GATEWAY DREDGING AND CONTRACTING, LLC
1777 Highway 79 South
Old Monroe, MO 63369
Office# (636)665-5180
Fax# (636)665-5184

Mr. Charles Frerker
US Army Corps of Engineers
St. Louis District
1222 Spruce Street
St. Louis, MO 63103

Mr. Frerker:

This letter is in response to the Public Notice for P-2920 and P-2921. Gateway Dredging and Contracting Inc. is the operating company for Limited Leasing Company and J.T.R. Inc. We would like to express our support for the issuance of the permits. These companies have been dredging sand in this area for over 45 years. During that time we have employed numerous highly skilled and compensated Union Operators. These employees have produced sand for many of the high profile construction projects in the area. Some of the projects include Lambert Field Expansion, Highway 40 and 364, the Dome, and new Busch Stadium. Our operation is an essential part of the St. Louis area and economy. Issuance of the permits would allow our companies to continue their operations and service to the area. Please consider our comments pertaining to permit renewal. Thank you.

Brian J. Viehmann, CEO

Gateway Dredging and Contracting, LLC.

Sailor, Matthew NWK

From: Richard Geekie [rfgeekie@gmail.com]
Sent: Friday, April 03, 2015 11:36 AM
To: Sailor, Matthew NWK
Cc: MDNR MVS External Stakeholder; ssatterthwaite@kdheks.gov; Mike Odell; David Williams; BHall@nhcweb.com
Subject: [EXTERNAL] Comments on dredging permit applications of Holliday Sand and Gravel
Attachments: Dredging and Channel degr Missouri River.pptx

Categories: Red Category

Dear Mr. Sailor:

Mike Odell asked me to submit the attached PPT summarizing some of my observations from my studies of the Missouri River. This is a somewhat abbreviated presentation because I did not want to make the PPT too long and also I just wanted to suggest that if dredging has an impact on channel degradation, the process is complicated.

The conclusions that that I have come to, and not all are presented in this PPT are the following:

1) that dredging does not cause a nick point and therefore does not cause head cutting. A preliminary investigation demonstrated this, however, the "test period" was only about two weeks. Further investigation over a longer period is required to confirm this result during extended periods of dredging.

2) the constriction of the floodplain at river mile (RM) 374.1 (I-435 Bridge) and also the constriction of the floodplain on the south end of the airport have caused most of the degradation.

3) It may be possible that dredging has contributed to channel degradation in the KC reach during the drought of 2000 to May 2007 because little bed-material load was coming from upstream.

4) The channel degradation in KC reach has appeared to stop since about 2007 (the end of the drought) and the channel upstream and downstream of the Kansas River has rebounded, that is, aggradation has occurred, even during significant amounts dredging in the KC reach.

5) The sills upstream of the I-435 Bridge may also have and still contribute to head cutting upstream of the Bridge.

The attached PPT has not been vetted by sediment transport experts and has not been peer reviewed. This PPT is derived from tow write-ups that I have been developing on dredging and channel degradation.

If you have any questions, please let me know.

Regards,

Richard
Richard F. Geekie, P.E., M.ASCE
13904 W. 69th Terrace
Shawnee, KS 66216
913-669-3370 (M)
rfgeekie@gmail.com

The correlation between dredging and degradation of the Missouri River channel in the Kansas City reach

The Kansas City reach is between River miles (RM) 340 and 410

Richard F. Geekie, P.E., M.ASCE
April 2015

Summary:

1) Channel degradation has been greatest in the Kansas City reach, approximately RM 340-410.
2) Corps-measured low-water surface profiles (75%) indicate that the channel bed has degraded significantly before 1974.
2) These low-flow measurements indicate that the channel in the Kansas City reach has been recovering (aggradation) since about 2006.
3) Significant dredging occurred after 2006.
4) A drought as measured by Kansas City gage discharge occurred from 2000 to May 2007; this drought appears to be correlated with increased or accelerated degradation at KC.
5) The end of the drought in early May 2007 appears to coincide with beginning of aggradation in the KC reach.
6) There are two slopes to the Kansas City channel: a steepening upstream above about RM 374 and flattening below about RM 374; these changes in water-surface slopes indicate degradation.
7) The water-surface slope above RM 374 begins to decrease in 2008 while the slope below RM 374 begins to Increase.
8) There is the possibility that large dredging amounts during a drought or low flow (low bed-material load from upstream) might result in head cutting.

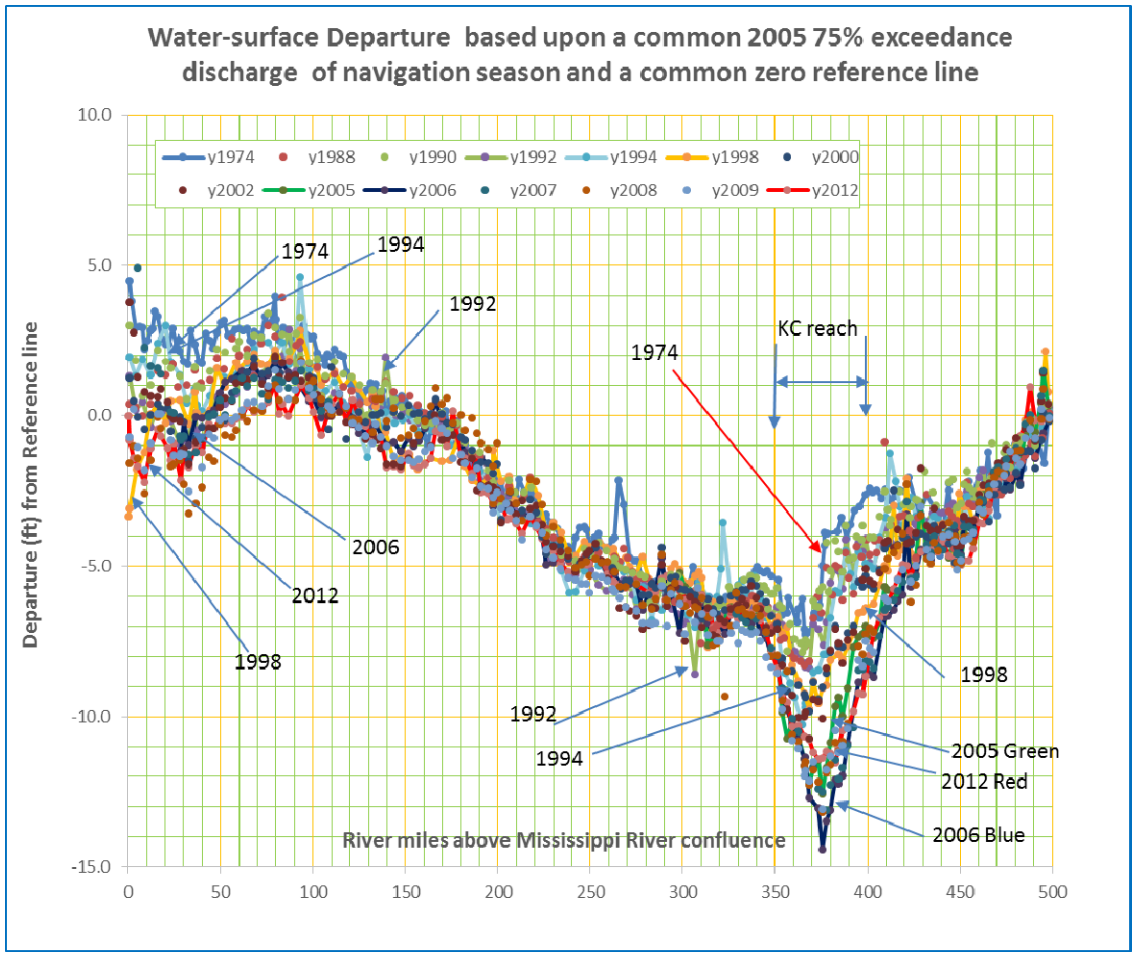

Figure 1 - A measure of channel degradation from the departure of 2005 75% water-surface profiles from common reference line shown as “0.0” on vertical axis

1) The greatest departures (degradation) from the reference line in the ***above figure 1*** are between RM 340 and 410.

2) There are also large departures (degradation) above RM 410 and below RM 340.

3) There are changes in slope of the departure “curves” at about RM 340 and above RM 420.

4) These changes of slope may be due to different degradation processes.

5) Notice the movement upstream of the low point from RM 366 to 374 between 1974 to 2006.

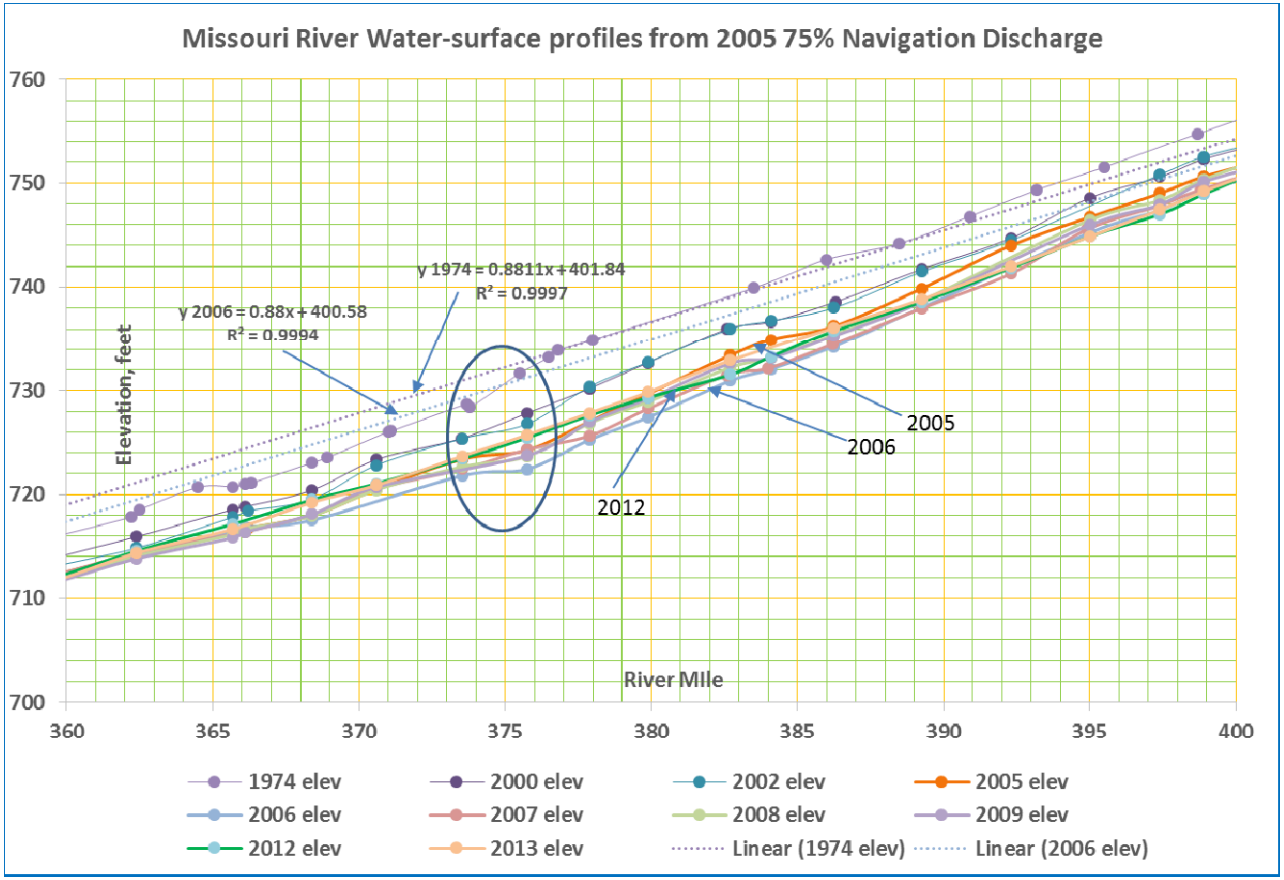

Figure 2 - Selected Low-flow water-surface profiles. Profiles after 2006 have shifted above the 2006 profile indicating channel recovery or aggradation.

A possible cause of the beginning of degradation in Kansas City reach:
a nick point and head cutting at river mile 374 and constricted floodplain just below Kansas River, between Broadway Bridge and I-35 Bridge (1450 feet floodplain width).

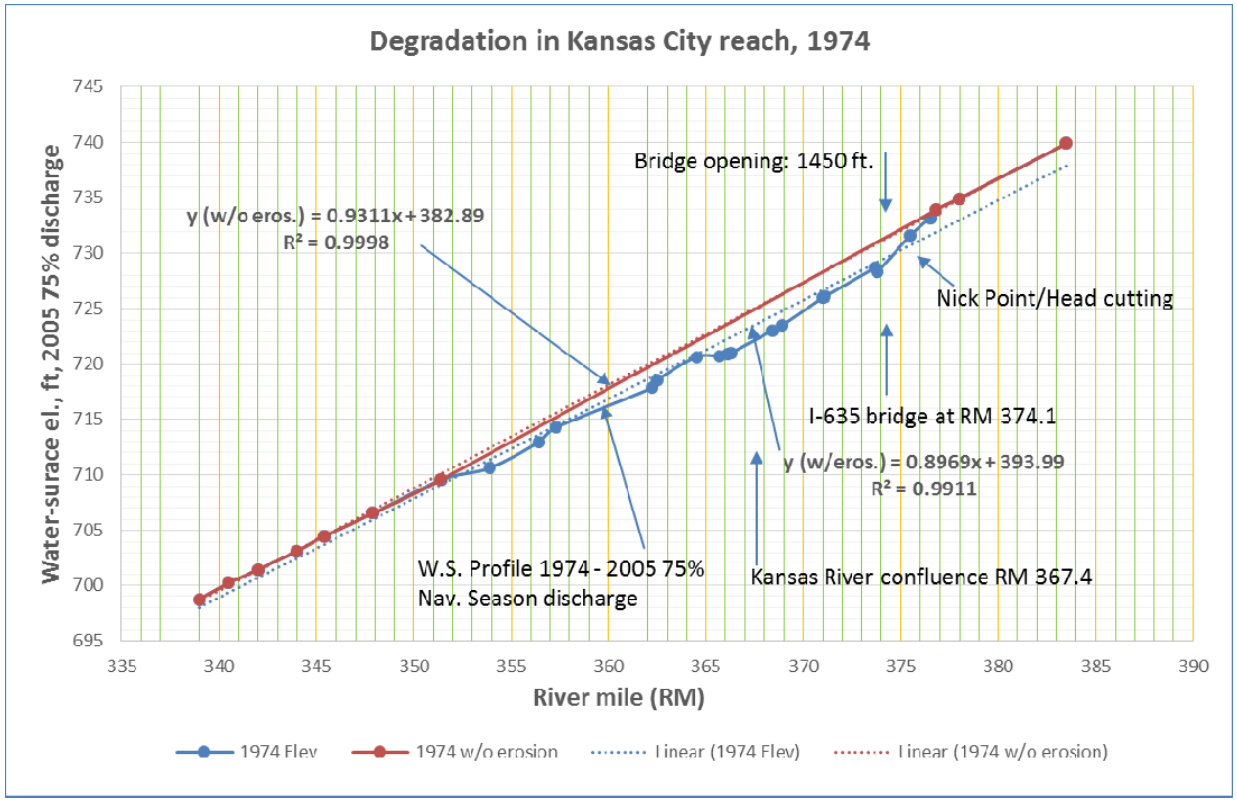

Figure 3 – Floodplain constriction at RM 374.1 and adjacent to Downtown Airport, RM 366.1 to RM 364.6

Head cutting is a process that can explain the steeping of the upstream slope, above RM 366 or RM 374 and flattening of the downstream slope. It is also possible in this case that sills above RM 383 are too high.

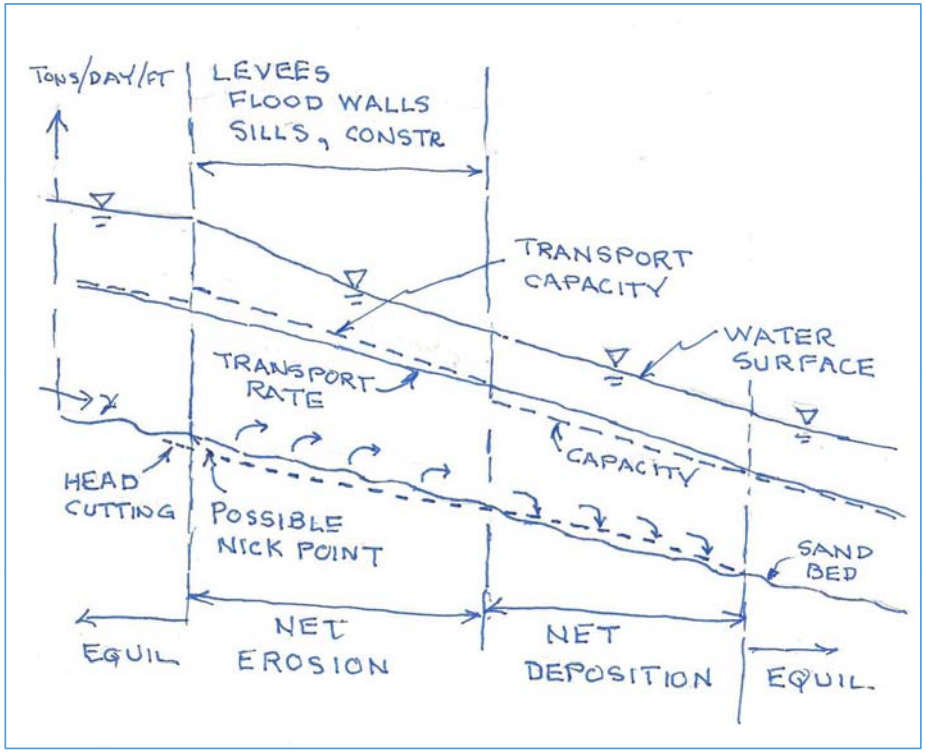

Figure 4 – Process of head cutting

Table 1 - Water-surface slopes of Missouri River below Rulo, NE (2005 75% discharge of the navigation season) Source: slopes calculated from KCD, USACE data contained in a spreadsheet

	feet per mile								
Year	498.1 -28.2	150-350	293-366	340-366	340-374	380-410	366-448	410-454	454-498
1974	0.88	0.87	0.89	0.82	0.84	0.94	0.94	0.88	0.94
1988	0.88	0.86	0.88	0.82	0.87	0.97	0.94	0.90	0.96
1990	0.88	0.86	0.87	0.80	0.86	0.95	0.95	0.92	0.96
1992	0.89	0.86	0.89	0.81	0.84	0.94	0.95	0.91	0.96
1994	0.88	0.87	0.85	0.72	0.78	1.00	0.96	0.86	0.98
1998	0.88	0.89	0.85	0.78	0.79	1.00	0.97	0.92	1.00
2000	0.88	0.86	0.85	0.75	0.77	1.01	0.97	0.89	0.97
2002	0.88	0.86	0.83	0.71	0.77	1.03	0.98	0.91	0.99
2005	n/a		0.82	0.70	0.72	1.04	1.00	0.94	1.00
2006	0.88	0.87	0.83	0.71	0.70	1.11	1.03	0.95	0.97
2007	n/a			0.70	0.71	1.10	1.02	0.94	1.00
2008	0.88	0.86	0.84	0.69	0.70	1.12	1.02	0.89	1.00
2009	0.88	0.86	0.83	0.71	0.73	1.08	1.01	0.93	0.99
2012	0.88	0.86	0.84	0.72	0.75	1.08	1.00	0.92	1.03
2013	n/a		0.83	0.73	0.76	1.04	1.00	0.93	1.01

Low-flow water-surface slopes above RM 374 have increased from 1974 to about 2008 while water-surface slopes between RM 340 – 366 and RM 340 – 374 have decreased from 1974 and 2008. These trends reverse after 2008.

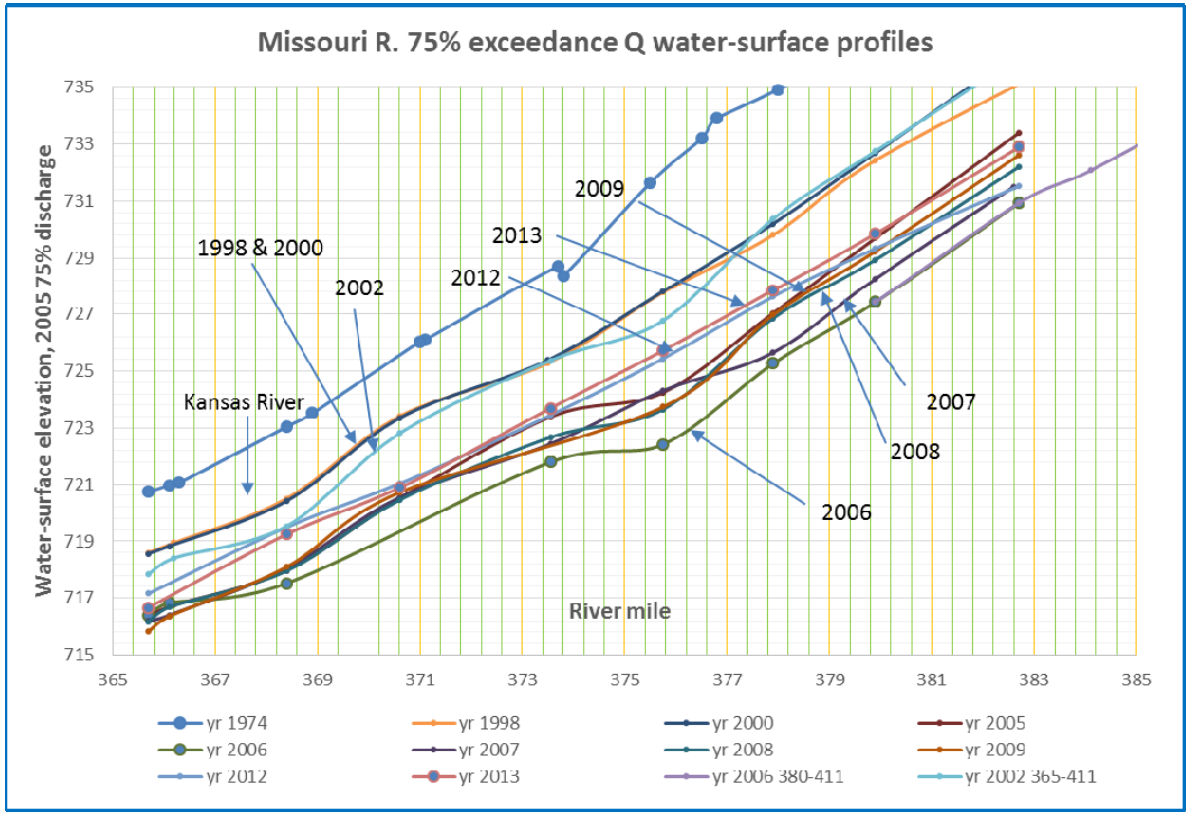

Figure 5 - Low-flow water-surface profiles have shifted up above the 2006 water-surface profile beginning in 2007, indicating deposition has occurred after 2006 for all profiles.

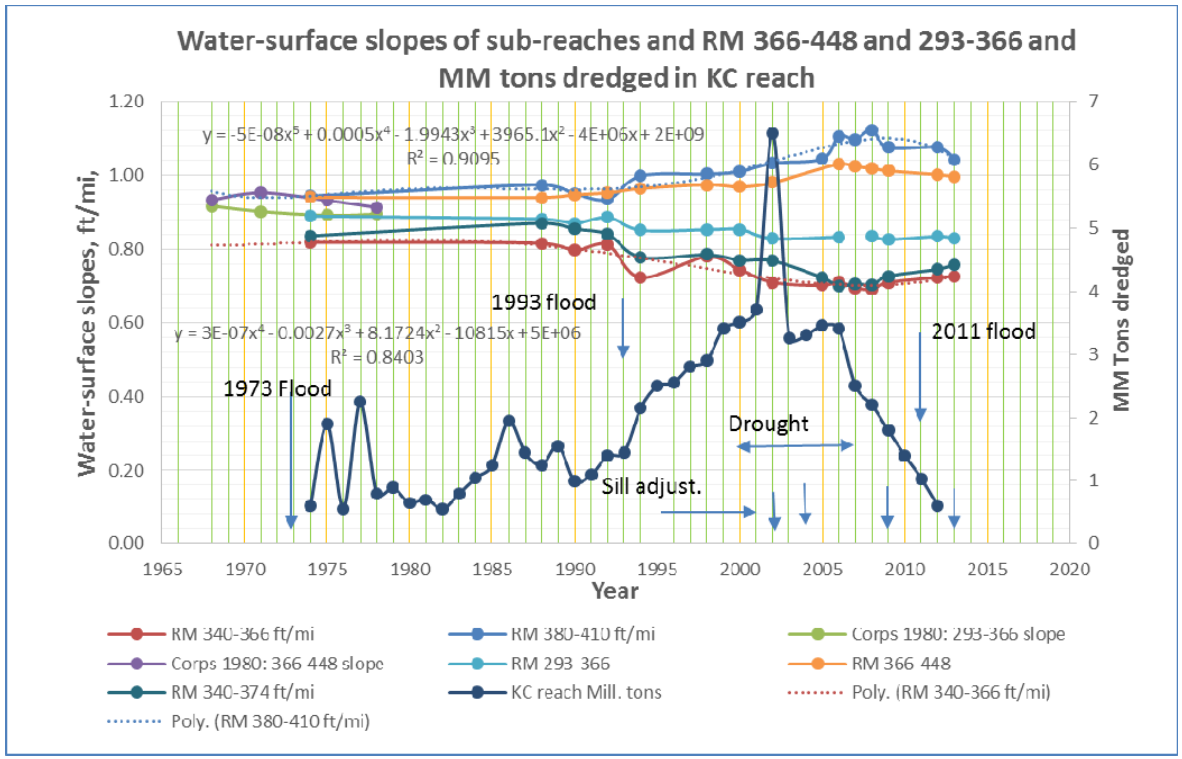

Figure 6 – Correlation between dredging in Kansas City reach and channel slopes

The slope of RM 380-410 begins to decrease or stabilize after 2007 while the slope of RM 340-366 (= RM 340-374) begins to increase or stabilize after 2007. These changes in slopes indicate deposition. Dredging in 2008 is about 2.4 MM tons.

Figure 6:
Between 1995 and 2001, there is significant increase in dredging but no change in the sub-reach slopes of RM 340-366 and RM 380-410.

After 2006, there appears to be some deposition in lower sub-reach and upper sub-reach as the dredging decreases. However, the precipitous decrease in annual dredging between 2006 and 2011 does not appear to correlate very well with the small changes of the two sub-reaches.

The drought ended in early May 2007 which suggests that the bed-material load increased which would offset any effects of dredging on channel degradation.

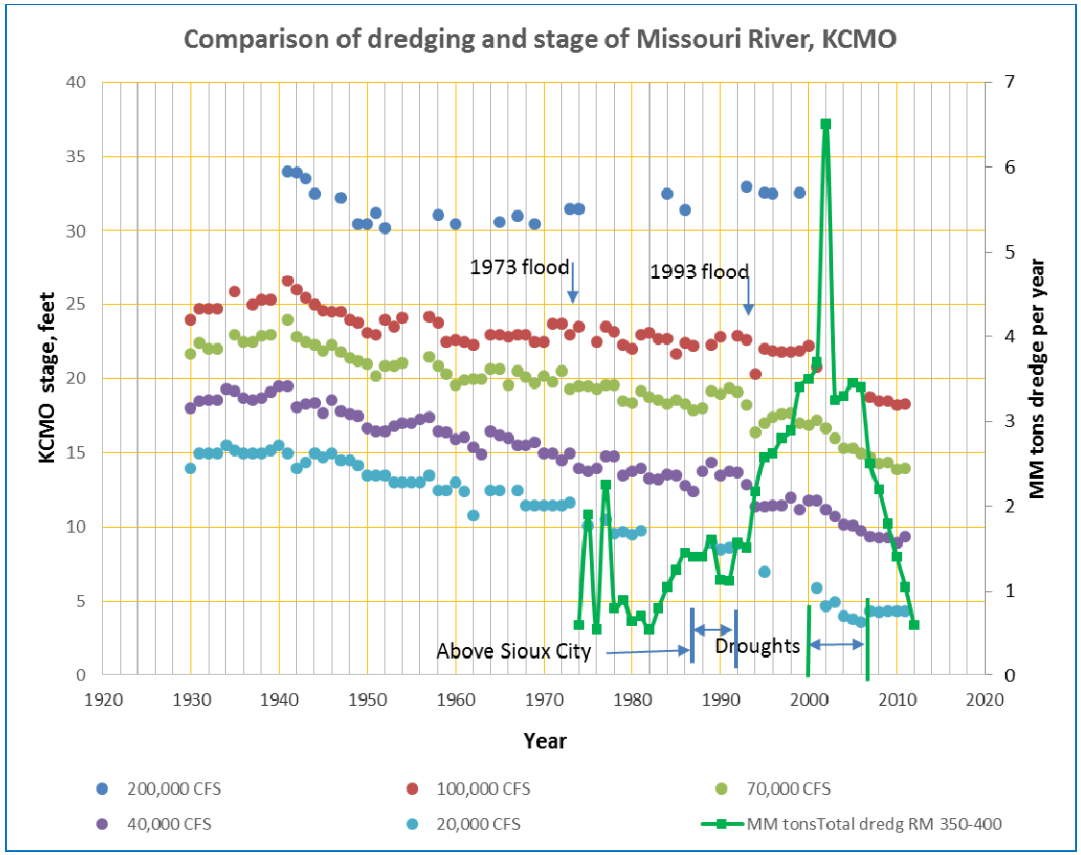

Figure 7 – Correlation between dredging and channel recovery after drought (2000-May 2007) Kansas City gage stage begins to stabilize in 2007. Dredging was above 2.0 MM tons from 2007 through 2009.

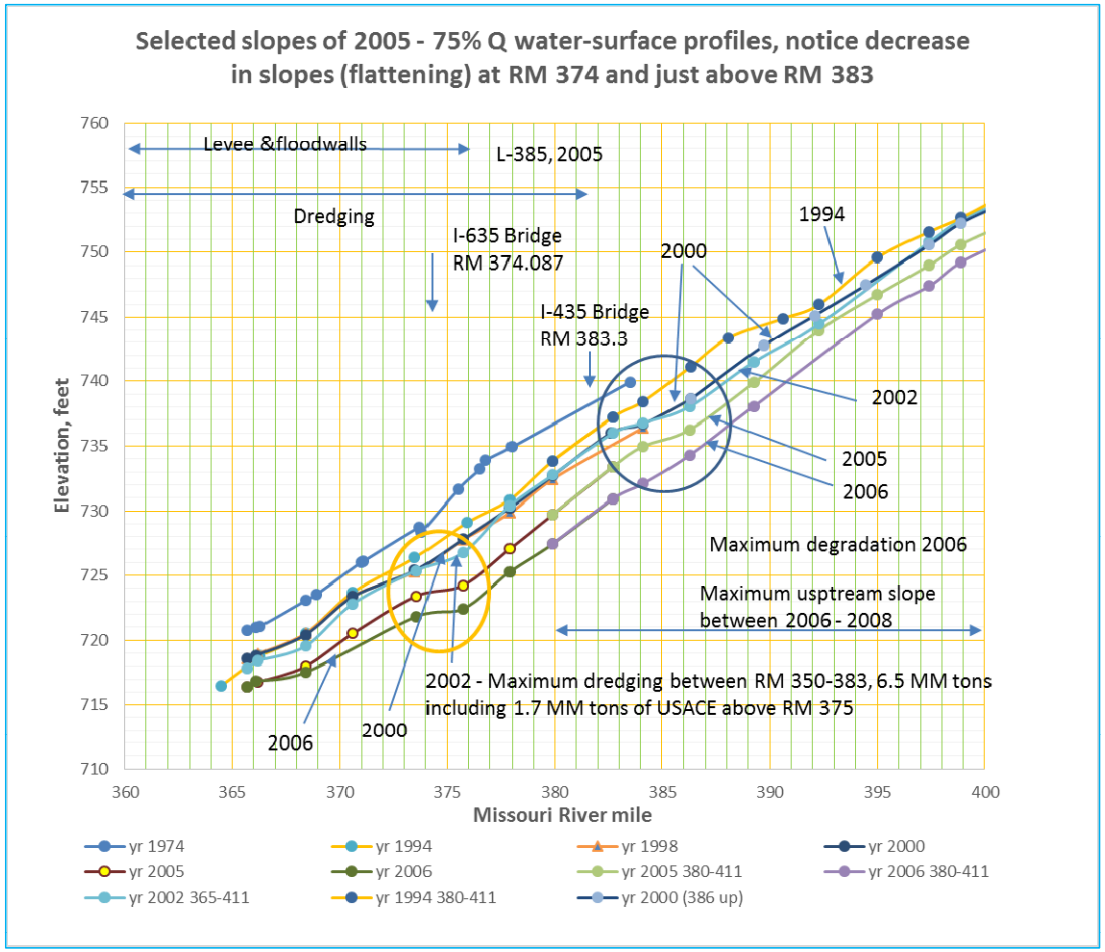

Figure 8 – Flattening of 75% water-surface profile at RM 374.1 (I-635 Bridge)

Possible causes (processes) of slope “flattening” in Figure 8 (RM 374 and RM 383) along with increasing of water-surface slopes and lowering of upstream low-flow water-surface profiles

1. Error in surveying such as incorrect bench mark elevation.

2. Scour hole downstream of dredging pit (hole) and head cutting from downstream scour hole, starting in 2002. There was no dredging above RM 383, however, the flattening at this location may be the result of deposition at RM 382.7 between 1998 and 2000. Again, the drought began in 2000 and ended in May 2007.

3. Sills and dikes upstream of I-635 and I-435 bridges confined flow more frequently over time resulting in increases bed shear more frequently. For example, the 2011 flood was contained within the Kansas City reach channel.

4. Drought was from 2000 through early May of 2007. The West Consultants L-385 report says that degradation appears to occur during low flow and aggradation appears to occurs during high flow.

Conclusions:

1) Dredging in a large sand-bed river with a small profile gradient does not cause head cutting, at least from the upstream edge of the dredge hole (pit). This was not discussed explicitly in this presentation. The Missouri River has a profile gradient of less than 1.0 foot per mile.

2) Figures 6 and 7 suggest that dredging is not correlated that well with channel degradation in the Kansas City reach, except perhaps during extended drought conditions. See discharge records at Kansas City gage between 2000 and 2007.
3) Dredging in the Kansas City reach below the Kansas River could be increased to about 2.0 MM tons per Year.

Holliday
SAND AND GRAVEL COMPANY
9660 LEGLER ROAD
PH: (913) 492-5920 LENEXA, KS 66219-1291 FAX (913) 438-0200

April 2, 2015

VIA EMAIL TRANSMISSION

Matthew Sailor
Regulatory Project Manager
U.S. Army Corps of Engineers--Kansas City Regulatory Office
601 East 12th Street, Room 402
Kansas City, Missouri 64106

Re: Missouri River Dredge Permit NWK-2011-00363

Dear Matt:

Please accept the following comments from Holliday Sand & Gravel Company ("Holliday") on our request for renewal of our Missouri River commercial dredging permit. We believe our comments will serve to inform interested parties that Holliday's River dredging, as requested in its U.S. Army Corps of Engineers ("USACE") permit application, is sustainable and critical to the infrastructure of greater Kansas City (KC) and as such is clearly in the public's interest.

Critical Demand for Sand

As construction in KC ramps up, the demand for sand is projected to soon exceed all available sources. As you know, concerns about bed degradation have reduced the volume of sand that Holliday can dredge in the Kansas City Segment of the Missouri River, up to 79% less. Much of the reduction has been supplemented in river segments upstream and downstream of KC. Regardless, we are predicting an annually increasing shortfall of tonnage beginning in 2015 as construction in the region ramps up. At this time there is no reliable alternate source for this growing shortfall of quality concrete sand that should begin this year.

Progress on Evaluating and Addressing Degradation

Holliday continues to participate in and help fund the Missouri River Degradation Study that seeks to determine the impacts, causes and solutions to bed degradation. However, the bed computer model that is a significant element of the Degradation Study remains incomplete and flawed; accordingly, Holliday agrees with the USACE's decision not to include the preliminary draft results of the model as part of the agency's evaluation of applications in this current permit cycle.[1] In the meantime, as the Degradation Study continues, changes have already occurred that suggest reduced degradation: the KC area river dike structures that intentionally cause scouring of the bed and preserve the navigation channel were lowered by the Corps thus decreasing the scouring effect, KC area dredging tonnages were significantly reduced, and dredge limits were imposed in five-mile reaches, moving dredge locations further from KC. Unfortunately, a once in a lifetime reservoir discharge event occurred in 2011 and has set back the progress from these significant changes.

Nevertheless, we are encouraged by the bed recovery that is evident from the recent river surveys, showing an increase in water surface elevations since 2009 from River Mile 280-390. Comparison of river cross-section surveys completed in 2009, 2012, and 2013 by the USACE indicate that the channel bed of the Missouri River has actually aggraded (material has deposited) from River Mile 325 to RM 370. This information was presented by the USACE at the February 9, 2015 meeting - see *2015 Annual Missouri River Dredgers Update Meeting*. This reach of river includes where Holliday has been dredging sand for construction materials over the same time period. Though it is a small improvement, it is significant considering the high flows and scour that occurred during the record 2011 scour event.

Data also presented shows the average slope line of the construction reference plane water surface profile has increased approximately 0.5 feet through this reach over this same time period. This bed aggradation represents approximately 2.5 to 3.0 MTons of bed material deposition in this reach over this 3 to 4 year time period from 2009 to 2013. We believe much of this bed recovery actually occurred after the high flow event in 2011, although cross section surveys are not detailed enough to confirm this hypothesis. In summary we note that both channel bed and associated water surface elevations have increased in this reach with a combination of ongoing dredging by Holliday within the regulatory limits and an extremely high flow event in 2011.

Isn't Dredging the Problem?

It's not that simple - there's plenty of sand in the Missouri River and it's constantly being replenished from upstream reaches. Reducing dredging is not the answer to bed degradation.

The US Geological Survey (USGS) measures suspended bed material sediment discharge on the Missouri River at Kansas City and summarized annual bed material sediment loads in their report *Characteristics of Sediment Data and Annual Suspended Sediment Loads and Yields for Selected Lower Missouri River Mainstem and Tributary Stations, 1976-2008*. For the time period from 1995 through 2006 (years that included an extreme drought) the **USGS reported that approximately 11.7 million tons per year of bed material sediment (very fine sand or coarser material) was transported by the Missouri River through Kansas City.** This quantity of sediment load is at least 10 times greater than the bed material sediment

[1] The USACE officially took this position during the agency's annual meeting with the Missouri River dredgers on February 9, 2015. If the USACE changes course during its processing of Holliday's permit application, Holliday hereby incorporates by reference into this comment letter the numerous submittals we have made to the USACE critiquing the model's development and implementation, including without limitation, Holliday's letters from January 30, 2015, November 20, 2014, and September 24, 2014.

dredged by Holliday on an annual basis since 2009, indicating that the sediment inflow to this reach adequately replenishes the bed material sediments extracted through ongoing dredging operations.

Is River Dredging really necessary?

Years of operational experience by Holliday support our conclusion that river dredging is by far the most economical and efficient method for obtaining sand in KC. In our experience, there is no reliable or economical alternative available for concrete sand produced by Missouri River dredging. Holliday also has determined that the average annual savings to the cost of KC area construction from Missouri River sand dredging is likely in excess of ten million dollars every year as compared to other sources of aggregate such as pit mining. This is in contrast to the determination of the USACE when the current Missouri River dredge permits were issued in 2011. Indeed, the authors of the Missouri River Commercial Dredging Environmental Impact Statement ("EIS") completed for the issuance of the revised permits in 2011concluded that land based pits could fully replace the shortfall from the reductions in Missouri River dredging. Based on our experience operating a Missouri River floodplain pit, we know that the excess fines and clays that must be removed increase costs and stifle the production of quality concrete sand which accounts for 75% of the demand in KC.

As it turns out, pits have not developed into a viable alternate source for concrete sand, though they have helped supply finer sand products and gravel. When the current Missouri River dredge permits were issued in 2011, Holliday made comments requesting another 800,000 tons in the Waverly segment (downstream of KC), stating:

> *"There are not sufficient alternate sources of sand in the Kansas City Segment."*

This amount was not approved for the 2011 permits, and the USACE response stated:

> *"The USACE has received letters from the Master's Dredging Company and Missouri Sand Company LLC (see letters in Appendix A) rebutting this assertion and providing credible information about existing and planned sand mining operation with ample reserves of sand that meets the requirements and can fulfill the market needs now and in the future."*[2]

Holliday can now say that since 2011 the two operational and one planned land sand pits have not developed into viable sources of concrete sand. As we predicted, the two existing pits have had serious deposit problems and will not be able to meet the shortfall of quality concrete sand needed to replace the reduction in Holliday's permit in the Kansas City segment, and to a greater extent, the increased demand we are now experiencing as the economy improves.[3]

What was an educated and experience based prediction in 2011 has now become established fact. A land based pit sand deposit in the ground does not guarantee a reliable, quality product. Because of geology and economics, Missouri River sand pits continue to be very difficult to operate, and are not going to supply the increased regional demand for concrete sand.

---

[2] Commercial Sand and Gravel Dredging on the Lower Missouri River
Record of Decision, March 2011, Section 4, Alternative Analysis, page 3-37,38

[3] Holliday in fact operated one of these pits for many years before selling it.

Meeting the Increasing Demand for Construction Sand

To prevent shortages and significant negative economic impacts to the region's construction industry during the next five year permit cycle, Holliday has requested that its existing tonnage allocations be preserved for the Kansas City and St. Joseph segments, and that its tonnage allocation in the Waverly Segment (downstream of the Blue River) be ramped up 10% each year to meet our projected increase in construction market demand. If the demand is not there, the increased quota in the Waverly Segment will not need to be dredged. Holliday is not requesting any increase in dredging in the KC or St. Joseph segments.

The Waverly Segment of the Missouri River has been aggrading, has very limited structural risk, and will in no way contribute to any potential degradation impacts upstream in the Kansas City Segment. Based on the recent stream bed surveys, we have calculated a net deposition of approximately 1.1MM tons in the upper Waverly Segment, between River Miles 345 to 357, from the time period 2009 to 2013 (0.75 feet average aggradation multiplied by 500 foot width between tips of dikes, by 12 miles long by 90 lbs/ft^3 is approximately 1.1 million tons of sediment aggradation). Considering the historic 2011 scouring event, this clearly shows a stable and aggrading reach.

Providing this additional tonnage allocation to Holliday is also consistent with the analyses contained in the *Missouri River Commercial Dredging EIS* and decisions outlined in the USACE accompanying Record of Decision. To protect from increased demand from the construction industry, Holliday had requested additional tonnage in the stable to aggrading Waverly Segment in its comments on the Final EIS. The USACE response stated:

> *"The USACE cannot increase the annual limit in the Waverly segment because the Final EIS (USACE 2011) did not consider an alternative with a higher annual extraction limit. However, in the next permit cycle the USACE may be able to increase the annual extraction limit in the Waverly segment if the segment continues to be stable or aggrading under Alternative B during the next five years.*[4]

It is now the next permit cycle and the Waverly segment continues to be stable AND is aggrading, thereby qualifying for additional dredging greater than the USACE's Alternative B criteria. The significant economic benefit of removing a small portion of the sand flowing past Kansas City is clearly in the public's interest, and reasonable amounts of Missouri River dredging remain very much necessary to meet the demand for construction materials in the KC Metro. With the existing close monitoring and adaptive management, as much dredging as possible should be allowed to continue that does not have a determinable, detrimental impact on bed degradation. Holliday's requested tonnage serves the needs of our area while being consistent with the USACE's permit application review criteria as applied to Missouri River commercial dredging.

Thank you for your time and consideration, and for including these comments in the record as support for reissuing NWK-2011-00363 with the requested revised dredging tonnage in the Waverly segment.

---

[4] Commercial Sand and Gravel Dredging on the Lower Missouri River Record of Decision, March 2011, Section 4, Alternative Analysis, page 3-41

Sincerely yours,

Holliday Sand & Gravel Company

Mike Odell

Vice President - Operations

CC:

Stacia Bax
wpsc401cert@dnr.mo.gov
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102
Scott Satterthwaite
ssatterthwaite@kdheks.gov
Kansas Department of Health and Environment
Bureau of Water - - Watershed Management Section
1000 SW Jackson Street, Suite 420
Topeka, Kansas 66612-1367.