HINKSON CREEK ACTION BRAINSTORMING LISTS

IF MONEY WERE NO IMPEDIMENT (EXPANSIVE AND CREATIVE LIST)

- Identify the ten largest discharge points into the Hinkson watershed and design systems that would detain and filter water flowing into the river. These filtration systems should be solar-powered and should be designed in such a way that the water being discharged is a higher quality than the stream into which it flows.
- Seriously restrict further development in the watershed.
- The second would be to create the "perfect" sewer throughout the watershed with no leaks or disturbances of the creek or its banks. (Ok, so this is the one that assumes no financial constraints)!
- Some of the university's Hinkson creek banks are pretty steep. I haven't been down to Reactor Park lately to see if the university had other areas that they could improve the creek bank or they could let the water flow into the flood plan. I suspect the University has a lot of land that could be useful to enhancements.
- The 38 acres of property by Bluff Dale Drive, if available, could be acquired as just a nature area.
- The University of Missouri on their land that sits below the huge #3 research center, the land that lays along the creek, there might be a way to get the Hinkson to overflow into that flood plain or at least the university could plant a better buffer zone.
- I know in their engineering school they had people who studied the way rivers meandered and such. They also studied what was left in the soil when the rivers changed their channels. Get some possible projects together right behind the research center (this is just south of the vet school) to improve the stream buffer or to modify the bank for better flow into the wet lands.
- Put a 50' buffer on each side of the stream.
- Forum Nature area – re-establish the wetlands and stop trying to make it into a prairie. I think this is possible as the land is owned by the city. The land would sort of go back to its intention of a wetlands or at least a sometimes flood plain. To "sell" it to the users of the trail, talk about taking it back to the original intention, slowing the water of the Hinkson, a low cost way to slow down some of the flow from the Hinkson as the water can spread out.
- Try to increase the upstream introduction of "fresh water".
- Design and build structures that would prevent run off from bridges / streets that cross the Hinkson. Channel the run off as per above.
- Seasonal (spring & fall) sampling should be performed for at least 2 years for benthic invertebrate populations in similar areas of the stream which were sampled previously. The sampling protocols should have a very robust, statistical design with adequate sample replicates to allow quantitative statistical analyses of the data. The results of the benthic invertebrate analyses should be peer-reviewed by outside experts in the field of aquatic ecology or related fields of expertise who would provide a scientific opinion on the status of benthic invertebrate populations in Hinkson Creek.
- The Physical Habitat Assessment proposed by the Science Team, the scope of the work activities should include in-depth analyses of benthic habitat characteristics and stream substrates among the various historical sampling areas in Hinkson Creek.
- I would spend at least as much money on mitigation as was spent on lawyer and consultant fees trying to avoid solving the Hinkson's problems.
- Filter all water before it enters the creek.
- Build filters (sand & gravel) to filter all parking lots, streets and highway runoff. Roof runoff would not need to be included. Start with the lots and roads with the highest volume of runoff and work down.

- This seems a strange question because money is always an object. So I will suggest that education is the key. I am not convinced that there is a problem with the Hinkson. Data I have observed suggest it has a better performance grade than what the media or special interest groups promote.
- I would like hard data, gathered over a reasonable period of time, using science based (not anecdotal) information to demonstrate or detail its existing condition and compare it to a target condition.
- We cannot address any specific remedy until we indentify a specifically known problem. So if money is no object, then I suggest more studies that provide specific discoveries.
- If money is the object in the way of this approach then we need to find a way to raise money to perform those studies.

RELATIVELY EASY ACTIONS OR "LOW HANGING FRUIT" LIST

- A study of Hinkson Creek and some of its tributaries to examine the habitat available and physical setting. While we need to use a very formalized and professionally conducted approach for the 11 sites that are currently proposed to be studied, a less rigorous supplemental of the entire system could be done by trained undergraduate and/or graduate students in Biology, Natural Resources and/or Geology at MU. Key parameters would include: bottom material, stream structure (riffle pool, etc). Tree, shrub and grass distribution, any human structures, and disruption of the flood plain, etc. This could be combined with a photo documentation to provide an excellent basis for both a greater understanding of the system and a tool for targeting future action.
- Determine the water and sediment budget of the system at different times and flow conditions. This would be more involved, but a more accurate estimate of these two parameters, could prove extremely useful in understanding the root causes of the factors influencing the biological community. Temporary stream and rain gauges would help determine the stream's response to storms. There are multiple tools for estimating sediment budgets that the science team could suggest.
- Litter control, erosion control.
- Under the auspices of MU "experiential learning" expectation, this could be done exceedingly inexpensively. Perhaps we can get some journalism or file major to a "fly thorough" of the creek using a wide angle lens to provide other tools that could be used in our discussions of specific sites and proposed action.
- Low-hanging fruit were identified well in Steve Hunt's presentation at the last meeting. Eliminating the lagoons he specified should be a high priority.
- The University of Missouri could get trees and such to plant. Some of the areas of the bank on the university site of the creek have no trees or few trees. They have forestry students; I would bet they have environmental engineers. This could be a class project, some type graduate student project.
- Monies available for the tree planting. I live on the Hinkson and I get free trees every Arbor Day to plant along the creek. The non- profit that supports Arbor Day could donate its trees to the city rather than give them to the public for a year.
- The low hanging fruit includes many smaller projects to reduce local flooding, storm water damage, and pollution. Reduction of pollution events should be goal. Another "guerrilla" project would be significantly reducing storm water 1 & 1 into our wastewater sewer system. Flow at the WWTP increases as much as fourfold during storms. It usually results in sewer overflows in a number of low-lying locations. None of these goals are real easy though, but we should try.
- In concert with the education goal I suggest all streams, including the Hinkson could be better identified in the Boone County area. I suggest signage on roads or within residential subdivisions or parks or other public places like business parks that clearly and concisely let people know what portion of any creek or tributary they are crossing whether that be by automobile or pedestrian activities. This intended to raise awareness of the travel distances of certain streams and their connectivity to larger scale waterways.
- Establish some method of collecting stormwater fees in the unincorporated areas of County. Suggest a county stormwater charge appear on annual real estate tax bill as a possible method, just as City of Columbia collects a stormwater charge on its monthly water and light utility accounts. Those taxable City properties could be exempted, since they are already paying on utility accounts. Or this real estate tax collection method could substitute the City utility method and the two entities could share the collection.
- Insist that public projects conform to same protective criteria as private developments.
- Identify the polluters or problem contributors and target them more profoundly (more costly) than everyone on same scale.

- Rain gardens – the knowledge, resources and interest are all in place for a large number of Rain gardens to be installed in people's yards and various other public and private lands in Boone County. For a tiny example of the resources that have been assembles, see; Carp-Columbia Aquatic Restoration Project- **hhtp://www.gocolubiamo.com/volunteer/opportunities;carp.php** - And, there are a bunch of relevant videos on you tube and elsewhere, included this example of the City of Columbia's you tube videos: **https://www.youtube.com/watch?**
- I propose that the Hinkson TMDL Stakeholder Committee consider nineteen projects in the I-70-US 63 intersection region described in the report located at the url below. The details are in the report. I have copied the site descriptions below (Sites #1-#19). These projects are in an area that drains into the Hinkson Creek where many of the non-supporting test results have occurred. Most of the projects have low or moderate costs (Low Hanging Fruit). Most of the projects are on public lands. Most of the private land involves large amounts of impervious surface in the form of buildings and parking lots. I am not aware of the current status of any of these projects.
  http://www.helpthehinkson.org/documents/HCWRPREPORT-REVISED20091130.pdf
  Summary version below. Full version is at link above.

- **Site #1**
  Location: BMP site #1 is located on MODOT right-of-way, southeast of I-70 Drive SE.
  Description: This BMP site consists of a fairly flat, open, turf-grass area. The proposed BMP would reside between the outfall of a stormwater culvert from the southeast and the invert of a stormwater culvert to the west. The BMP site is bordered by electrical utilities on the east side and a sanitary sewer line on the south. Site #1 discharges to sites #6 and #10.
  Property Owner: Missouri Department of Transportation.

- **Site #2**
  Location: Site #2 is located within the MODOT right-of-way on the east side of the US Hwy-63 north bound off-ramp, in alignment with the western terminus of Lansing Avenue.
  Description: Site #2 consists of an existing channel, approximately 1,830 feet in length. The channel runs north/south parallel to the adjacent off-ramp and is sharply cut and highly eroded. The channel runs adjacent to an electric utility line. Site #2 discharges to site #10.
  Property Owner: Missouri Department of Transportation.

- **Site #3**
  Location: Site #3 is located adjacent to northbound US Hwy-63, immediately adjacent to a private property.
  Description: Site #3 consists of 1,380 linear feet of earthen channel. The channel runs north/south parallel to Hwy-63. The channel is moderately eroded with very sparse vegetation. Site #3 discharges to site #5.
  Property Owner: Missouri Department of Transportation / private.

- **Site #4**
  Location: Site #4 consists of the vegetated parking lot islands within a shopping complex.
  Description: Site #4 consists of approximately 3.40 acres of paved parking area and drive aisle with intermittent vegetated parking lot islands.
  Property Owner: private

- **Site #5**

  Location: Site #5 is located north of Trimble Road, west and adjacent to a shopping complex. Site #5 resides in very close proximity to Hinkson Creek.

  Description: Site #5 consists of several undeveloped lots that have been recently graded to a very minor slope from east to west. The site receives only minor surface flow from the paved areas to the south and east and the site discharges to a swale along its western edge. The swale currently conveys stormwater to a newly constructed detention facility at the north end of the site.

  Property Owner: private

- **Site #6**

  Location: Site #6 is located north and west of I-70 Drive SE, east of the US Hwy-63 connector, and south of the I-70 eastbound on-ramp.

  Description: Site #6 consists of a large turf grassed area with sharply cut and highly eroded channel approaching from the south and from the east. The BMP site is proposed to reside between the outfall of a culvert from the east and the invert of a culvert to the west, as well as the channels to the east and south. The BMP area is bordered by a sanitary sewer line in the south-central area as well as a water line on the southern end. Site #6 receives flow from site #1 and discharges to site #10.

  Property Owner: Missouri Department of Transportation.

- **Site #7**

  Location: Site #7 is located east of the US HWY-63 northbound on-ramp and northwest of and adjacent to a private business.

  Description: The site consists of a large turf-grass open area fairly flat on the east half, then dropping rather quickly towards the northwest corner. The northwest corner contains the outfall of two large culverts and a very broken and semi-vegetated concrete flume. This BMP area is bordered by a sanitary sewer line to the west and a water line to the east. Site #7 does not receive water from or discharge to any other BMP sites.

  Property Owner: private

- **Site #8**

  Location: Site #8 is located east of site #7, between Penn Terrace and the residential neighborhood to the northeast.

  Description: Site #8 consists of a low lying turf-grass open area. The site breaks from the south and from the north creating a large swale formation that ultimately drains to the northwest. The site is bordered by sanitary lines, electrical lines, and water lines to the northeast and northwest, and is bordered by electric lines to the southwest. Site #8 does not receive water from or discharge to any other BMP sites.

  Property Owner: private

- **Site #9**

  Location: Site #9 is located adjacent to and west of the US Hwy-63 connector and extends from approximately 300 feet south of Clark Lane north to an existing concrete flume, along an existing earthen channel approximately 800 feet in length.

  Description: Site #9 consists of the 800 foot length of earthen channel adjacent to the US Hwy-63 connector. The channel is moderately eroded, sparsely vegetated and outfalls to a concrete flume on the north end, which conveys the stormwater north to Hinkson Creek. Site #9 does not receive water from or discharge to any other BMP sites.

  Property Owner: City of Columbia / Missouri Department of Transportation.

- **Site #10**

  Location: Site #10 is located west of and adjacent to the US Hwy-63 connector and south of the I-70 eastbound off-ramp.

  Description: Site #10 consists of approximately 1,000 linear feet of riprap reinforced channel. The channel has substantial depth (12' – 30') and rises sharply to the adjacent roadways on the west and north, as well as to the commercial sites to the west and south. The channel receives substantial amounts of stormwater from the culverts to the south and east. Site #10 receives the second greatest volume of stormwater in comparison with the other 18 examined BMP sites, surpassed only be site #15. Site #10 receives water from sites #1, #2, #6, #11, #12, #17, #18 and #19.

  Property Owner: Missouri Department of Transportation.

- **Site #11**

  Location: Site #11 is located west of and adjacent to the US Hwy-63 southbound on-ramp, and south and east of, and adjacent to Conley Road.

  Description: Site #11 consists of a large open turf-grass area surrounded on all sides by roadways. The site receives flow from the south and west via four culverts and outfalls to the north via a culvert to site #10. Site #11 conveys stormwater from the discharging culverts to the outfall through a series of highly eroded and sparsely vegetated earthen channels. The site is bordered on the south by electric and water utilities, and is bordered on the west by two sanitary sewer lines. Site #11 receives drainage from sites #17, #18 and #19 and discharges to site #10.

  Property Owner: Missouri Department of Transportation

- **Site #12**

  Location: Site #12 is located south of and adjacent to I-70 Drive SE, and is east of and adjacent to the US HWY-63 northbound off-ramp / US HWY-63 connector.

  Description: Site #12 consists of both a moderately sized open turn-grass area as well as 1,830 feet of channel running adjacent to the US Hwy-63 northbound off-ramp. The existing earthen channel is highly eroded sharply cut and devoid of vegetation. The channel and site drain to the north, to a culvert that ultimately discharges to site #10. The site is bordered by water and electric lines to the east and is crossed by water, electric and sewer lines approximately 200 feet from its northern end. Site #12 does not receive discharge from any other sites.

  Property Owner: Missouri Department of Transportation.

- **Site #13**

  Location: Site #13 resides west of and adjacent to a private business, near the buildings northwest corner.

  Description: Site #13 consists of the turf grass area northwest of the existing private business. The area contains steep slopes that break to the west – southwest towards a newly constructed detention facility.

  Property Owner: private

- **Site #14**

  Location: Site #14 is located south of and adjacent to a private business parking lot, on the south side of the building.

  Description: The site consists of the existing failing detention structure that appears to have been cut-off from its incoming flows. The detention structure is an earthen basin with a concrete weir outlet structure that

discharges to the south. Site #14 discharges to site #15 and does not receive stormwater from any other BMP sites.
Property Owner: private

- **Site #15**
  Location: Site #15 resides south of and adjacent to the south of a private business parking lot and north of and adjacent to westbound I-70 and the westbound I-70 off-ramp. Site #15 encompasses the south and east sides of site #14.
  Description: Site #15 consists of a large low-lying open space between the highway to the south and the parking lot to the north. Site #15 contains the convergence of two channels, one entering from the east and one entering from the northeast. The site contains multiple billboards and their associated electrical connections as well as a sanitary sewer utility along the northern and eastern edges. Site #15 receives stormwater from Site #14 and does not discharge to any other BMP sites.
  Property Owner: Missouri Department of Transportation / private

- **Site #16**
  Location: Site #16 resides east of adjacent to, and parallel with northbound US Hwy-63 and south of and adjacent to eastbound I-70.
  Description: Site #16 consists of 750 feet of eroded and sparsely vegetated earthen channel running parallel from south to north along northbound US Hwy-63. The channel outfalls at its northern end to the western terminus of site #10 and is then conveyed to Hinkson Creek. Site #16 does not receive stormwater from any other BMP sites.
  Property Owner: Missouri Department of Transportation.

- **Site #17**
  Location: Site #17 resides east of and adjacent to both northbound US Hwy-63 and the southbound US Hwy-63 on-ramp and west of and adjacent to the northbound US Hwy-63 off-ramp.
  Description: Site #17 consists of a large turf-grass area along with the convergence of two roadside channels from the southeast and southwest. The site breaks to the north and outfalls to a culvert which conveys the stormwater to site #11. Site #17 is bordered by a water line and a sewer line at the extreme northern end of the site. Site #17 receives flow from site #18 and discharges to sites #11 and #10.
  Property Owner: Missouri Department of Transportation.

- **Site #18**
  Location: Site #18 is located east of and adjacent to the southbound US Hwy-63 on-ramp and west of and adjacent to southbound US Hwy-63.
  Description: Site #18 consists of a large open area bordered on all sides by roadways. The site breaks consistently from southeast to northwest and contains the roadside drainage ditch adjacent to and parallel with the southbound US Hwy-63 on-ramp. The site does not appear to contain any utilities other than the concrete stormwater flume that the site discharges to on the north end. Site #18 discharges to sites #17, #11 and #10.
  Property Owner: Missouri Department of Transportation.

- **Site #19**
  Location: Site #19 located west of and adjacent to Conley Road and east of and adjacent to the old MODOT facility off of Conley Road.

Description: Site #19 consists of a large open turn grass area bordered on the east and south by roadways and bordered on the west by the MODOT facility. The site breaks primarily to the north to a culvert that discharges to site #11. The site resides in a large swale formed between the slope up to Conley Road on the east and the slope up to the MODOT facility on the west. The site is crossed by both water lines and electrical lines. Site #19 discharges to sites #11 and #10.

Property Owner: Missouri Department of Transportation / private

GENERAL COMMENTS FOR ACTION

- Restoration of the flood plain using plantings and, where necessary, limited earthmoving to provide greater habitat, a more natural hydrograph and to filter some nutrients and other pollutants entering the creek and its tributaries.
- My primary goal would be to reduce peak flows perhaps by as much 40% as suggested by EPA. The problem is too much storm water quickly reaching our creek system.
- I don't see the problem as limited to the Hinkson. You can't solve all of the Hinkson problems without solving the Perche Creek problems. The only way to solve the current problem is to retain huge quantities of storm water upstream on the Hinkson and Perche / Bear systems. Taxpayers probably will have to fund these solutions. New development should not add to the problem if required to retain excess storm waster onsite.
- A property goes from the cul de sac of Bluff Dale Drive to almost to Stadium road. This area is a flood plain by the creek and has very steep hills. If this can continue to be forested and maybe direct the flow of the water so it too on high water occasions, flood the lowlands, then it can slow the Hinkson down, just as in the Forum areas. These 38 acres should be a conservatory land and not developed.
- Bluff Dale Drive property should at least be considered as a non developed area, so it could be used as a big green space with all the trees it already has in place.
- City's trunk sewer line runs through the above property. The trunk sewer line in some places is close to the Hinkson creek and the bank around where the sewer line is eroding. There should be a plan in place to try to preserve the banks around the city sewer lines. If not then other structural things will have to be planned, paid for and fixed in the future. Right now the ground is holding the sewer line in place. When the ground is washed away there is nothing holding the sewer line.
- I live on the County House Branch Creek next to Twin Lakes and the junction with the Hinkson. The Hinkson confluence with the Perche Creek is only a short distance downstream from that. When the Perche Creek is full or overflowing, the Hinkson is unable to discharge and it backs up and flood areas upstream well past the County House Branch Creek and perhaps the Flat Branch Creek junctions. During normal years this series of events occurs 2 – 6 times annually with relatively minor storms (3" or less) and the water may remain out of the banks for 6 – 12 hours each time. As a result, I have lost over 100 trees over the years. My efforts to start new trees have failed every time that I have tried. The Twin Lakes area has lost many trees as well.
- We may need large storm water retention system west, north and east of Columbia to solve our current problems.
- We may need to review our current requirements for dealing with storm water from new development to make sure that we aren't making things worse.
- I don't understand why the city's stormwater educator is not engaged in this process. And, how does our effort interdigitate with Columbia's Storm Water Utility?
- I hope the members of the Hinkson Stakeholder will do their best to participate in the Ninth Annual Hinkson Clean Sweep from 10 am to noon on Saturday Oct. 20th , I've pasted some info below. To sign up and for more information see: **hhtp://www.gecolumbiamo.com/volunteer/hinksoncleansweep.php**