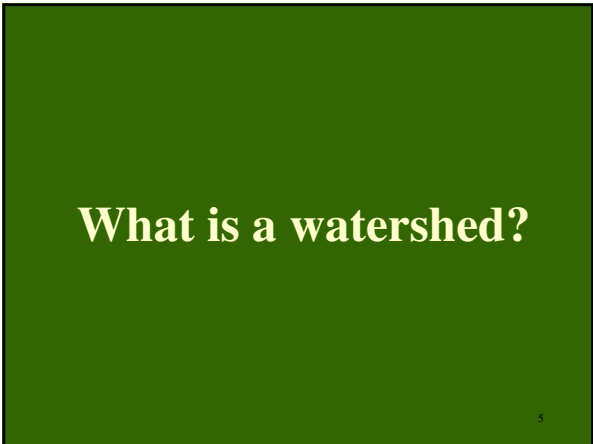
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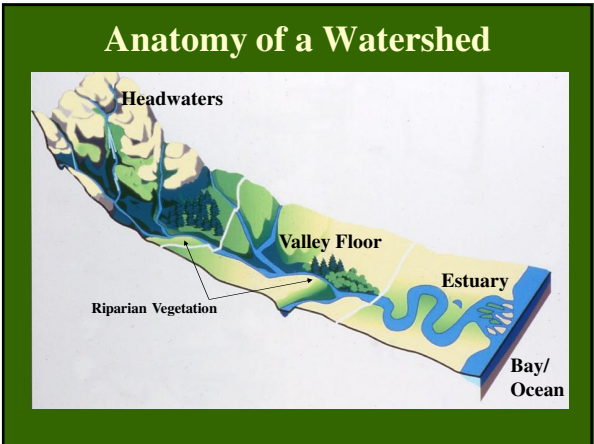
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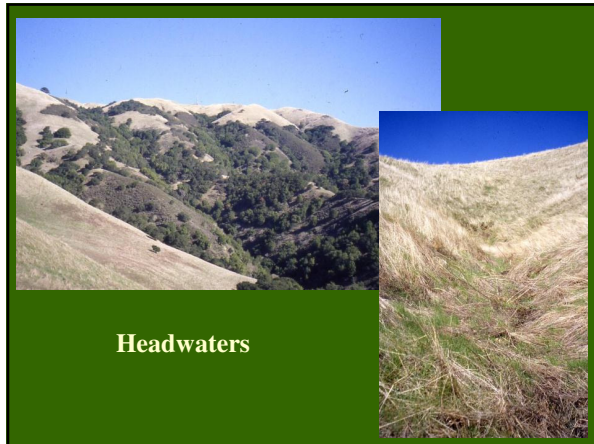


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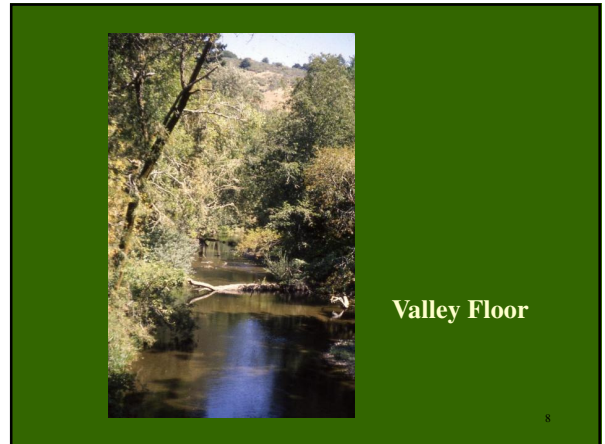


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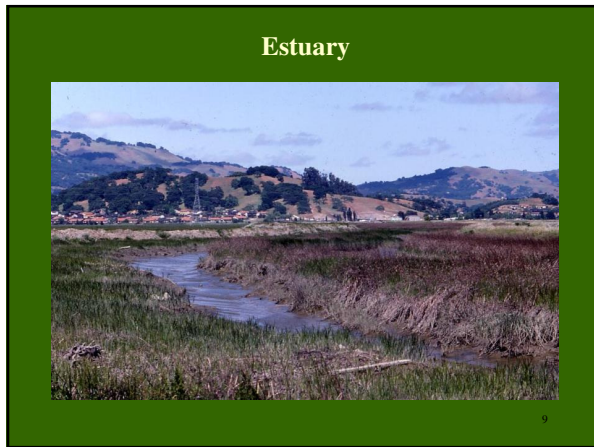


Headwaters



Valley Floor

8



Estuary

9

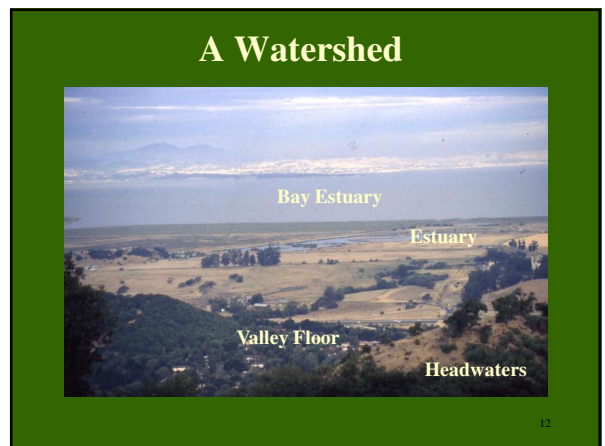


The Bay

10

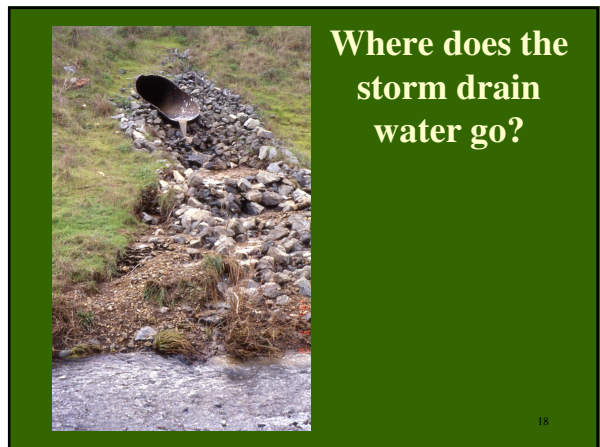
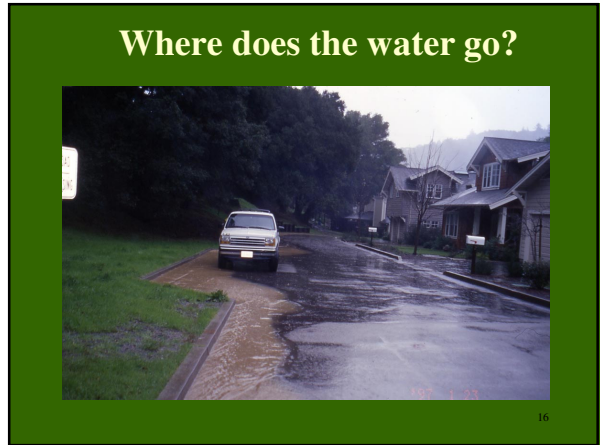
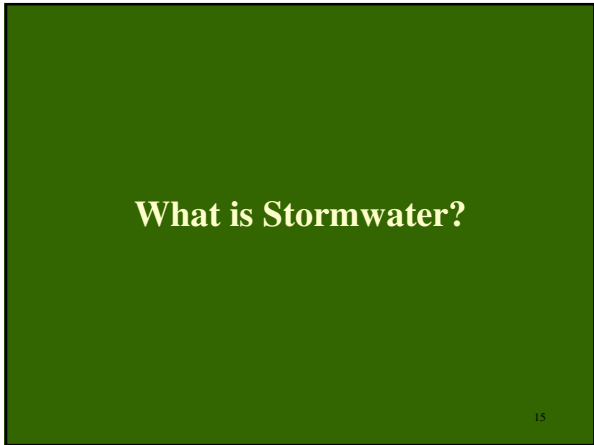
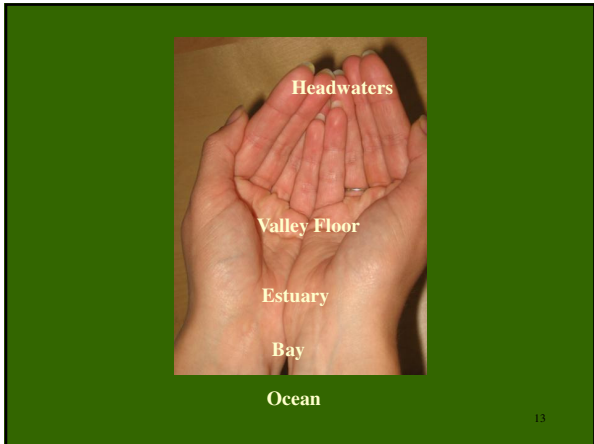


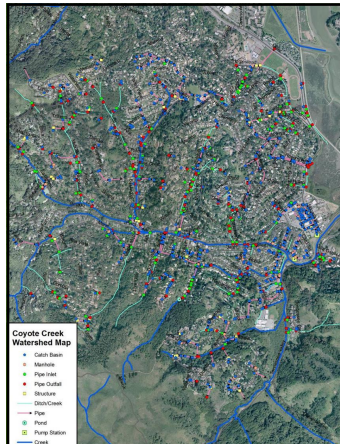
The Ocean



A Watershed

12





Storm Drain Mapping using GPS

If green dots are inlets...
blue dots are storm drains...
And red dots are outfalls...

How many potential points of pollution do you see?



Your neighborhood connection...

What we do around the house can really affect our creeks and the bay!

What is creek pollution?

21

Trash and Litter

Automotive Waste and Oil

When you change your oil...

Recycle the used oil and filter!

Keep oil out of the creek!

Municipal Waste



Chemicals: Pesticides, herbicides and fertilizers



Pets



Sediment from erosion



Before



After

09-27-2010 10-10

Roots help prevent erosion



A Healthy Creek



Who else is affected by pollution?



California Newt



California Roach

32



California Freshwater Shrimp



Red-Legged Frog



Western Pond Turtle

33

Who is this endangered species?



Steelhead Trout



A baby Steelhead trout, called a Fry

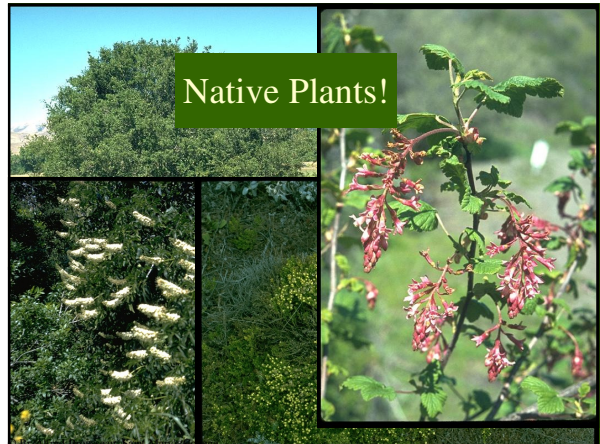
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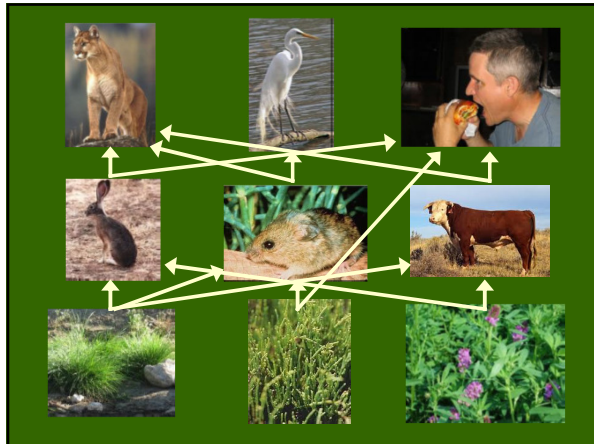
How many fish do you see?



35

Native Plants!





How can we help our watersheds?

Remove non-native, invasive plants...

Non-native and invasive!

English Ivy: is it a non-native, invasive, or a native plant?

English Ivy Removal

Before After

Which one is native?

California blackberry Himalayan blackberry

Compare the Stems

...and replace them with native plants.



43



Dogwood



Flowering Currant

44

Native Grass-like plants



A native rush
Juncus spp.



A native sedge
Carex barbarae

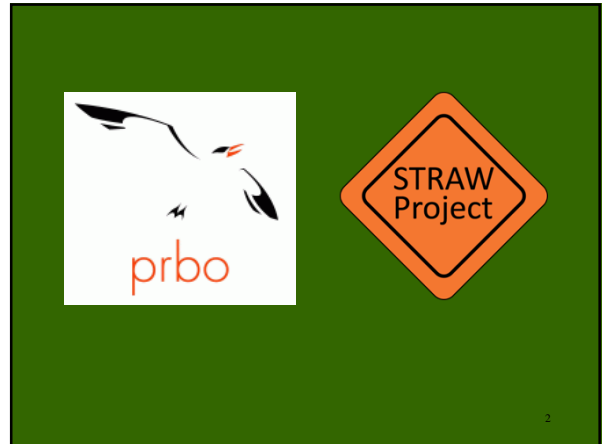
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On the day of your restoration...

46



47

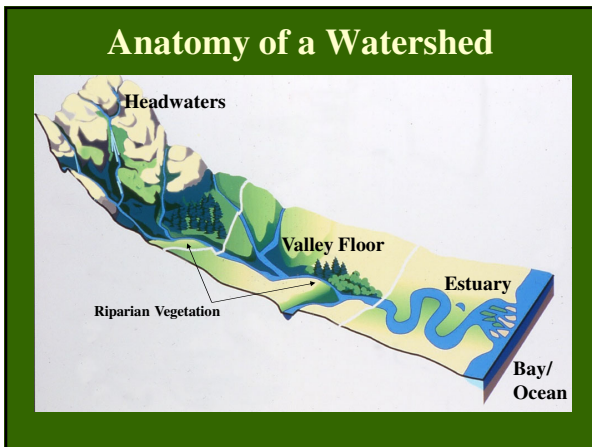


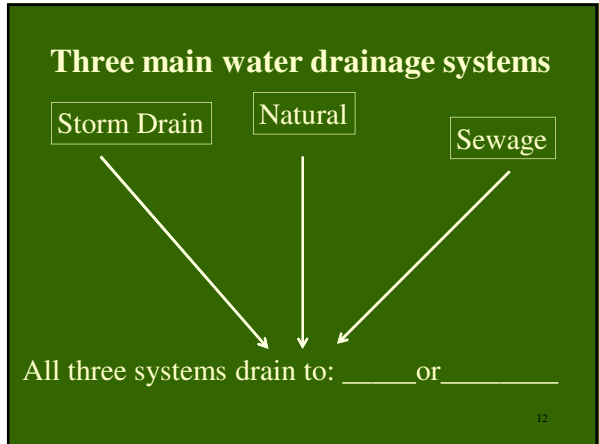
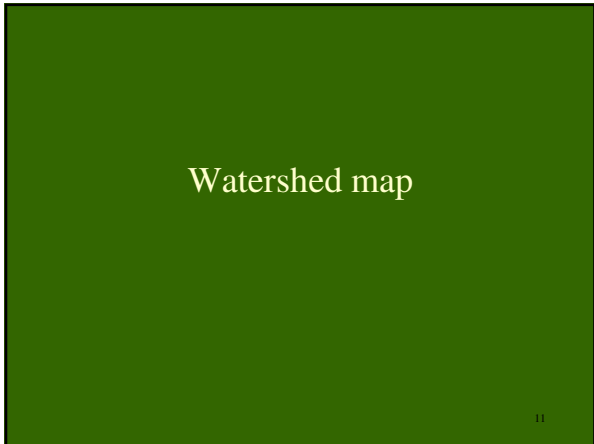
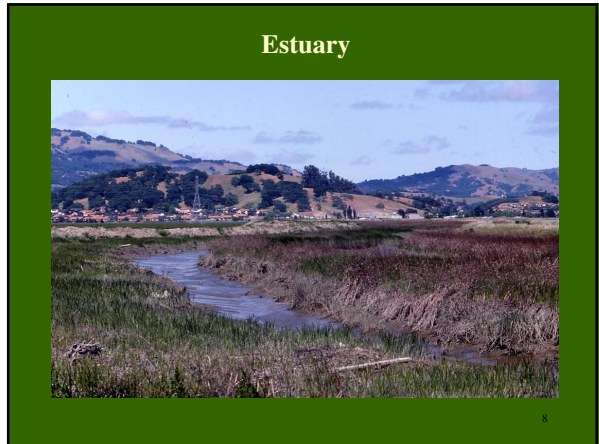
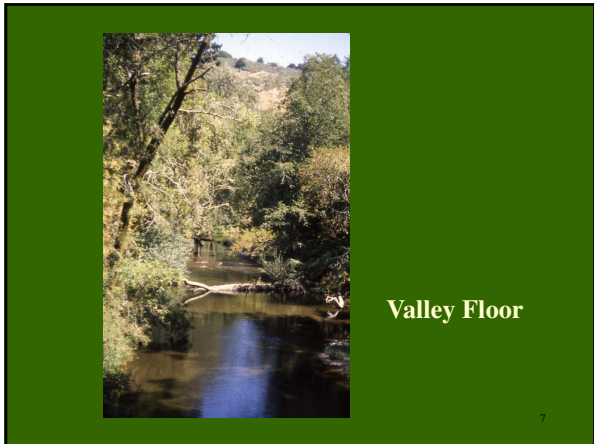
MCSTOPPP

<http://mcstoppp.org/>

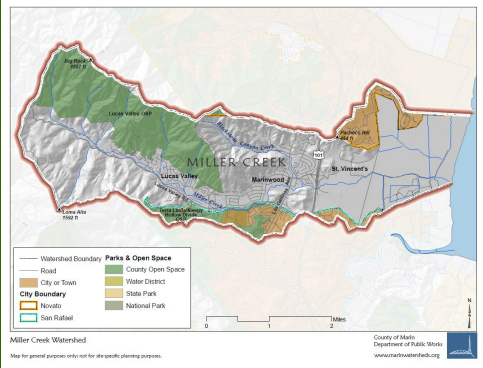
What is a watershed?

A watershed is the area of land from which all water (rainwater, snow _____) drains into a common body of water _____.





Natural Drainage System



A Healthy Creek



Storm Drainage



Your neighborhood connection...

What we do around the house can really affect our creeks and the bay!

Sewage Treatment System



Sewer lines map



Human Impact

Stormwater

- Trash
- Oil
- Soap
- Fertilizer/
Pesticide
- Paint

Natural

- Sediment
- Trash
- Pet Waste
- Fertilizer/
Pesticide

Sewage

- Prescription
drugs
- Fats, oils,
grease
(FOG)
- Dental floss

19

How can we help our
watersheds?

20

Remove non-native,
invasive plants...



21

Non-native and invasive!



© Bruce G. Marcot

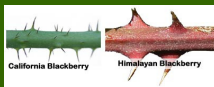
English Ivy: is it a non-native, invasive,
or a native plant?

22

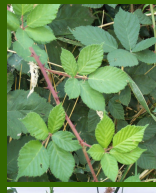
Which one is
native?



California
blackberry



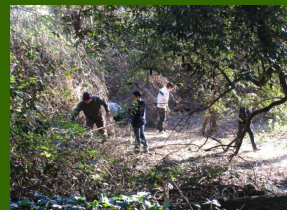
Compare the Stems



Himalayan
blackberry

23

Himalayan Blackberry Removal



Before



After

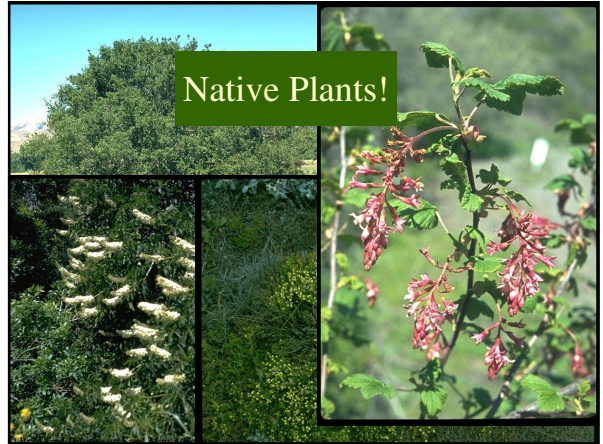
24

....and replace them with native plants.



25

Native Plants!



Dogwood



Flowering Currant

Native Grass-like plants



A native rush
Juncus spp.



A native sedge
Carex barbarae

28

A Healthy Creek



STRAW/MCSTOPPP
Watershed Restoration
Note-taking Guide

Name:
Teacher:

Date:
Section:

A watershed is an a _____ of l _____ from which all the water (_____) drains into _____.

Three kinds of drainage systems in an urban watershed:

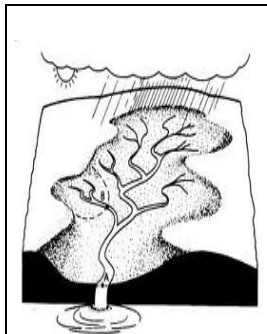
STORMWATER SYSTEM
 Carries _____

NATURAL SYSTEM
 C _____ & R _____

SEWAGE SYSTEM
 Carries _____



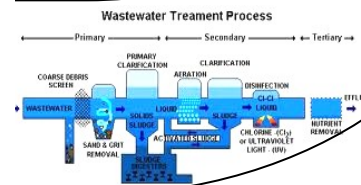
Pollutants:



Pollutants:



Pollutants:



- Put the initial "H" on the two systems that are built by humans.
- Put the letter "T" on the one system in which the water is treated before it reaches the bay and ocean.
- Label the pictures "household liquid wastes", "storm drain intake", "storm drain out-fall", "creek drainage system/watershed", "sewage treatment plant".

All three systems drain to :

 or

- What observations could indicate a healthy watershed?
- What can we do to help?

Suggested Follow-up:

6. Put a “-” on the system(s) that can be negatively impacted by human activities. Put a “+” on the system(s) that can be positively impacted by human activities. Put “+/-” if both are true.

7. Create a slogan, poster, or skit for a public service announcement to educate others in your community about how they can help.

8. Perform a service project (see examples that follow).

- Storm drain stenciling
- Campus clean-up
- Design your own

Contact MCSTOPPP if help is needed.

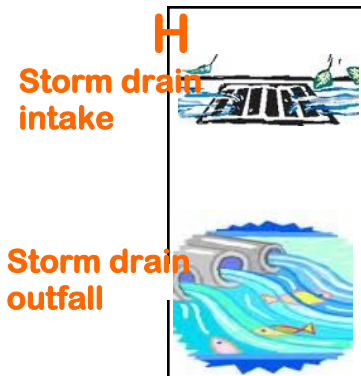
A watershed is an **area** of **land** from which all the water (**rainwater, run-off, snow-melt**) drains into **a common body of water**.

Three kinds of drainage systems in an urban watershed:

STORMWATER SYSTEM
Carries **stormwater** down **gutters** into **storm drains**

NATURAL SYSTEM
Creeks & Rivers

SEWAGE SYSTEM
Carries **household and industrial liquid wastes**



Creek drainage system/watershed



Pollutants:

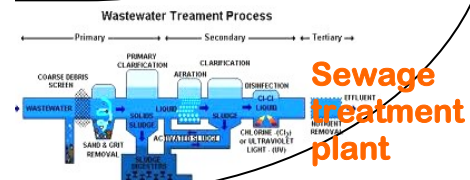
Sediment, oil, pesticides, fertilizers, construction wastes, soaps, paint, trash

Pollutants:

Sediment, trash, pesticides, fertilizers, animal wastes, pet wastes

Pollutants:

Medications, dental floss, FOG (fats, oils, grease), paint, chemicals



- Put the initial "H" on the two systems that are built by humans.
- Put the letter "T" on the one system in which the water is treated before it reaches the bay and ocean.
- Label the pictures "household liquid wastes", "storm drain intake", "storm drain outfall", "creek drainage system/watershed", "sewage treatment plant".

All three systems drain to : bay or ocean .

- What observations could indicate a healthy watershed?
Shade, flood plain, different kinds of plants, root structure, meanders, clear water, riffles and pools, different kinds of animals
- What can we do to help?
Perform a restoration by removing trash and invasive plants and planting native plants. Do not pollute.

Suggested Follow-up:

6. Put a “-” on the system(s) that can be negatively impacted by human activities. Put a “+” on the system(s) that can be positively impacted by human activities. Put “+/-” if both are true. **Put “+/-” on all three systems.**

7. Create a slogan, poster, or skit for a public service announcement to educate others in your community about how they can help.

8. Perform a service project (see examples that follow).

- Storm drain stenciling
- Campus clean-up
- Design your own

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