

# Kansas TMDL Prioritization Framework – March 16, 2016

## 1. Introduction

### The National Backdrop for TMDL Prioritization

The Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program established by EPA and the States proclaims:

*“The Clean Water Act Section 303(d) Program provides for effective integration of implementation efforts to restore and protect the nation’s aquatic resources, where the nation’s waters are assessed, restoration and protection objectives are systematically prioritized, and Total Maximum Daily Loads and alternative approaches are adaptively implemented to achieve water quality goals with the collaboration of States, Federal agencies, tribes, stakeholders, and the public”* (emphasis added).

Among the six elemental goals of the Long-Term Vision is “Prioritization”:

*“For the 2016 integrated reporting cycle and beyond, States review, systematically prioritize, and report priority watersheds or waters for restoration and protection in their biennial integrated reports to facilitate State strategic planning for achieving water quality goals”.*

The draft guidance for the 2016 Integrated Report encourages States to establish and identify their priorities beyond the traditional 2-year window rendered by the biennial Section 303(d) listing of impaired waters. States have flexibility in how they define their priorities and may use a variety of ways to describe these priorities, which include:

- by geographic units: watersheds, ecoregions, and basins;
- by pollutants; or,
- by designated uses.

Setting long-term CWA 303(d) priorities from FY 2016 to FY 2022 affords States an opportunity to strategically focus their efforts and demonstrate progress over time in achieving environmental results. As such, the long-term priorities are not expected to substantially change from FY 2016 to FY 2022.

Consistent with the new Vision, beginning in 2016, the Integrated Report (IR) submitted by States should include or reference: the State’s long-term priorities for the CWA 303(d) program from 2016 to 2022 and the associated rationale used to set these long-term priorities. The rationale should explain how the State arrived at the long-term priorities; and, it should discuss where the State plans to develop future TMDLs, alternative restoration approaches or protection plans and the extent to which they already exist in priority watersheds or water segments.

### Kansas Nutrient Reduction Framework

Since 2004, Kansas has chosen to address excessive nutrients in state waters through a strategy of load reduction ahead of pursuing numeric nutrient criteria. Since 2008, Kansas began listing

streams as impaired by excessive phosphorus and nitrate impairments have been noted since the beginning of the 303(d) process. Much of the Kansas strategy has subsequently been corroborated through the issuance of the 2011 EPA memorandum, *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions*, outlining the elements of a framework for States to follow in reducing nutrients prior to formally adopting numeric nutrient criteria. The eight elements address prioritization and goal setting, implementing actions and accounting and reporting of nutrient reduction efforts in the State. The first element calls for “prioritizing watersheds on a statewide basis for nitrogen and phosphorus loading reductions”. The three steps under the first element include:

- A. Use best available information to estimate nutrient loadings on a HUC 8 basis.
- B. Identify the major watersheds that contribute a substantial portion of nutrient loadings in the State
- C. Within each major watershed, identify targeted or priority subwatersheds at the HUC 12 scale to implement specific nutrient load reduction activities.

This first recommended element of this nutrient reduction framework became the foundation for Kansas establishing its priorities under the Vision for its 303(d) program. As subsequently described, a number of factors were evaluated for 68 of the 90 HUC 8’s in Kansas that had such information with each HUC 8 ranked relative to the others on each factor. A final selection of 16 priority HUC 8’s established the beginning of establishing long-term priorities for TMDL development with the 2014 Integrated Report.

## **2. The Kansas 303(d) Prioritization Process: the Factors**

Kansas, in 2012, began collating information on factors influencing nutrient impacts in the state. Of the 90 HUC 8’s comprising the state of Kansas, 68 had ambient phosphorus data. Phosphorus was chosen as the key nutrient to control because 1) phosphorus levels are inherently high in Kansas fresh waters; 2) conventional wisdom says phosphorus has been the controlling nutrient in fresh waters systems, whereas nitrogen controls in saltwater ecosystems; 3) phosphorus is typically easier to control, given its penchant to adhere to sediment and organic matter and settle out of the water column, whereas nitrogen tends to remain in the water column; and, 4) nitrogen is going to be reduced extensively by controls on nitrate and ammonia through water quality criteria.

### **Historic Condition**

The first set of factors described the historic ambient condition and relative generation of phosphorus loads within each of the 68 HUC 8’s. Those factors include:

1. Estimated average incremental total phosphorus load generated within the HUC 8 in T/yr.
2. The estimated total phosphorus load exiting the HUC 8 (including P loads imported from upstream HUC’s) in T/yr.
3. The median total phosphorus concentration of all streams within the HUC 8 in mg/l.

The loads provided some hydrologic context to the ambient concentrations found in each HUC 8. For example, one HUC 8 with a very high median TP concentration was the Lower Sappa Subbasin in Northwest Kansas. However, the lack of surface flows in that subbasin precluded high loads being generated within the HUC and, hence, low P loads exiting the HUC. Therefore, the inclusion of hydrology tended to push the rankings of loads toward the eastern and central portions of Kansas.

The HUC 8's were ranked from high to low for each of these indicators and scores were assigned to percentile groupings, i.e., Ranks 1 – 7 got 5 points (top 10%); Ranks 8 – 17 got 4 points (11 – 25%); Ranks 18 – 34 got 3 points (26 – 50%); Ranks 35 – 51 got 2 points (51 – 75%); Ranks 52 – 61 got 1 point (76 – 90%) and the lowest seven ranked HUC 8's, #'s 62 – 68 (bottom 10%) got no points.

### **Stressors**

The next set of factors described the current and probable future stresses that would exacerbate the impacts of phosphorus loading within each HUC 8. These factors included:

1. The crop acres in the HUC 8.
2. The percentage of land area within the HUC 8 that was cropland.
3. The urban acres in the HUC 8.
4. The percentage of land area within the HUC 8 that was urban.
5. The number of stream TP impairments and the number of lake eutrophication impairments present in the HUC 8.
6. The total design volume of wastewater potentially discharged by the major facilities in the HUC 8.
7. The percent population change between 2000 and 2010 for each county within the HUC 8.
8. The number of cattle inventoried in each county in 2007 within the HUC 8.

These factors were similarly ranked and scored as the historic condition factors.

### **Relative Value of Water**

Several factors were identified that conveyed a sense of value for the surface waters found in each HUC 8, each were ranked and scores were tabulated for the 68 HUC 8's. These factors describe:

1. The number of Outstanding National Resource Waters (i.e., Tier 3) present in the HUC 8.
2. The number of Exceptional State Waters (i.e., Tier 2.5) present in the HUC 8.
3. The Priority Riparian Area scores for each HUC 8.
4. The presence of a public water supply lake in the HUC 8.
5. If public water supplies have a direct point of diversion into any of the streams in the HUC 8 (i.e., public water supplies served by surface waters).

6. The influence of the pour point of the HUC 8 on the quality of water seen at the interstate border (At the border, close to the border, distant from the border, or no impact at the border).

### **Implementation Potential**

The final set of factors dealt with the probability that effective implementation could occur if nutrient TMDLs were established for waters in any given HUC 8. For point source discharges, previous stressor factors involving major NPDES discharges, population growth and urban land distribution in a HUC 8 also serve as indicators of our ability to control those regulated discharges through wastewater and stormwater NPDES permits. Given the pervasive rural constitution of Kansas watersheds, the key for implementation then lies with the ability of the non-point source control programs at the disposal of the state (i.e., 319, State Water Plan, Farm Bill). Because non-point source control implementation depends heavily on local leadership and management, the four factors used for this consideration were tied to the presence and ability of Watershed Restoration and Protection Strategy groups (WRAPS) in certain HUC 8's.

1. Is there an active WRAPS group present in the HUC 8?
2. Does the WRAPS group have a history of performing effective implementation on the ground since it formed?
3. Has the WRAPS group identified critical HUC 12's?
4. Does the WRAPS group have effectiveness monitoring in place to evaluate its efforts?

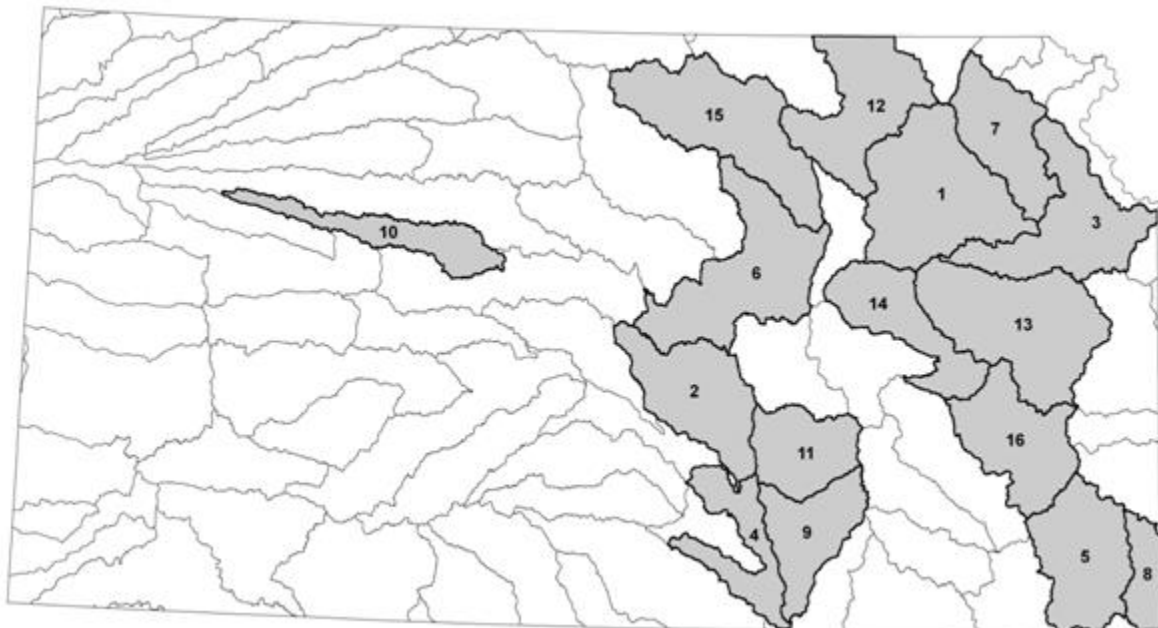
### **Results of HUC 8 Prioritization and Subsequent Scheduling of TMDL Development**

Kansas decided to concentrate its TMDL development over 2014 – 2022 on the top 25% of HUC 8's among the 68 HUC 8's subject to the ranking and scoring exercise. Essentially 16 HUC 8's were designated as top priority for 303(d) purposes addressing nutrient impairments. These 16 HUC 8's are identified in the table below and displayed in the following map. These 16 priority HUC 8's became the centerpiece of setting priorities in Kansas' Integrated Reports.

***Top Priority HUC 8's with Nutrient Impairments to be Addressed by the 303(d) Program***

1	10270102	Middle Kansas
2	11030012	Little Arkansas
3	10270104	Lower Kansas
4	11030013	Middle Arkansas-Slate
5	11070205	Middle Neosho
6	10260008	Lower Smoky Hill
7	10270103	Delaware
8	11070207	Spring
9	11030018	Lower Walnut River
10	10260007	Big
11	11030017	Upper Walnut River
12	10270205	Lower Big Blue
13	10290101	Upper Marais des Cygnes
14	10240011	Independence-Sugar
15	10250017	Lower Republican
16	11070204	Upper Neosho

***Top Priority HUC 8's with Nutrient Impairments to be Addressed by the 303(d) Program***



The 303(d) methodology for listing those waters in 2014 & 2016 included the following provision:

**4.5 STREAM CHEMISTRY CATEGORY 5 PRIORITY FOR TMDL DEVELOPMENT**

*Consistent with Kansas’ emerging TMDL Vision Strategy, establishing priorities for TMDL development between 2014 and 2022, certain AUs [Assessment Units] containing streams impaired by total phosphorus in certain HUC 8s will be designated for TMDL development. The targeted HUC 8s and impaired streams intended for TMDLs in 2016 are:*

<i>HUC 8 Subbasin</i>	<i>Stream Chemistry Station</i>	<i>Stream Assessment Unit</i>	<i>Targeted TMDL Development Year</i>
<i>10270101 Upper Kansas</i>	<i>SC518</i>	<i>Kansas River near Ogden</i>	<i>2016</i>
<i>10270102 Middle Kansas</i>	<i>SC260</i>	<i>Kansas River near Wamego</i>	<i>2016</i>
	<i>SC259</i>	<i>Kansas River at Willard</i>	<i>2016</i>
<i>10270104 Lower Kansas</i>	<i>SC257</i>	<i>Kansas River at Lecompton</i>	<i>2016</i>
	<i>SC255</i>	<i>Kansas River at Eudora</i>	<i>2016</i>
	<i>SC254</i>	<i>Kansas River at Desoto</i>	<i>2016</i>
	<i>SC203</i>	<i>Kansas River at Kansas City</i>	<i>2016</i>

Certain tributaries to the Kansas River with significant point and non-point sources that influence the nutrient levels of the river are slated for TMDL development in 2017. Additionally, the other major mainstem river of the State, the Arkansas River, will have TMDL development underway and near completion in 2017. The following table displays the specific stream assessment units these 2017 TMDLs will address.

<i>HUC 8 Subbasin</i>	<i>Stream Chemistry Station</i>	<i>Stream Assessment Unit</i>	<i>Targeted TMDL Development Year</i>
<i>10270102 Middle Kansas</i>	<i>SC238</i>	<i>Shunganunga Creek near Topeka</i>	<i>2017</i>
<i>10270104 Lower Kansas</i>	<i>SC251</i>	<i>Mill Creek near Shawnee</i>	<i>2017</i>
	<i>SC252</i>	<i>Cedar Creek near Cedar Junction</i>	<i>2017</i>
	<i>SC602</i>	<i>Stranger Creek near Easton</i>	<i>2017</i>
<i>11030010 Gar-Peace</i>	<i>SC524</i>	<i>Arkansas River near Yoder</i>	<i>2017</i>

<i>11030012 Little Arkansas</i>	<i>SC728</i>	<i>Little Arkansas River at Wichita</i>	<i>2017</i>
<i>11030013 Middle Arkansas – Slate</i>	<i>SC729</i>	<i>Arkansas River near Yoder</i>	<i>2017</i>
	<i>SC281</i>	<i>Arkansas River at Derby</i>	<i>2017</i>
	<i>SC527</i>	<i>Arkansas River at Oxford</i>	<i>2017</i>
	<i>SC218</i>	<i>Arkansas River near Arkansas City</i>	<i>2017</i>

The table of current and future TMDLs addressing the priorities of Kansas under the 303(d) Vision is included as a table or an appendix to this document. As can be seen in these tabular displays, some discretionary additions were made to the designated priority HUC 8's subject to TMDL development. Certain HUC 8's were included with the original priority 16 HUC 8's because those additional HUC 8's exert significant influence on the quality seen in the designated priority HUC 8's. For example, the Lower Cottonwood Subbasin has the city of Emporia located within it and Emporia's wastewater and stormwater discharge near the pour point of that HUC 8 into the Neosho Headwaters HUC 8, which is a priority 16 HUC 8. It made sense to Kansas to include that lowest portion of the Lower Cottonwood to account for Emporia's influence, even though the ranked factors used to score that HUC 8 came in at a moderate score.

Similarly, the Upper Kansas HUC 8 was not among the priority 16 HUC 8's but it conveys the waters and loads from two upstream priority HUC 8's, the Lower Republican and the Lower Smoky Hill to a downstream priority HUC 8, the Middle Kansas. Hence, it was included to maintain continuity in load transport and relations. Kansas anticipates that other HUC 8's, such as the Gar – Peace Subbasin (11030010) above the Middle Arkansas – Slate priority HUC 8 or the Lower Saline (10260010) and Solomon River (10260015) discharging into the Lower Smoky Hill might be included if their influence on downstream stream reaches of priority HUC 8's is determined to be significant.

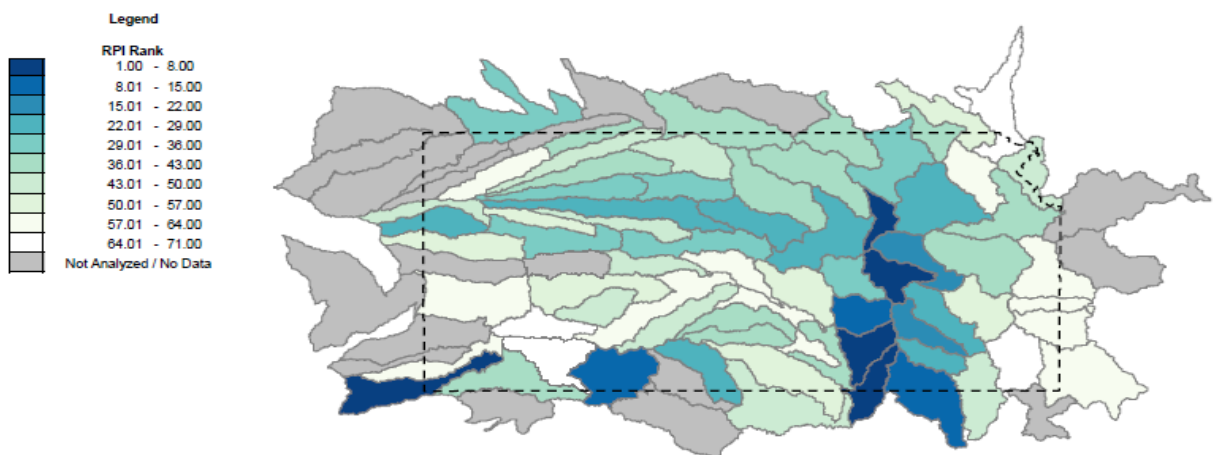
Additionally, some tributaries to the main stem streams of certain HUC 8's might be subject to TMDL development in subsequent years leading up to 2022. For example, Stranger Creek in the Lower Kansas Subbasin is a major non-point source contributor of phosphorus to the lower Kansas River and will have a TMDL established on it in 2017. The table of priorities in the appendix identifies specific stations, stream assessment units and designated years of TMDL development. Additionally, there are allowances for slippage in TMDL development incorporated within the TMDL Vision schedule. Kansas has already employed some of that cushion against slippage as it grapples with establishing TMDLs along the Kansas River, originally slated for 2015, now destined for 2016. The schedule provides for time to address more complex phosphorus impairments and linkages, as well as newly impaired assessment units present within the priority 16 HUC 8's.

This priority schedule means that TMDL development in other basins of the State, particularly those in western Kansas, will be deferred until after 2022. Similarly, impairments, other than those which are nutrient-driven, will not be addressed during the 2014- 2022 TMDL Vision time period. Those impairments and geographic basins will be evaluated with the 2022 Integrated Report and considered for development of TMDLs in the next TMDL Vision period of 2023-2032.

In order to corroborate the priorities and direction of the Kansas in-house prioritization process, a follow-up exercise was conducted in 2015, using EPA Headquarters assistance and the Recovery Potential Tool tailored to Kansas data on water resource value, stressors and social capabilities to implement improvements. The Recovery Potential Tool evaluated up to 90 HUC 8's, based on current and potential stressors, water resource value and potential point and non-point implementation success.

The initial run of the Recovery Potential Tool presented a ranking of Recovery Potential (RPI Rank) that was both obvious (HUC 8's in the Flint Hills ecoregion tended to be ranked high because of high value and low stress) and confounding (the Upper Cimarron and Upper Cimarron – Bluff HUC 8's in southwest Kansas). That initial run weighted all factors equally and included some social indicators such as distance to outlet of the State that brought in some of the western HUC 8's. Furthermore, the intent of the Kansas TMDL Prioritization was to identify those HUC 8's that are impacted by phosphorus and high density of NPDES dischargers as well as the urban/cropland land use that typically is indicative of environmental stress.

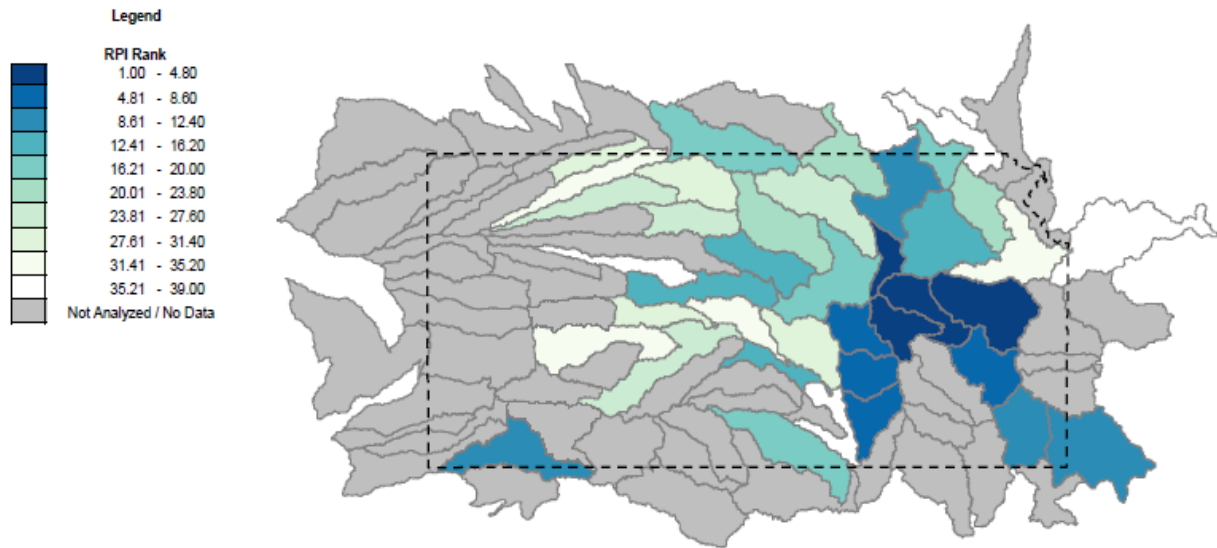
A second run was made that minimized the weight of the social factors. Additionally, the ecological and stressor indicators were expanded to provide more comprehensive consideration of factors of value and impact. Finally, the universe of HUC 8's considered in the analysis was reduced from 90 to 39. This subset of HUC 8's are those that have streams currently listed for excessive phosphorus or have existing phosphorus TMDLs. In some cases, i.e., the Upper Marais des Cygnes, some HUC 8's were included because they were among the original priority 16 HUC 8's, even though they have no stream phosphorus impairments.



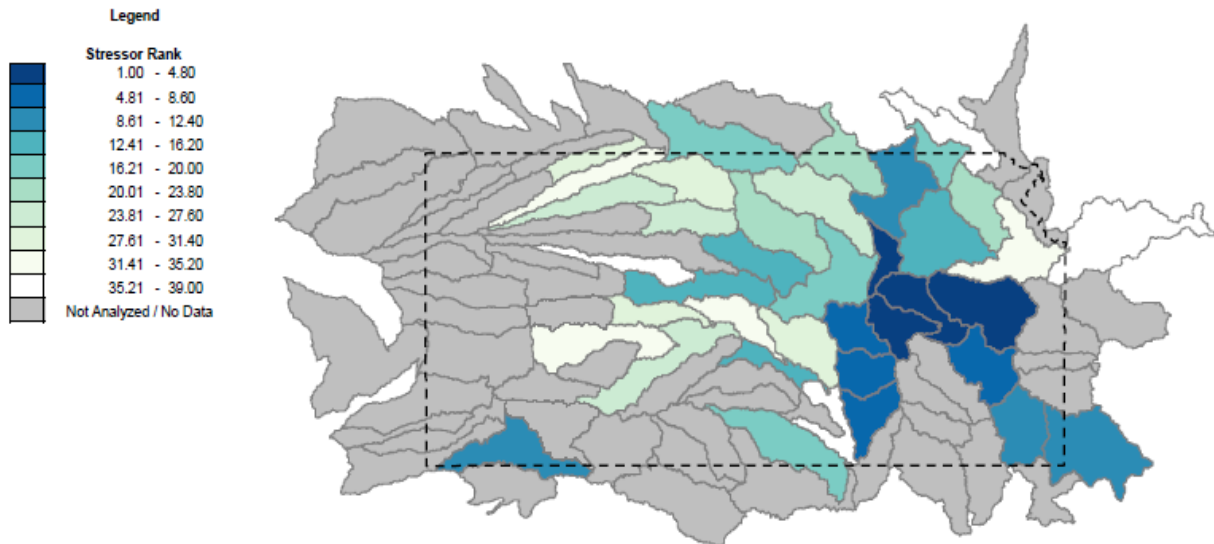
RPI Rank Map from First Run of Recovery Potential Tool



The results of this revised Recovery Potential run tended to corroborate the Kansas prioritization scheme with greater stress seen along the HUC 8's comprising the 16 priority HUC 8's. Some of those priority HUC 8's were found to rank quite high in Recovery Potential, such as the Upper Marais des Cygnes, Neosho Headwaters, Lower Cottonwood and the Upper and Lower Walnut Subbasins. Those results reflect a heavy density of grassland as the predominant land use and relatively isolated centers of population and associated wastewater and stormwater, indicative of low stress.



RPI Rank Map from Final Run of Recovery Potential Tool



Stressor Rank from Final Recovery Potential Tool Run

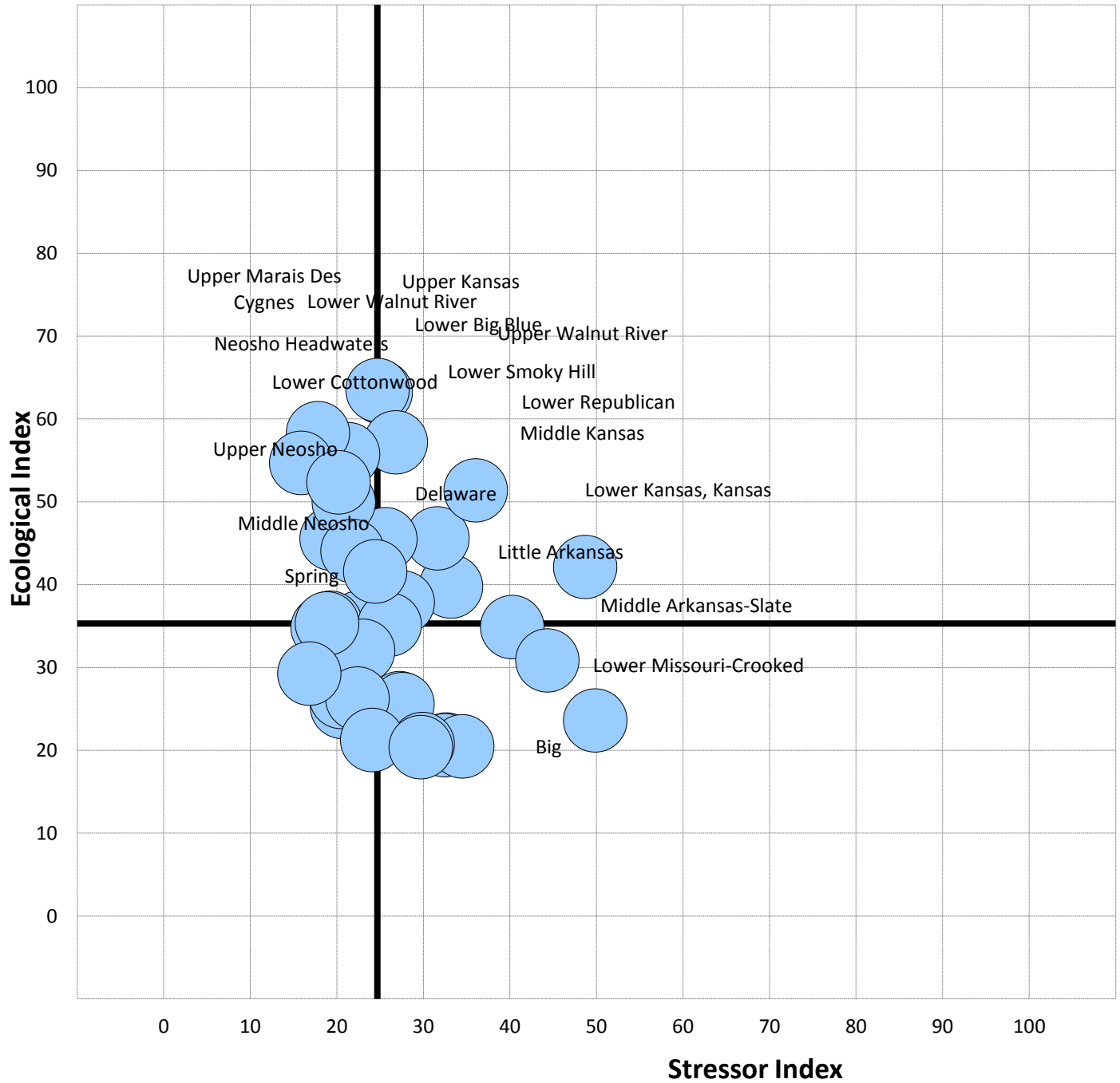
Use of a bubble plot is more informative in confirming the decisions made under the Kansas prioritization effort. Since the Social Indicators were minimized, all of the bubbles are the same diameter, allowing for comparison by position along the horizontal stressor axis and vertical ecological axis. Many of the Kansas priority 16 HUC 8's were skewed toward higher stress positions and most have above average ecological value. Notable on the plot are the relatively low stress HUC 8's in the Neosho, Marais des Cygnes and Walnut Basins which also exhibit high ecological value. These subbasins have few or no stream phosphorus impairments identified in the 2016 303(d) list.

Conversely, the Big Creek subbasin has lower ecological value, but a fair amount of stress. Big Creek was the first stream on which KDHE attempted a phosphorus TMDL, largely because of the stress caused by wastewater from the City of Hays. One of the most stressed subbasins is the Lower Missouri – Crooked, which contains Indian Creek, a heavily impacted stream in the Kansas City metro area. Indian Creek has major habitat disruption on top of excessive levels of phosphorus and nitrate. Flow is dominated by wastewater discharges from two treatment plants operated by Johnson County. KDHE is foregoing TMDL development on Indian Creek as plans for treatment plant upgrade and consequent nutrient reduction are already in place.

These results from the Recovery Potential analysis provided verification on the most stressed of the original HUC 8's needing TMDLs in the next 4-6 years. Additionally, a few of the priority HUC 8's have few or no phosphorus listings and the Recovery Potential analysis tended to place these sub-basins in a category of relatively low stress and high ecological value. These sub-basins have already undergone TMDL development for stream phosphorus issues on their main stems or tributaries. Finally, a few HUC 8's were shown to have relatively low ecological value, but high levels of stress. These sub-basins, such as the Lower Missouri-Crooked (Indian Creek) will either have TMDLs developed after 2022, or will have alternatives, notably NPDES-induced improvements applied to address their stream phosphorus impairments. The 39 HUC 8's are identified in the Appendix and ranked in order of stress from high to low, along with their ecological value and overall RPI scores and ranks.

### **Relationship with EPA Performance Measures WQ-27 and WQ-28**

With the advent in Federal Fiscal Year 2015 of two new performance measures tied to tracking State progress of TMDL development under its Vision-based priority schedule, a clear picture has emerged in Kansas as to what constitutes its priorities within the universe of stream phosphorus impairments across the state. Additionally, the associated baseline of previously accomplished work done in 2011 – 2014 as a precursor to the Vision is now established. Finally, Kansas can anticipate and schedule its annual targeted commitments of TMDL production over the 2015 – 2022 time period. In some cases, stream nitrate impairments will also be addressed with TMDLs and subsequent implementation of nitrogen reduction treatment of wastewater.



*Note: Circle Size Similar because Social Indicators were Minimized*

The appendix to this document outlines the specific timing of TMDL development for certain assessment units comprising main stem stream segments, their classified tributary streams and associated HUC 12 sub-watersheds, monitored by a KDHE station at the pour point of the assessment unit watershed. Those stream systems have impairments by total phosphorus and/or nitrate and comprise needed TMDLs within the 16 priority HUC 8's prior to 2022. Kansas will report these assessment units of stream segments and associated sub-watersheds to EPA Region

VII who will facilitate creation of the National Hydrographic Database (NHD +) catchments that will populate the EPA WQ-27 measure database, describing Kansas' universe, baseline and annual commitment targets under the measure.

Additionally, certain assessment units with phosphorus or nitrate impairments in other HUC 8's outside the priority 16 sub-basins that are successfully addressed by TMDLs or, alternatively, technical support for NPDES permitting or 319 watershed planning will be housed within EPA performance measure WQ-28, until such time that those segments and their associated catchments may be migrated over to WQ-27. Any emerging phosphorus or nitrate impairments on streams in the priority HUC 8's that arise in the 2016, 2018 or 2020 Integrated Reports for Kansas will either be incorporated into the schedule for TMDL development for their sub-basin or will be addressed with TMDLs during the catch-up period in 2021 and credited as adjustments to WQ-27. Kansas anticipates that the WQ-28 credits for non-priority segments and alternative approaches will transition over to become part of the baseline for WQ-27 for the time period 2023 – 2032.

### **3. Alignment of Kansas 303(d) Priorities with EPA National & Regional Priorities**

The central theme of Kansas' priorities for its 303(d) program is nutrient reduction in certain surface waters of Central and Eastern Kansas. This priority aligns closely with EPA's priorities on both the national and regional scale. EPA's FY 2014-2018 Strategic Plan reaffirms among its goals and objectives:

#### **Goal 2: Protecting America's Waters**

##### **Objective 2.2: Protect and Restore Watersheds and Aquatic Ecosystems**

##### **Sub-objective 2.2.1: Improve Water Quality on a Watershed Basis**

The Strategic Plan is implemented through the FY 2016 – 2017 Final National Water Program Manager Guidance (NWPMG) and the FY 2017 Final Office of Water Addendum to the FY 2016 - 2017 NWPMG. A core priority within the FY16-17 NWPMG was "*Controlling Nutrient Pollution*". Among the anticipated actions to be undertaken by EPA with the States is:

1. *Work with States to implement nutrient pollution reduction consistent with the March 2011 memorandum "**Working in Partnership with States to address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions**"*  
[\[http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/uplad/memo\\_nitrogen\\_framework.pdf\]](http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/uplad/memo_nitrogen_framework.pdf)
2. *Encourage States to set priorities on a watershed basis, establish nutrient reduction targets and adopt numeric nutrient criteria.*
3. *Focus on continuing to work with States to implement the Section 319 program with a large number of projects focused on reducing nutrient pollution.*
4. *Continue to work with States to ensure effective permitting of nutrient pollution to protect State WQS.*

Secondarily, the efforts of Kansas and its 303(d) program coincide at least indirectly with EPA's priority to protect and restore the health of the Gulf of Mexico and reduce the size of the hypoxia zone in the Gulf through, lowered nutrient loads entering the Missouri and Arkansas Rivers, en route to the Mississippi River and the Gulf. One of Region VII's three priorities is protecting and improving water quality across the Missouri-Mississippi Basin.

Among the performance measures associated with the Strategic Plan and Water Program Manager Guidance supported by the nutrient-based priorities of Kansas' 303(d) program are:

1. WQ-26: Number of states implementing nutrient reduction strategies by (1) setting priorities on a watershed or state-wide basis; (2) establishing nutrient reduction targets, and (3) continuing to make progress (and provide performance milestone information to EPA) on adoption of numeric nutrient criteria for at least one class of waters by no later than 2016. *Region VII target = 0.67 States for FFY15 [Note: Kansas is deferring the third objective of numeric nutrient criteria until such time that successful nutrient reduction through TMDL implementation begins to be documented.]*
2. WQ-SP-10.N11: Number of water bodies identified in 2002 as not attaining water quality standards where standards are now fully attained. *Region VII targets = 467 water bodies in FFY15; 456 in FFY14, 443 in FFY13.*
3. WQ-SP-11: Remove the specific causes of waterbody impairment identified by States in 2002. *Region VII targets = 1449 causes in FFY15, 1417 in FFY14, 1363 in FFY13.*
4. WQ-SP-12.N11: Improve water quality conditions in impaired watersheds nationwide using the watershed approach. *Region VII targets = 14 watersheds in FFY15, 13 in FFY14, 11 in FFY13.*

Finally, two performance measures directly tied to the Vision are fully in place for FFY 16. The setting of priority areas by Kansas directly aligns with tracking progress and performance defined by these measures.

1. WQ-27: Extent of priority areas identified by each state that are addressed by EPA-approved TMDLs or alternative restoration approaches for impaired waters that will achieve water quality standards. *FFY 17 National Target = 12% of priority areas with TMDLs.*
2. WQ-28: State-wide extent of activities leading to complete TMDLs or alternative restoration approaches for impaired waters.

The just-released draft FY 2017 Addendum to the National Water Program Manager Guidance reiterates these goals, objectives and performance measures.

## **4.The Kansas Priorities for TMDL Development from 2014 – 2022**

Based on the priority HUC 8's identified through the Kansas TMDL Vision and Nutrient Reduction Framework processes which emphasize stream phosphorus and nitrate impairments constituting the initial universe and baseline for performance measure WQ-27, the specific Kansas assessment unit priorities are identified in the attached appendix. These priority assessment units and the stream segments contained therein will be used to generate the associated catchment areas to populate Kansas' portion of the national EPA WQ-27 database. The schedule of intended TMDL development should translate to annual targets of commitment between Kansas and EPA. These priorities are memorialized within the approved 2014 Kansas 303(d) list as either completed TMDLs or listings within the priority 16 HUC 8's.

## **5. Approach to Changing Priorities**

The priorities described in this document and on the approved 2014 303(d) list represent the anticipated universe of priority waters and issues that will comprise the Kansas Vision effort until 2022. However, these priorities and their schedule will subject to two situations: slippage in TMDL development and emerging new priorities. Slippage is handled by having three turnout periods, in 2017, 2021 and 2022, to catch up development of priority TMDLs underway in previous years. Additionally, 2022 may be used, in part, to finalize any late TMDL development prior to reporting out on performance measure WQ-27. The current schedule already incorporates some 2015 – 2016 slippage in the work load for 2017.

There are four scenarios anticipated to occur that would interrupt the priorities established with this 2016 framework.

1. First, there may be new stream phosphorus or nitrate listings for streams in the 16 priority HUC 8's that emerge from the 2016, 2018 or 2022 303(d) lists. These new listings will alter the original universe of priority areas and will have TMDLs developed on them either at the scheduled time for their associated sub-basins or during the catchup period in 2021 -2022. Adjustments will be made to the WQ-27 universe to reflect these additional priorities and targets for 2021 and 2022 will correspond to their TMDL development in those years.
2. Impairments associated with excessive nutrients (pH, deficient DO, stressed biological communities or lake eutrophication) within the 16 priority HUC 8's may have TMDLs developed on them, as time and staffing allow. Such TMDLs ("priority non-priorities") will have any TMDL established on them in 2022. These additional TMDLs will be accounted for within WQ-28 as supplemental efforts to the primary priority effort.
3. Phosphorus or nitrate impairments on streams outside the 16 priority HUC 8's may be addressed by alternative means, either NPDES permitting or implementation of 319

watershed plans (WRAPS). As such, technical aid and analysis will be provided by calculating the necessary Wasteload Allocations (WLAs) for point source discharges or Load Allocations for non-point sources without developing a formal TMDL on those impaired waters. These situations will be noted as “5-alt” waters in subsequent 303(d) lists. They shall initially be accounted for within WQ-28, however, when the WQ-27 universe and baseline is reset for 2023 – 2032, these waters will be included in that baseline for the performance measure.

4. Some impaired waters, not associated with nutrient pollution, may be directed to be addressed by the Kansas TMDL program due to some prevailing social, political, environmental or economic reason. These impairments may be addressed anytime between 2016 – 2022 through an alternative means (e.g., NPDES or 319-WRAPS), without need for a formal TMDL. These “non-priority priority” alternatives will be identified as “5-alt” waters in subsequent 303(d) lists. It may also be possible that Kansas decides to develop a TMDL on these anomalous impairments. If so, they will be developed in 2022 and accounted for within WQ-28. This includes local requests for TMDLs intended to protect healthy waters.

Kansas will use the Integrated Report to biennially document the status and changes to the universe of priority waters between 2016 and 2020, with a full accounting of all efforts that occurred from 2011 – 2022 in the 2022 Integrated Report.

## **6. Philosophical Shift in Prioritization Considerations between 2006 – 2012 and 2014 – 2022**

Over the period 1998 – 2006, TMDL development in Kansas was dictated by the terms and schedule of the 1998 Court Decree regarding such development. Under that schedule, all impairments from the 1996 and 1998 303(d) lists had TMDLs developed on a staggered basis, with all such waters in the 12 major river basins having TMDLs established between 1999 and 2006.

After 2006, control over scheduling reverted back to Kansas and a five-year rotation among the 12 river basins was attempted to address priority impairments within those basins. Priorities during this time, prior to the emergence of the National TMDL Vision in 2012, were a function of the value of impaired waters, e.g., large Federal or State lakes afflicted with eutrophication. Many times, Basin Advisory Committees in each of the 12 river basins advised KDHE on those priorities. Additional priority was given to waters of an interstate nature, e.g., the Arkansas River between Colorado and Kansas; or impairments that were initially of concern by practicing watershed groups, e.g., bacteria in streams. After 2010, consideration of listings that had been present for some time, approaching the end of 8-13 year window expressed by EPA as the appropriate pace for TMDL development, became more prevalent.

With the advent of the National TMDL Vision and Kansas' adoption of a Vision Strategy that focuses on nutrient issues, 303(d) priorities became focused on streams impaired by excessive phosphorus or nitrate. Most major lakes with eutrophication already had TMDLs in place, but streams needed attention because of the prevailing anecdotal evidence that excessive nutrients were a problem. Most major NPDES discharges loaded nutrients into streams, not lakes. Additionally, the export of high nutrients from Kansas to downstream, interstate waterbodies through stream transport became a Kansas and national interest. Coinciding with the State's quest to establish a Nutrient Reduction Framework that would ultimately be implemented through TMDLs, the priorities expressed in this document were established for the time period 2014 -2022. Some initial work on stream TMDLs had been done and EPA's approval of the Big Creek phosphorus TMDL in 2011 paved the way for TMDL development on the priority stream systems identified in the 2014 303(d) list. The table on the next page inventories the TMDLs addressing stream phosphorus and nitrate, with those developed in 2011 – 2013 comprising the baseline for WQ-27. The TMDLs developed over 2014 – 2015 represent the first annual commitment by Kansas under the performance measure.

Pace of TMDL development will be dictated by the schedule within this document. Other pollutant impairments will be deferred until 2023 or thereafter. TMDL development will be concentrated in 16 select HUC 8's, located within 6 of the 12 major river basins. TMDL development in the western third of Kansas or in certain eastern basins is expected to be deferred to after 2022, where population and land use stresses are less prevalent than in the priority areas. An evaluation of the outcomes of this priority TMDL process will occur in 2022, after which, there will be a newly established prioritization scheme for the next 10-year period, 2023 – 2032. Priorities anticipated for that next period will be a function of the progress made on nutrient reductions between now and 2022 and the emergence of environmentally and socially significant impairments that warrant near-term attention on the part of the State.

## **7. Public Engagement**

The interested public has been informed and engaged in the priorities established under the Kansas TMDL Vision since the State undertook its Nutrient Reduction Strategy and Framework over 2004 – 2012. The primary forum for public engagement in the TMDL/303(d) process has always been the 12 Basin Advisory Committees across Kansas. These BAC's have been briefed on the changing philosophy on scheduling TMDL development at their regular meetings since 2012.

Changes to the Kansas Water Planning Process replaced the 12 BAC's with 14 Regional Advisory Committees (RACs) which followed surface watershed and groundwater administrative boundaries. The near-term agenda on a majority of these RACs is centered more on water supply issues rather than water quality. However, three RAC's, the Neosho, the Kansas and the Smoky Hill-Saline, are addressing water quality to some degree. Eleven of the 16 priority HUC 8's as well as two accompanying HUC 8's are located within these three basins.



<b>Year</b>	<b>HUC 8</b>	<b>Subbasin</b>	<b>Station</b>	<b>Watershed</b>	<b>Location</b>	<b>Nutrient</b>
2011	10260007	Big Creek	SC541	Big Creek	Abv Hays	Phosphorus
			SC540	Big Creek	Munjor	Phosphorus
			SC540	Big Creek	Munjor	Nitrate
			SC752	Big Creek	Russell	Phosphorus
2007	11030012	Little Arkansas	SC535	Sand Creek	Sedgwick	Nitrate
2013			SC535	Sand Creek	Sedgwick	Phosphorus
			SC533	Turkey Creek	Alta Mills	Phosphorus
2014- 2015	11070201	Neosho Headwaters	SC273	Neosho River	Neosho Rapids	Phosphorus
			SC637	Neosho River	Parkerville	Phosphorus

11070203*	Lower Cottonwood	SC274	Cottonwood River	Emporia	Phosphorus
11070205	Middle Neosho	SC564	Labette Creek	Labette	Phosphorus
11070207	Spring	SC212	Shoal Creek	Galena	Phosphorus
		SC567	Cow Creek	Lawton	Phosphorus
		SC570	Short Creek	Galena	Phosphorus
11030017	Upper Walnut	SC279	Walnut River	El Dorado	Phosphorus
		SC038	Whitewater River	Towanda	Phosphorus
11030018	Lower Walnut	SC106	Walnut River	Gordon	Phosphorus
		SC744	Four Mile Creek	Gordon	Phosphorus
		SC704	Eight Mile Creek	Douglass	Phosphorus

\* Not a priority HUC 8 but exerts significant influence on water quality of priority HUC 8

For those TMDLs addressing the concerns of these RAC's, implementation will be supported by the action plans being developed by the RAC's. Much of that implementation will be handled to abate non-point source loading of nutrients into water bodies via watershed plans under the purview of Watershed Restoration and Protection Strategy groups (WRAPS). Implementation decisions regarding fund allocation for non-point source abatement and Federal initiatives such as the National Water Quality Initiative of USDA have utilized the priority HUC 8's and associated priority sub-watersheds to place those funds and programs in order to effect nutrient reduction.

In keeping with the emerging water planning structure, KDHE has presented how the new planning regions interface with surface waters with nutrient impairments and the priority 16 HUC 8's directing nutrient reduction, including TMDL development. From the following map, one can see that far western areas of Kansas have no significant nutrient issues for their paltry surface water inventory. Nutrients become more prevalent issues in the central and eastern portions of the state, but there are still areas where the dominant land use of grassland or forest and low population densities dampen the urgency for nutrient control in regions where surface water is abundant.

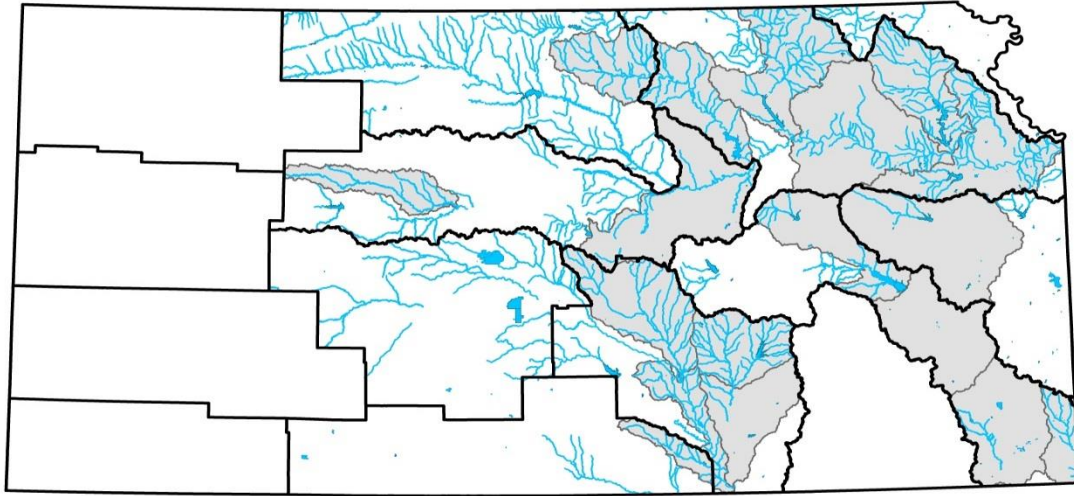
Because the Kansas 303(d) Vision is tilted toward implementation potential, the primary audiences for where Kansas TMDL priorities are located are the NPDES community and active watershed management groups overseeing non-point source abatement. Numerous discussions and presentations have been made to these groups and their associations to convey the sense of priority that Kansas is taking with nutrients and TMDLs between now and 2022. Major wastewater dischargers and MS4 urban stormwater programs have been fully briefed on these priorities. Daily in-house interaction between the Kansas TMDL, permitting and 319 programs ensures that permitting watershed planning and implementation are coordinated with an eye toward nutrient reductions from all significant sources. Subsequent NPDES permits and watershed plan revisions will reflect those priorities and coincide with the priorities presented within this document.

Starting with the 2014 Integrated Report, the 303(d) priorities have been displayed and the rationale behind their enhanced status explained to stakeholders interested in the Kansas environment. The priorities and this document will be posted on both the water quality assessment and TMDL development websites of KDHE for public access and review.

## **8. Conclusion**

This prioritization framework represents Kansas' direction for its 303(d) program through 2022, scheduling TMDL development to reflect nutrient reduction on priority streams where stresses, value and opportunities are prevalent. Sufficient flexibility has been designed into the schedule to account for slippage in TMDL development and emergence of additional priorities or issues of concern between now and 2022. The priorities lend themselves to easy translation to populate the new performance measures WQ-27 and WQ-28, allowing for full accounting of TMDL progress upon the 50<sup>th</sup> anniversary of the Clean Water Act in 2022. Finally, aggressive adherence to this schedule will expedite Kansas' Nutrient Reduction Framework to move implementation toward real environmental benefits realized through less ambient phosphorus present in stream systems and the accompanying responses in the biological and chemical conditions of those streams more fully supporting their designated uses of aquatic life support, recreation and public water supply, as decreed by Kansas Water Quality Standards.

***Nutrient impaired streams, high priority HUC 8's for TMDL development and Regional Planning Areas in Kansas***



**Finalized March 14, 2016**

**APPENDIX: 2014 – 2022 SCHEDULE OF PRIORITY KANSAS TMDLS**

<b>TMDL Development Year</b>	<b>BASIN</b>	<b>HUC8</b>	<b>WATERBODY NAME</b>	<b>IMPAIRMENT</b>	<b>STATION</b>
2014	KR	10250017	Milford Lake	Eutrophication	LM019001
2014	KR	10250017	Milford Lake	Dissolved Oxygen	LM019001
2014	NE	11070201	Lake Kahola	Eutrophication	LM043401
2015	WA	11030017	Whitewater River At Towanda	Total Phosphorus	SC038
2015	WA	11030017	Walnut River Near El Dorado	Total Phosphorus	SC279
2015	WA	11030017	Augusta City Lake	Eutrophication	LM040001
2015	WA	11030017	Walnut River Near El Dorado	Dissolved Oxygen	SC279
2015	WA	11030018	Walnut River At Gordon	Total Phosphorus	SC106
2015	WA	11030018	Eight Mile Creek Near Douglas	Total Phosphorus	SC704
2015	WA	11030018	Four Mile Creek Near Gordon	Total Phosphorus	SC744
2015	WA	11030018	Eight Mile Creek Near Douglas	Dissolved Oxygen	SC704
2015	NE	11070201	Neosho River At Neosho Rapids	Total Phosphorus	SC273
2015	NE	11070201	Neosho River Near Parkerville	Total Phosphorus	SC637
2015	NE	11070203	Cottonwood River Near Emporia	Total Phosphorus	SC274
2015	NE	11070205	Labette Creek Near Labette	Total Phosphorus	SC564
2015	NE	11070207	Shoal Creek Near Galena	Total Phosphorus	SC212
2015	NE	11070207	Cow Creek Near Lawton	Total Phosphorus	SC567
2015	NE	11070207	Short Creek Near Galena	Total Phosphorus	SC570
2016	KR	10270101	Kansas River Near Ogden	Total Phosphorus	SC518
2016	KR	10270102	Kansas River At Willard	Total Phosphorus	SC259
2016	KR	10270102	Kansas River At Wamego	Total Phosphorus	SC260
2016	KR	10270104	Kansas River At Kansas City, Kansas	Total Phosphorus	SC203
2016	KR	10270104	Kansas River At Desoto	Total Phosphorus	SC254
2016	KR	10270104	Kansas River At Eudora	Total Phosphorus	SC255
2016	KR	10270104	Kansas River At Lecompton	Total Phosphorus	SC257
2017	LA	11030010	Arkansas River Near Yoder	Total Phosphorus	SC524
2017	LA	11030012	Little Arkansas River At Wichita	Total Phosphorus	SC728
2017	LA	11030013	Arkansas River Near Arkansas City	Total Phosphorus	SC218
2017	LA	11030013	Arkansas River At Derby	Total Phosphorus	SC281
2017	LA	11030013	Arkansas River At Oxford	Total Phosphorus	SC527
2017	LA	11030013	Arkansas River At Wichita	Total Phosphorus	SC729
2017	LA	11030013	Arkansas River At Derby	Nitrate	SC281
2017	KR	10270102	Shunganunga Creek Near Topeka	Total Phosphorus	SC238
2017	KR	10270104	Mill Creek Near Shawnee	Total Phosphorus	SC251
2017	KR	10270104	Cedar Creek Near Cedar Junction	Total Phosphorus	SC252
2017	KR	10270104	Stranger Creek Near Easton	Total Phosphorus	SC602
2017	KR	10270104	Crooked Creek Near Winchester	Total Phosphorus	SC683

<b>TMDL Development Year</b>	<b>BASIN</b>	<b>HUC8</b>	<b>WATERBODY NAME</b>	<b>IMPAIRMENT</b>	<b>STATION</b>
2018	SS	10260008	Smoky Hill River At Junction City	Total Phosphorus	SC264
2018	SS	10260008	Smoky Hill River At Enterprise	Total Phosphorus	SC265
2018	SS	10260008	Smoky Hill River Near Salina	Total Phosphorus	SC268
2018	SS	10260008	Mud Creek Near Abilene	Total Phosphorus	SC643
2018	SS	10260008	Sharps Creek Near Freemount	Total Phosphorus	SC749
2018	SS	10260008	Smoky Hill River Near Salina	Nitrate	SC268
2018	SS	10260010	Saline River Near New Cambria	Total Phosphorus	SC267
2018	SS	10260010	Mulberry Creek Near Salina	Total Phosphorus	SC640
2019	KR	10250017	Republican River Near Clay Center	Total Phosphorus	SC503
2019	KR	10250017	Republican River Near Clay Center	Total Phosphorus	SC504
2019	KR	10250017	Buffalo Creek Near Concordia	Total Phosphorus	SC509
2019	KR	10250017	Republican River Near Rice	Total Phosphorus	SC510
2019	KR	10250017	Peats Creek Near Clifton	Total Phosphorus	SC649
2019	KR	10250017	Salt Creek Near Hollis	Total Phosphorus	SC650
2019	KR	10250017	Wolf Creek Near Concordia	Total Phosphorus	SC707
2019	KR	10250017	Elm Creek Near Ames	Total Phosphorus	SC709
2019	KR	10250017	Mulberry Creek Near Clifton	Total Phosphorus	SC710
2019	KR	10270103	Delaware River Near Half Mound	Total Phosphorus	SC554
2019	KR	10270103	Grasshopper Creek Near Muscotah	Total Phosphorus	SC603
2019	KR	10270103	Elk Creek Near Larkinburg	Total Phosphorus	SC604
2019	KR	10270205	Big Blue River Near Oketo	Total Phosphorus	SC233
2019	KR	10270205	Big Blue River Near Blue Rapids	Total Phosphorus	SC240
2019	KR	10270205	Black Vermillion River Near Frankfort	Total Phosphorus	SC505
2019	KR	10270205	Horseshoe Creek Near Marysville	Total Phosphorus	SC717
2019	KR	10270205	North Elm Creek Near Oketo	Total Phosphorus	SC731
2019	KR	10270205	Robidoux Creek near Frankfort	Total Phosphorus	SC754
2019	KR	10270207	Little Blue River Near Hollenberg	Total Phosphorus	SC232
2019	KR	10270207	Rose Creek Near Narka	Total Phosphorus	SC712
2019	KR	10270207	Little Blue River Near Waterville	Total Phosphorus	SC741
2020	LA	11030012	Little Arkansas River At Alta Mills	Total Phosphorus	SC246
2020	LA	11030012	Emma Creek Near Sedgwick	Total Phosphorus	SC534
2020	LA	11030012	Kisiwa Creek Near Halstead	Total Phosphorus	SC703
2020	LA	11030012	Black Kettle Creek Near Halstead	Total Phosphorus	SC705
2020	LA	11030012	Little Arkansas River At Valley Center	Total Phosphorus	SC282
2020	LA	11030013	Cowskin Creek In Wichita-Valley Center Floodw	Total Phosphorus	SC288
2020	LA	11030013	Slate Creek Near Wellington	Total Phosphorus	SC528
2020	LA	11030013	Cowskin Creek Near Belle Plaine	Total Phosphorus	SC702
2020	LA	11030013	Cowskin Creek At Wichita	Total Phosphorus	SC730

Watershed ID	Watershed Name	Ecological Index	Ecological Rank	Stressor Index	Stressor Rank	RPI Score	RPI Rank
10300101	Lower Missouri-Crooked	23.60	33	49.86	39	24.58	39
10270104	Lower Kansas, Kansas	42.13	14	48.70	38	31.14	32
11030013	Middle Arkansas-Slate	30.85	26	44.32	37	28.84	37
11030012	Little Arkansas	34.87	22	40.27	36	31.53	31
10270102	Middle Kansas	51.38	8	36.04	35	38.45	16
10260007	Big	20.48	38	34.50	34	28.66	38
10250017	Lower Republican	39.77	16	33.18	33	35.53	24
10240008	Big Nemaha	20.70	36	32.63	32	29.36	36
10250015	Prairie Dog	20.62	37	32.46	31	29.39	35
10260008	Lower Smoky Hill	45.58	10	31.62	30	37.99	17
11030005	Pawnee	20.76	35	29.90	29	30.29	33
11030011	Cow	20.38	39	29.70	28	30.23	34
10260015	Solomon	37.83	17	27.60	27	36.74	21
10260012	Lower North Fork Solomon	25.58	31	27.57	26	32.67	29
10250011	Lower Sappa	25.68	30	27.23	25	32.82	28
11030017	Upper Walnut River	57.18	4	26.80	24	43.46	7
10270103	Delaware	35.17	21	26.09	23	36.36	22
10270205	Lower Big Blue	45.50	12	25.60	22	39.97	11
10270101	Upper Kansas	63.22	2	25.06	21	46.05	4
10290101	Upper Marais Des Cygnes	63.48	1	24.69	20	46.27	3
11070207	Spring	41.60	15	24.43	19	39.06	12
11030008	Lower Walnut Creek	21.24	34	24.09	18	32.38	30
10270207	Lower Little Blue	32.00	25	23.03	17	36.32	23
10240007	South Fork Big Nemaha	35.40	18	22.53	16	37.62	19
11030004	Coon-Pickerel	26.23	29	22.38	15	34.62	27
11070205	Middle Neosho	44.07	13	21.80	14	40.76	10
11030018	Lower Walnut River	55.75	5	21.30	13	44.82	5
11070202	Upper Cottonwood	49.94	9	20.80	12	43.05	8
10260011	Upper North Fork Solomon	25.24	32	20.61	11	34.88	26
10260014	Lower South Fork Solomon	26.45	28	20.48	10	35.32	25
11070204	Upper Neosho	52.35	7	20.20	9	44.05	6
10250016	Middle Republican	33.50	24	19.93	8	37.86	18
11040006	Upper Cimarron-Liberal	45.54	11	19.40	7	42.05	9
10260006	Middle Smoky Hill	35.40	18	19.23	6	38.72	15
11030010	Gar-Peace	35.30	20	18.86	5	38.82	13
10260010	Lower Saline	34.80	23	18.36	4	38.82	13
11070201	Neosho Headwaters	58.28	3	17.81	3	46.82	1
11060005	Chikaskia	29.26	27	16.81	2	37.48	20
11070203	Lower Cottonwood	54.70	6	15.87	1	46.28	2

**39 HUC 8's with Total P Impairments in Streams; Ranked High to Low in Stress**