*Friends of Deckers Creek*

# The State of the Creek, 2003 Interim Report

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Jay Berenzweig
Jason Freund
Laura Paugh
Brock Reggi
Evan Smith
William Thorne
David Thorne

Zack Liller, John Ree and Martin Christ conducted most of the sampling.
Martin Christ prepared this report. Wildlife and Fisheries Professor J. Todd Petty, at WVU's College of Agriculture and Forestry supported the investigations of aquatic biology with equipment and advice.

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--Interim Report—

## Introduction

This State of the Creek report is Friends of Deckers Creek's first progress report resulting from our "Clean Creek" program. This program's overall goal is to document the condition of Deckers Creek every year, so that the community and cooperators can track improvements over time and direct cleanup funds toward those parts of the watershed most in need of remediation. This report will also be distributed widely to local schools and governments and to state and federal agencies that work on water quality issues.

Annual State of the Creek reports will be released every fall; this interim report documents the first half-year of data, collected between fall 2002 and winter 2003.

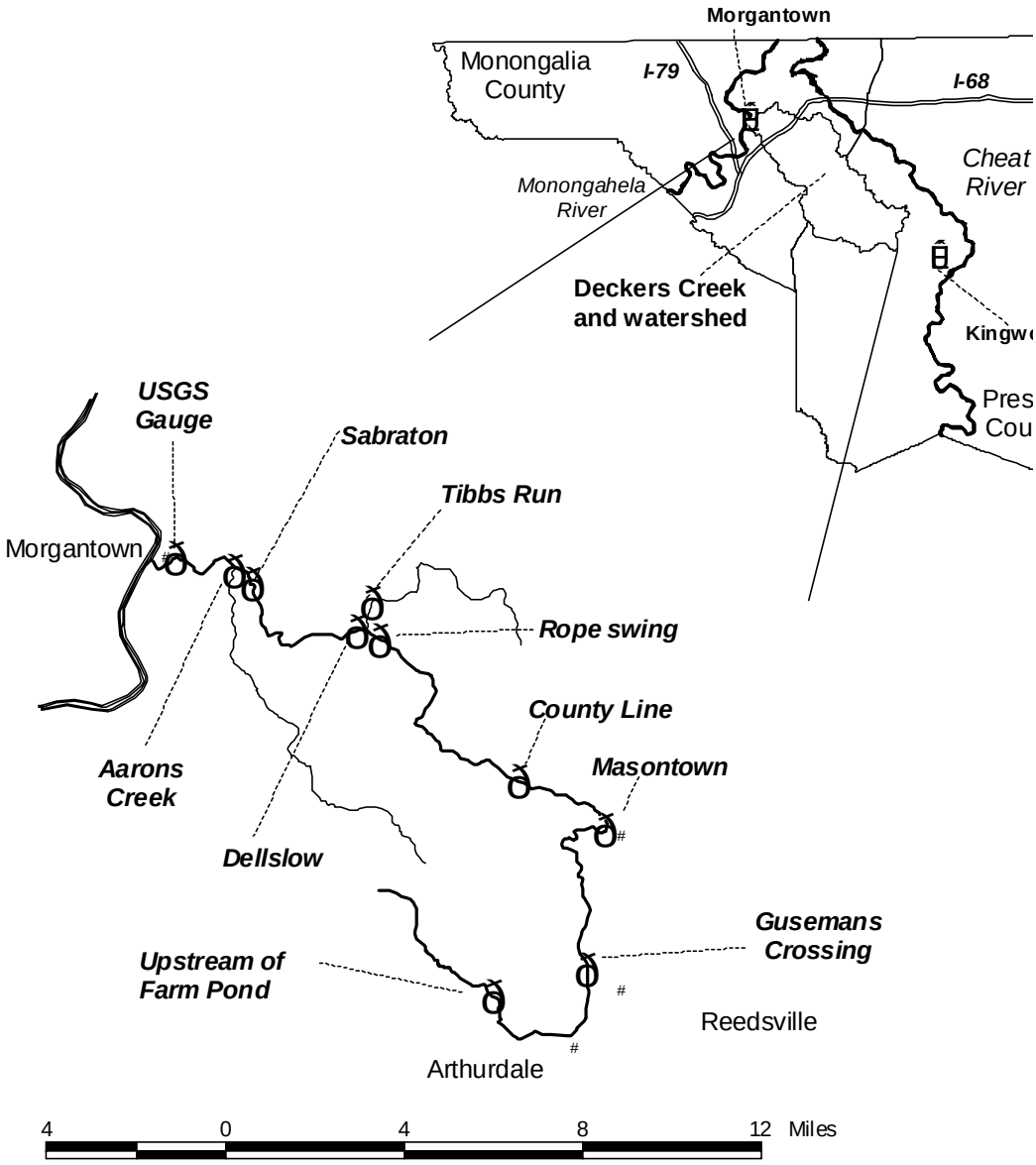
It is hoped that these long-term data will demonstrate the recovery of the creek, and the coming of rich biological communities and cleaner conditions.

# The Deckers Creek watershed

## *The geography of the Deckers Creek watershed*

Deckers Creek flows across the border between Monongalia and Preston counties twice. It starts on the eastern side of Chestnut Ridge, flows east into Preston County, north from Arthurdale to Masontown, and then toward the northwest. In that stretch, it cuts a "water gap" through Chestnut Ridge as it flows toward Morgantown. After it passes through the ridge, it flows approximately six miles through the Morgantown area, where it joins the Monongahela River (Figure 1).

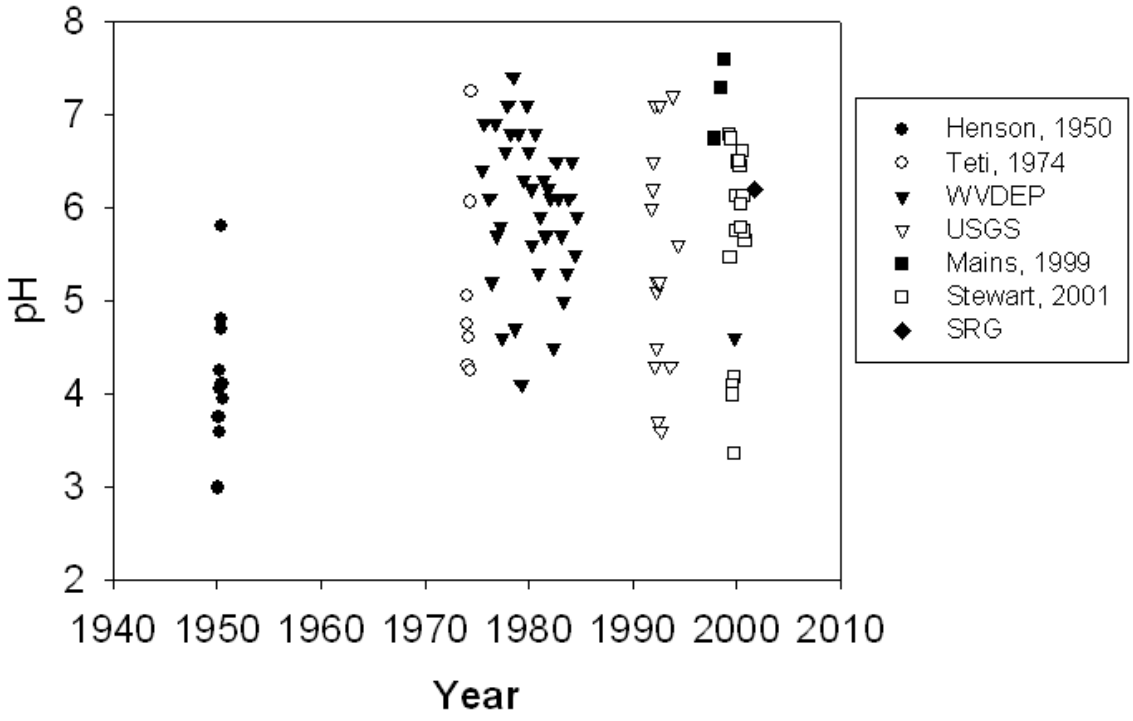
**Figure 1: Map of Deckers Creek, indicating towns and sampling sites for the study.**



## *Previous information*

Local residents, as well as sportsmen, environmentalists, state agencies, and WVU personnel have been paying attention to Deckers Creek for a long time, and have observed how it has changed over the years. Deckers Creek was heavily polluted by acid mine drainage (AMD), a result of mining coal from sulfur-rich seams, especially the Upper Freeport seam. The coal appears in two places in the watershed: areas with coal on the northwest and southeast sides of the watershed are divided by an area with no coal mining. Previous information indicates a gradual improvement in water quality, as measured by pH, in some parts of the creek, but little trend in other parts. For example, pH values at the location of the US Geological Survey (USGS) stream gage at the bottom of Kingwood Street in Morgantown improved from 1950 to 1974, but the average value has changed little since then (Figure 2). State standards require streams to maintain a pH between six and nine to support healthy fish communities.

**Figure 2: Wide variation in water quality in Deckers Creek in Morgantown, as measured by pH**



# Sampling scheme

## *Locations*

We chose ten locations for tracking the state of the creek from year to year. Eight sites are on the mainstem of Deckers Creek and two are on tributaries. We chose sites that fit as many as possible of the following criteria:

- Representative of a significant length of the creek with similar water quality and or channel characteristics
- Relatively accessible
- Different in water quality or channel characteristics from segments represented by other sampling sites
- Presence of structure for fish habitat
- Visited at times by the public, especially those involved in outdoor recreation.

We chose the following sites:

Deckers Creek at USGS gage in Morgantown This site is representative of the lower reaches of Deckers Creek, where its waters are not far from those of the Monongahela River. Users of the rail-trail frequently mention seeing large fish, almost certainly carp, in this segment of the creek.

Aarons Creek at the mouth Aarons Creek generally has water with good chemical qualities, and benthic macroinvertebrate and fish communities indicating very good water quality. This site is an index of the care with which the land along the northern part of Greenbag Road is being developed.

Deckers Creek behind Food Lion in Sabraton This site is representative of a long segment of Deckers Creek that is degraded by the drainage from the abandoned Richard Mine. FODC hopes that those crossing the creek on the rail-trail at this site will witness improvement in the creek rapidly, once the problem of the Richard Mine is solved.

Deckers Creek at the Dellslow Bridge Preliminary studies indicated that this area was likely to have the best fishery in the creek. The creek at this point is large enough to hold a sizable community of sizable fish. It is cool and aerated after passing through a long, steep, rocky gorge. Its water is also well buffered after passing a long stretch with no AMD inputs, and also passing an area with limestone bedrock and a limestone mine.

Tibbs Run at the crossing of Tyrone Rd. We chose this site because Tibbs Run is a possible refuge or alternative habitat for fish from Deckers Creek at Dellslow.

Deckers Creek at the rope swing This site was chosen as the hallmark site of Deckers Creek in the "gorge," a steep, rugged, rocky section often visited by summer bathers, as well as by those who just enjoy the scenery. It is of special interest to anglers because it physically resembles excellent trout habitat.

Deckers Creek at the Monongalia/Preston County Line This site shares many of the physical characteristics of the site at the rope swing. It differs in that the water at this point has not passed through the area with limestone bedrock or the limestone mine. This area is thus more likely to experience some episodes with acidic or metal-laden water. The smell of sewage is often present, and its biological effects may also be evident.

Deckers Creek at Masontown This segment occurs at the downstream end of a three-mile segment where Deckers Creek flows through a wooded area at a low gradient. It is also at a parking area for the rail-trail.

Deckers Creek at Guseman's Crossing This site (where the Kingwood Pike crosses Deckers Creek) represents a channelized, relatively low gradient segment of Deckers Creek after it has received the input of one stream (Kanes Creek) that is heavily impacted by AMD.

Deckers Creek upstream of the Reedsville Farm impoundment This site represents the headwaters of Deckers Creek and its tributaries, which rise on hard sandstone ridges, and carry water from soils with relatively little capacity to buffer either AMD or acid rain.

## *Measurements*

Friends of Deckers Creek is aware of water quality problems stemming mostly from either AMD or sewage. The sampling scheme therefore includes measurements that give some indication of the presence of these pollution sources in the water. The scheme also calls for using biological communities to assess water quality. In addition to the laboratory measurements, which are taken at each site four times a year, fish are sampled in the fall using an electric shocking device, and benthic invertebrates are sampled in the spring, using a kick seine. At the time that this interim report was prepared, two sets of water chemistry data, plus one set of fish community data, have been collected. Table 1 lists all the measurements to be made.

**Table 1: Measurements to be made at each sampling site**

| Measurement | Frequency |
|---|---|
| pH (in field and in lab) | Quarterly |
| Specific conductivity (in field and in lab) | " |
| Total iron | " |
| Total aluminum | " |
| Total manganese | " |
| Hot acidity | " |
| Alkalinity | " |
| Sulfate | " |
| Flow | " |
| Fecal Coliforms | " |
| Fish Community | September |
| Benthic invertebrate community | March |

# Results

Fish

Although Deckers Creek has been subjected to numerous forms of pollution, it does contain a fish community. Twenty species of fish were found at eight of the ten sampling sites when sampled in October 2002. No fish were found at two of the sites. Table 2 lists the species found at each sampling site.

**Table 2: Fish species found at eight sampling sites in October 2002. Two sites had no fish.**

| ----------Sites---------- | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tibbs Run | Aarons Creek | Upstream of farm pond | Gusemans Crossing | County Line | Rope Swing | Dellslow | USGS gage | Fish Species |
| 143 | 98 | 28 | 9 | 173 | 97 | 558 | 68 | *Total number of fish* |
| X | | | | | | X | | Black-nose dace |
| | X | X | | X | | X | | Bluegill |
| | | X | | | | | | Brown bullhead |
| | X | | | | | X | | Central stoneroller |
| | | | | X | | | | Golden shiner |
| X | X | X | | X | X | X | | Creek chub |
| | X | | | | | | | Fantail darter |
| | X | | X | | | X | X | Green sunfish |
| | X | | | | | | | Johnny darter |
| | | | X | | | X | | Largemouth bass |
| | X | | | | | | | Least brook lamprey |
| | X | | | | | | | Northern hog sucker |
| | X | X | | X | X | X | | Pumpkinseed |
| | | | | | X | | | Redbreast sunfish |
| | | | | | | | X | Rosyface shiner |
| | X | | | | | | X | Smallmouth bass |
| | | | | | | | X | Spotfin shiner |
| | X | | | X | | | | Spotted bass |
| | X | | | | | X | | White sucker |
| | X | X | X | X | X | X | | Yellow bullhead |

Aarons Creek contained the most (13) species, four of which were found nowhere else in the watershed. The species richness, as well as the particular species found in Aarons Creek (least

brook lamprey, fantail darter, and Johnny darter) indicates that this site had the best water quality.

Of the mainstem sites, Dellslow had the greatest number of fish species. Most of the nine species at the site are fairly pollution tolerant. Sampling at the same site in September, 2001, revealed an assemblage with fewer species and no small minnow species. The appearance in 2002 of black-nosed dace, and a variety of size classes of other species, especially creek chub, suggests that water quality at the site has remained good enough to allow fish reproduction and colonization from unpolluted tributaries. The change at this site has been positive, and additional years of sampling will determine whether it is, in fact, a trend.

There are two sites in the steep, "gorge" section of the creek upstream from Dellslow. Both of these sites contained subsets of the set of species present at Dellslow, with one or two additional species. The "Rope Swing" site, approximately one-third of a mile upstream from Dellslow but downstream of the limestone mine at Greer, contained four species. The site at the Monongalia/Preston County Line contained six species. The County Line site is less well buffered, because it is upstream from Greer, but may contain more species because it has a gentler gradient than the creek at the Rope Swing site. In addition, nutrient and organic matter input from sewage at Masontown may support a microbial and insect food web that eventually supports fish.

Tibbs Run, which joins Deckers Creek between the Dellslow and Rope Swing sites, supported only two species of fish, both of which were present in Dellslow.

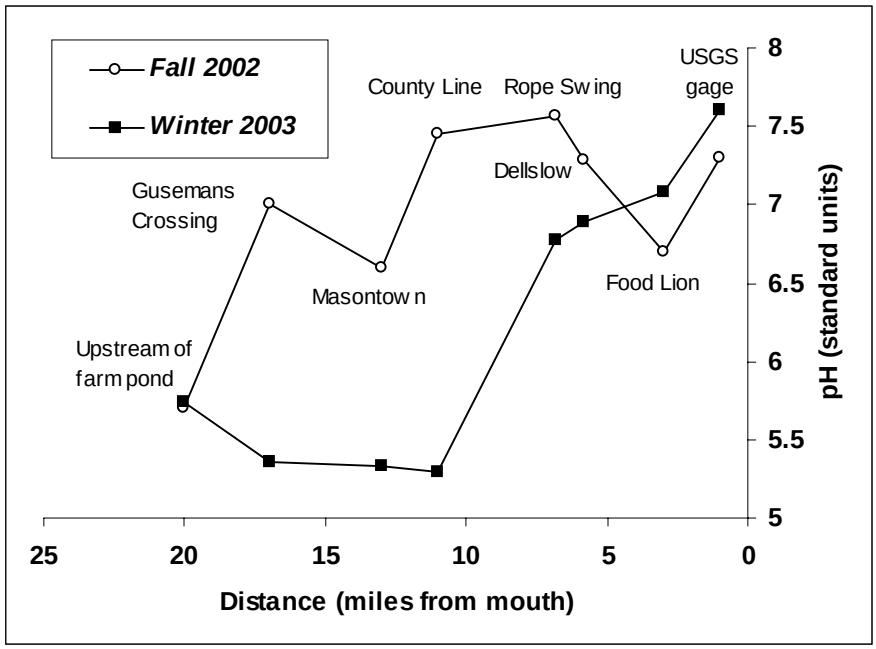
Of the remaining Deckers Creek sites, the one upstream of the Reedsville farm pond had the most (five) species. This site also had the distinction of having the largest fish found: a 34-cm brown bullhead. Sites at Gusemans Crossing and at the USGS gage had three and four species respectively. Sites at Masontown and behind Food Lion in Sabraton had no fish.

The most widely-occurring fish , creek chub and yellow bullhead, were both found at six sites. Creek chub were numerous at sites where it occurred, but oxnly a few bullhead occurred at any single site.

Water Chemistry

The fall 2002 sweep indicated that most of the creek was not, in fact, acidic. All but one of the sites had a pH greater than 6.5. By winter, 2003, however, pH values at three of the sampling sites had fallen below 6, indicating water quality impairment at those sites (Figure 3). The pH at the Aarons Creek site was always greater than 7. The pH in Tibbs run fell from 7.2 in fall 2002, to 6.5 in winter 2003.

**Figure 3: pH values at eight sites on the mainstem of Deckers Creek in fall 2002 and winter 2003**

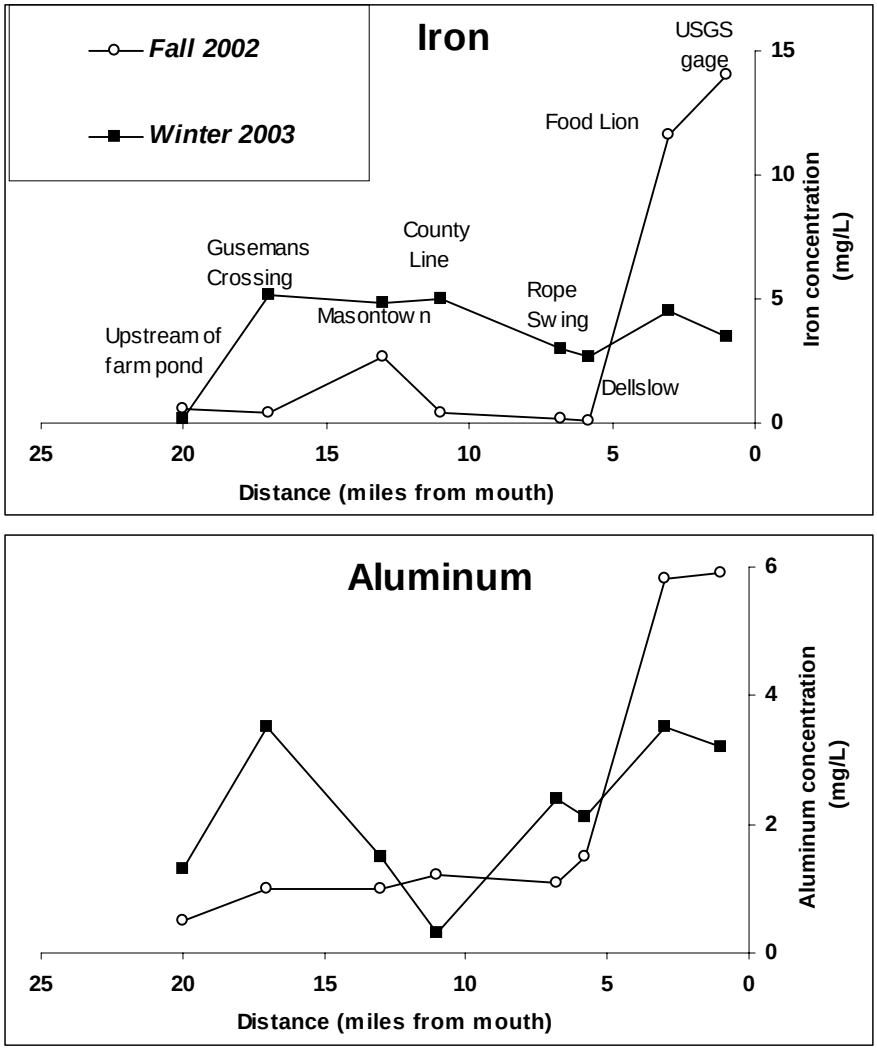



Concentrations of iron and aluminum appear in Figure 4. Iron concentrations in the lower part of the creek were higher in fall 2002, whereas concentrations in the upper part were higher in winter 2003. The pattern for aluminum is similar, though not as distinct. State water quality regulations have two standards for iron: water with more than 1.5 mg/L is deemed unable to support a warm-water (bass) fishery or human recreation. Water with more than 0.5 mg/L is deemed unable to support a cold-water (trout) fishery. Although the fast water and steep terrain in the Deckers Creek gorge suggests trout water, summer temperatures probably become too warm for trout to thrive. FODC has placed temperature monitors in the creek at several places in the gorge in order to learn more about its temperature regime. Deckers Creek exceeded the warm-water iron standard at Masontown and downstream of the Richard Mine in October 2002 and at all sites except above the farm pond in February 2003. Aarons Creek and Tibbs Run contained 0.5 mg/L or less iron at both sampling times.

There are two different time periods for evaluating aluminum concentrations in water. Average concentrations fail to meet the acute standard if they exceed 0.75 mg/L over a one hour period. Aluminum concentrations fail to meet a chronic standard if they average more than 0.087 mg/L over a four day period. These standards are identical for warm- and cold-water fisheries. Deckers Creek fails to meet the acute aluminum standard at all sites but one during each

sampling sweep. Tibbs Run and Aarons Creek, however, met the standard. No sites satisfied the chronic aluminum criterion

**Figure 4: Iron and aluminum concentrations in Deckers Creek mainstem sites.**




The decrease in pH and the increase in iron and, with the exception of Masontown, aluminum from fall 2002 to winter 2003 for sites upstream of and including Dellslow indicate a decline in water quality over this period. In contrast, decreases in aluminum and iron and increased in pH at the two sites below Dellslow suggest an improvement in water quality.

The behavior of the lower part of the creek is probably explained by the Richard mine, which drains into Deckers Creek between the Dellslow and Food Lion sites. The amount of water flowing from large mines usually fluctuates less than the amount of water flowing in a stream. Therefore, in summer and fall, when streamflow decreases, the chemistry of the water from the mine has a greater influence on the water downstream.

The reason for the decrease in water quality in the upper part of the creek is less clear. Water may cease to flow from certain surface mines in the upper watershed during the drier summer

and fall seasons. Alternatively, there may be agricultural practices (for example, liming) that add alkalinity to the creek during the growing season. Finally, many lakes and reservoirs have the capacity to generate alkalinity (the capacity to neutralize acid) through sulfate and nitrate reduction during the warmer months.

## Conclusions and future plans

Although improvements in the water quality of Deckers Creek have been observed, and fish communities exist in much of the creek, the data presented in this interim State of the Creek report indicate that the creek remains polluted and in need of remediation.

This monitoring program will continue in the spring with a water quality sweep and benthic invertebrate study, and in summer with one more water quality sweep. The seasonal sampling program will continue indefinitely (depending on funding) so that Friends of Deckers Creek, watershed residents and businesses and indeed all stakeholders can track the state of the creek.