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Todd A. Wester
Curriculum & Instruction

July 2, 2010

Laura Andersen
Water Quality Specialist
Water Quality Planning Bureau
Department of Environmental Quality
PO Box 200901
1520 E 6th Ave
Helena, MT 59620

Dear Laura;

Begun in September, 2009, Sleeping Giant Middle School seventh-grade life science students have completed classroom and field study exercises aimed at understanding and stewardship of aquatic resources in the municipal / environmental interface. The primary goal of the study funded by this mini-grant was to inform students and members of the community that storm drains carry water to Fleshman Creek, a local stream.

Units and lessons for the study were designed collaboratively by science teacher David Pettit and curriculum director Todd Wester. Mark Richards, Park County GIS specialist, helped students to interpret maps of storm drains and to understand how to use handheld GPS units to locate them. Park County Sanitarians Doris Morgan and Randy Taylor demonstrated to students how they take water samples from storm drains to check for pollutants. City of Livingston assistant director of utilities Sandy Wulf provided maps of the storm drains for Main, B, and 2nd Streets.

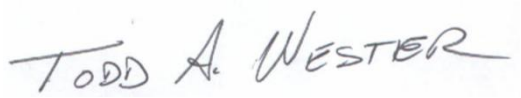
Students used stencils to label sidewalks next to 22 storm drain grates with the words, “Dump No Waste: Drains to Stream.” They produced advertisements for publication in the Livingston Enterprise, and wrote for publication about their studies and recommendations (examples attached).

Prior to field work, students considered the nature of point-source and non-point source pollutants, conducting water quality sampling on Fleshman Creek. Students learned to explain the connection of storm water runoff to point-source pollution, why it can be a problem, potential storm water pollutants, and why we should manage the system. Students created brochures and advertisements to elevate community awareness about problems associated with indiscriminate dumping down storm drains.

Students also became familiar with the course Fleshman Creek takes through the city of Livingston and surrounding area, a thing not well known to most. They learned the protocol for sampling techniques and much of the methodology behind water quality science and restoration engineering.

A lead-up took place this fall. On September 23, all sophomores at Park High School, in collaboration with all seventh-grade students at Sleeping Giant Middle School, participated in water quality monitoring exercises at 12 distinct sites on the Town Reach of Fleshman Creek, all between Sacajawea Lagoon and the Yellowstone River. In final analysis, physical and chemical indicators of water quality fell within acceptable parameters, with the exception that there appears to be excessive backwater along the Town Reach of Fleshman, which contributes to a siltation problem. More troubling was the recent

disappearance of virtually all benthic aquatic macro-invertebrates with the exception of sow bugs and leeches below the Lagoon. Students concluded that a low water quality event had taken place within the past year, perhaps a function of a storm drain spill. Students recommended the replacement of insufficient-diameter culverts, an investigation in to the potential relocation of the city pool (some speculate high-test hypochlorite may have leaked in to the stream), and continued monitoring. Next steps include installation of remote sensing probes for pH, temperature, conductivity, turbidity, and dissolved oxygen, and participation in the FEMA pre-disaster mitigation project to restore Fleshman Creek.



Todd A. Wester

Dump No Waste!

(Note: This is a journal written by Sleeping Giant Middle School 7th grader Tiffany Parsons of her experience spraying warnings near the downtown drains in Livingston to alert people about the adverse effect chemicals and waste have on life in Fleshman Creek.)

Today, April 20, 2010, we got to paint warnings on the corners of Main Street.

We gathered our supplies and materials - two brooms, two three-fold science boards, some newspaper, bright orange spray paint and two of our special stencils that read, "DUMP NO WASTE. DRAINS TO STREAMS."

Mr. Pettit led us out the back door off the loading dock, through the back parking lot and up Main Street. We had to stop to buy more paint but then we were off.

Now, I should probably explain that all the drains we were spraying the labels on drain right into Fleshman Creek. Due to the fact people are dumping chemicals and other waste, the once "always growing" environment is slowly dying out.

Well, back to our attempt to save the fish. On the first drain Mr. Pettit demonstrated how to sweep the area so no leaves or rocks are around. Then we set the stencil facing out towards the street. The next step was to place newspaper around the edges of the stencil so that way, none of the back splash of paint gets on the outer sidewalk.

Before spraying, if needed, we set up one of the science boards to block the wind from carryiing the paint away.

Mr. Pettit then held the can upside down and sprayed until all the letters were coated. The final step was to, of course, remove the stencil, carefully. We did about five drains in all and you could tell who held the newspaper by looking at their hands.

Now that may sound strange but almost all who did left science with Cheeto® fingers!

In conclusion, today we labeled which drains lead to Fleshman Creek so, hopefully, people stop dumping in them.

Tiffany Parsons

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THE LIVINGSTON

ENTERPRISE

Wednesday, April 21, 2010 • Livingston, Montana • Vol. 9

Enterprise photos by Matt Dettori

Sleeping Giant Middle School seventh-grader Murphy Polsak, center, holds a stencil in place on the corner of Geyser and South Main streets, Monday afternoon. Murphy, along with his classmates, was painting the sidewalks of downtown Livingston near storm drains to warn the public that dumping materials could harm Fleshman Creek and the Yellowstone River.

SGMS students paint warnings to help bring life back to a section of Fleshman Creek

By Matt Dettori
Enterprise Staff Writer

Sleeping Giant Middle School seventh-grader Sage Triantis studied Fleshman Creek in her biotech science class this fall and found an absence of life.

Her study point was between South Second and South B streets. When Triantis and her classmates studied other parts of the stream, they found an abundance of aquatic life.

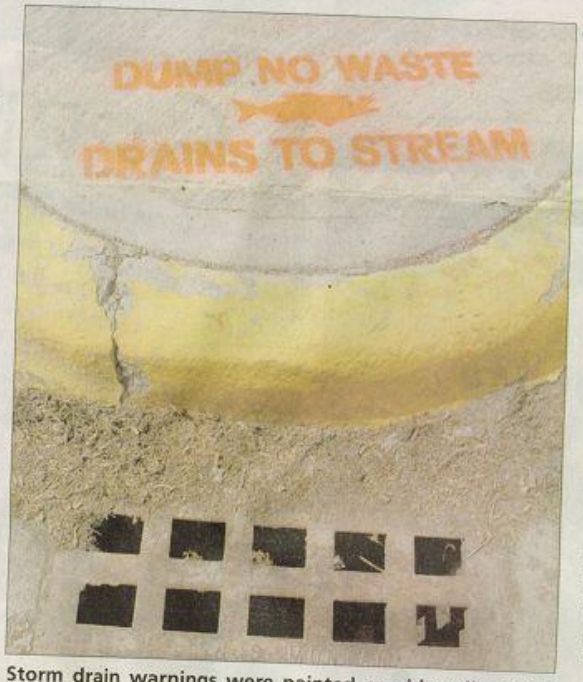
Fish use Fleshman Creek as a spawning ground to lay their eggs, said seventh-grade science student Gus Bornemann Tuesday as he walked north on South B Street.

Anything that flows into a downtown storm drain can end up in Fleshman Creek, said Bornemann.

As part of a SGMS project to clean up the creek, students fanned out Tuesday to spray painting a warning on sidewalks near storm drains, alerting the public to the risk of harming the stream.

"We're spray-painting the sidewalks to try and stop people from dumping their waste into Fleshman Creek, because the pollution can kill the macro invertebrates," Bornemann said.

Pollution in Fleshman Creek "also harms the ecosystem of the Yellowstone River, because fish in the Yellowstone spawn in the creek, and that's where they lay their eggs," he said.



Storm drain warnings were painted on sidewalks along Second, Main and B streets.

"Macro invertebrates," explained seventh-grade science student Emily Cornell, "are things you see without a microscope, like bugs."

The middle school science students will tell you pollutants that harm bugs also harm other organisms in the stream.

"Pollutants dumped into downtown drains make their way to Fleshman Creek, which kills the stream's organisms, Triantis said Tuesday while painting the warning on sidewalks on B Street.

"No bugs, means no food for the fish," she added.

The middle school students started marking the sidewalks Monday on South Second Street, along Main Street and finished B Street Tuesday.

SGMS science teacher David Pettit said he was surprised during his Fleshman Creek studies three years ago when his classes first discovered the absence of macro invertebrates near the downtown streets.

He was surprised because other parts of the stream had a lot more living organisms, Pettit said. The only section that seemed affected was between Second and B streets, he added.

Storm drains on those streets, south of Park Street, lead into the stream, he said.

Spray painting the sidewalks to make the public aware, Pettit said, was a fun project for the students to become more aware of their own surroundings and the environment they live in.

The recent projects are funded by a grant Pettit received last year. His biotech class was supplied with testing kits and tools to study the stream's quality.

The students used global positioning devices to locate and record every storm drain that spills into Fleshman Creek, Pettit said. Students will be able to use the storm drain locations to identify different variables in the stream's water quality, he said.

Fleshman Creek has become a major area of study for the Livingston School District.

Pettit's science classes can be found studying the creek three days a week during good weather, Bornemann said.

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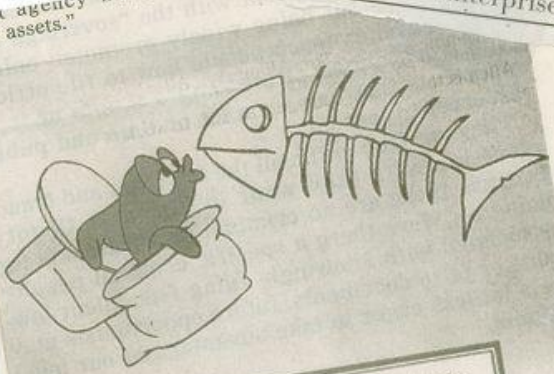
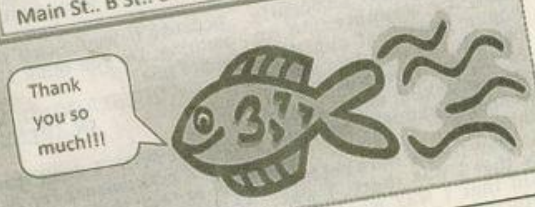
your assets."



The images above mean I'm dead due to the fact that people dumped harmful waste into Fleshman Creek. Do your part and don't dump waste into the drains on Main St., B St., or Second St.



July 2, 2010

FOR IMMEDIATE RELEASE

Livingston, MT, Middle School Students Label Storm Drains to Protect Fish

In an effort to restore and to protect life in a creek that flows through their town, students in David Pettit's 7th-grade science classes recently labeled downtown Livingston, MT, storm drains with bright-orange lettering that reads, "DUMP NO WASTE – DRAINS TO STREAM." Three years ago, a chemical spill killed fish and benthic macroinvertebrates – stream-bottom dwelling insects, mollusks, and crustaceans -- throughout much of the town reach of Fleshman Creek, a tributary of the fabled Yellowstone River. Mr. Pettit's students aim to prevent that from happening again.

In a report prepared for the Livingston Enterprise, student Tiffany Parsons explained that chemical dumping had turned an environment that was once "always growing," to one that is now "dying out." Fall macroinvertebrate samples taken by the class yielded a low diversity of mostly pollution-tolerant organisms, an indicator of one or more previous low water quality events. Typically, macroinvertebrates recolonize rapidly, so their continued absence since the storm drain spill suggests recurrent problems.

Livingston school students have studied water quality in the creek for more than a decade. For the past six years, they have also been involved in restoration and remediation efforts, planting riparian vegetation, studying and proposing solutions to backwater issues, and working to identify non-point source pollutants.

Units and lessons for the storm drain study were designed collaboratively by science teacher David Pettit and curriculum director Todd Wester. Mark Richards, Park County GIS specialist, helped students to interpret maps of storm drains and to understand how to use handheld GPS units to locate them. Park County Sanitarians Doris Morgan and Randy Taylor demonstrated to students how they take water samples from storm drains to check for pollutants. City of Livingston assistant director of utilities Sandy Wulf provided maps of the storm drains for Main, B, and 2nd Streets.

Students used stencils to label sidewalks next to 22 storm drain grates. They produced advertisements for publication in the Livingston Enterprise, and wrote for publication about their studies and recommendations. Funding for the project came in the form of a Montana Department of Environmental Quality (DEQ) Mini Grant.

INVOICE

Invoice Date	03-22-2010

Billed To:
Montana Department of Environmental Quality
Water Quality Planning Bureau
PO Box 200901
Helena MT 59620-0901

Quantity	Item	Price per Unit	Extended Price
	Storm Sewer Labeling Project Match Amount: $1000.00	$1500.00	$1500.00
		Total Amount Due	$1500.00

Payment of invoice can be made only by check and mailed to:

Livingston Public Schools
c/o Todd Wester
132 South B Street
Livingston MT 59047
Federal Tax ID # 81-6000691