REGULATORY PLAN
FOR
COMMERCIAL DREDGING ACTIVITIES
ON
THE KANSAS RIVER

APPENDIX A

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INTRODUCTION

This Regulatory Plan has been developed to aid the Kansas City District, Corps of Engineers in its administration of permit applications for commercial dredging activities on the Kansas River. The Plan is intended to limit the magnitude of dredging-related impacts to the morphology and ecology of the river; to manmade structures located in and along the river; and to other public and private interests such as adjacent land, water supplies and recreation. Adverse impacts include: (a) riverbed degradation 1/; (b) bank erosion; (c) channel widening; (d) lowering of water surface elevations in the river channel; (e) lowering of water table elevations adjacent to the river; (f) a reduction in the structural integrity of bridges, pipelines, jetties, dams, weirs and other manmade structures; and (g) a loss of environmental values resulting from (a) through (e).

The adverse impacts that result from commercial dredging activities are being controlled by establishing a maximum acceptable level of impacts 2/ and by providing the restrictions necessary to keep impacts at or below the acceptable level. The maximum level of impacts established for purposes of this Plan is a level which will have only minor effects 3/ on the morphology and ecology of the river and on public and private interests located in and along the river.

This Plan is subdivided into 2 main parts, entitled Dredging Restrictions and Monitoring Program. The Dredging Restrictions consists of criteria developed to limit dredging-related impacts to an acceptable level. The Monitoring Program will utilize data collected from the river to evaluate the impacts associated with restricted dredging in order to ensure that the established maximum acceptable level of impacts will not be exceeded. Data collected through the Monitoring Program will be used to quantify the actual rate of riverbed degradation, bank erosion, channel widening, and other parameters affecting

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1/ The term riverbed degradation refers to lowering of riverbed elevations.

2/ The term maximum acceptable level of impacts is defined for purposes of this Plan as the maximum level of impacts determined by the Kansas City District to be compatible with the overall public interest involved.

3/ The term minor effects, as used in this plan, is described as those effects which are not expected to have a significant impact on nondredging concerns such as adjacent landowners and various entities responsible for structures located in and along the river, nor would those effects be expected to unduly impact environmental resources.

the morphology and ecology of the river, and to evaluate related adverse impacts occurring to public and private interests located in and along the river. The data will ultimately be used to adjust the Dredging Restrictions, as needed over time, to assure that the established maximum acceptable level of impacts will not be exceeded, and/or to adjust the Restrictions if monitoring efforts reveal that certain constraints can be lessened or eliminated without exceeding the established acceptable level of impacts.

Every effort has been made to develop this Plan through the application of scientific principles. Due to the limitations inherent in predicting future changes in river morphology, some of the elements in the Plan are based upon professional judgment and experience. Development of the Plan has relied on information presented in economic, social, environmental and engineering studies prepared to address this activity; on information provided to the District by various involved parties; and on the information and experience acquired by the District over a decade of analyzing Kansas River dredging.

Formulation of this Plan has been based on the following objectives: (a) limit the adverse impacts associated with commercial dredging activities to an acceptable level; (b) minimize the economic hardships which may occur to the producers, related construction concerns and consumers; and (c) provide a plan which will treat all producers equitably. Due to the complex nature of the issues relating to commercial dredging activities on the Kansas River, it has not been possible to develop a plan that will entirely satisfy the interests of all of the involved parties. This Plan satisfies the overall public interest involved and represents a compromise between the extremes of the alternatives available to the Kansas City District.

DREDGING RESTRICTIONS

This section of the Regulatory Plan contains restrictions that have been developed to limit the adverse impacts associated with commercial dredging activities on the Kansas River. The restrictions are intended to limit those impacts to a level which will have only minor effects on the morphology and ecology of the river and on public and private interests located in and along the river. Implementation of the Dredging Restrictions in conjunction with the Monitoring Program is intended to ensure that the established maximum acceptable level of impacts will not be exceeded.

I. Restrictions Concerning Riverbed Degradation.

The magnitude of dredging-induced riverbed degradation is a key factor influencing the degree of instability of the river channel. Degradation of the riverbed results in secondary impacts such as bank erosion, channel widening, lowering of water surface elevations in the river channel, lowering of water table elevations adjacent to the river, alteration of aquatic and terrestrial habitat, and a reduction in the structural integrity of manmade structures. Since secondary impacts increase as riverbed degradation increases, the degree of dredging-induced river channel instability can be limited by controlling the amount of dredging-related degradation.

Based on all available information, the Kansas City District has determined that most reaches of the Kansas River cannot sustain more than approximately 2 feet of riverbed degradation (based on riverbed elevations on the date of implementation of this plan) before secondary impacts exceed acceptable levels. Therefore, the maximum allowable reduction in the surface elevations of the riverbed is 2 feet for all reaches of the river. The 2-foot maximum reduction in bed elevations will be measured as an average reduction 1/ in bed elevations through any 5-mile-long reach of river. If riverbed elevations in a 5-mile-long reach of river approach 2 feet of degradation, dredging activities which adversely affect bed elevations in that reach will be altered or terminated before unacceptable impacts occur. Further, if the average reduction of riverbed elevations in a 5-mile-long reach of river attains 2 feet (regardless of the cause), dredging activities which adversely affect bed elevations in that reach will be terminated.

1/ The average reduction in riverbed elevations through a 5-mile-long reach of river will be computed by the Kansas City District using data collected through the Monitoring Program. Any 5-mile-long reach of river is subject to riverbed elevation averaging. A 5-mile-long reach can begin at any location on the river and will extend 5 miles upstream or downstream of that location.

Due to the implementation of a monitoring program, it is estimated that most producers would have 2 - 3 years notice prior to closure of a dredged-out reach 1/ of river. However, if an unforeseen event such as a flood causes excessive lowering of the riverbed which requires the unexpected closure of a reach of river, the affected producers will normally be allowed to continue dredging in that reach for one year in order to allow sufficient time for the relocation of their dredging operations. A reach of river which has been dredged-out and closed to dredging will not be reopened until its riverbed elevations increase to an average elevation exceeding the established minimum for that reach, and until sufficient materials have accumulated to support renewed dredging activities for a reasonable period of time. Riverbed elevations will be determined with the aid of riverbed cross-section surveys and/or water surface profiles, as specified in the appropriate sections of the Monitoring Program. Riverbed degradation will be computed by subtracting future riverbed elevations and/or water surface profiles from base line data collected after implementation of this Plan.

II. Restrictions Concerning the Rate of Sand and Gravel Extraction from Specified Reaches of the River.

The rate 2/ of sand and gravel extraction from a reach of river is an important factor affecting the river channel's stability. The magnitude of instability induced into the river channel by dredging activities increases as the rate of extraction increases (channel stability decreases as the length of time utilized to reach a given level of degradation decreases). Therefore, greater channel stability can be obtained by limiting the rate of extraction within a reach of river to provide a reasonable period of time for the channel to adjust to declining bed elevations.

The following restrictions are being implemented to limit the rate of sand and gravel extraction from specified reaches of the river:

A. The Confluence of the Kansas and Missouri Rivers to the Atchison, Topeka and Santa Fe Railway Company Bridge at Bonner Springs (River Miles 0 - 21.2 (Approx.)).

A maximum of 1 million tons of sand and gravel can be extracted from this approximately 21.2-mile-long reach of river annually. Refer to Section VII.B.1.c. for an additional restriction

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1/ The term dredged-out reach refers to any 5-mile-long or longer reach of river that degrades an average of 2 feet or more after implementation of this Plan.

2/ The term rate is defined for purposes of this report as tons/time.

concerning extraction rates within this reach.

B. The Atchison, Topeka and Santa Fe Railway Company Bridge at Bonner Springs to River Mile 48.0 (River Miles 21.2 (Approx.) - 48.0).

No total annual extraction limit has been established for this approximately 26.8-mile-long reach of river. However, the maximum amount of sand and gravel that can be extracted annually from any 15-mile-long section of river within this reach is 750,000 tons. A 15-mile-long section of river can begin or end at any location within this reach.

C. River Mile 48.0 to Bowersock Dam at Lawrence (River Miles 48.0 - 51.8 (Approx.)).

A maximum of 150,000 tons of sand and gravel can be extracted from this approximately 3.8-mile-long reach of river annually.

D. Bowersock Dam at Lawrence to the Confluence of the Kansas, Smoky Hill and Republican Rivers Near Junction City (Approx. River Miles 51.8 - 170.4).

No total annual extraction limit has been established for this approximately 118.6-mile-long reach of river. However, the maximum amount of sand and gravel that can be extracted annually from any 15-mile-long section of river within this reach is 750,000 tons. A 15-mile-long section of river can begin or end at any location within this reach.

NOTE: The 750,000 ton extraction limit, per 15-mile-long section of river, referenced in parts B. and D. of this section does not apply to part A. of this section.

III. Restrictions Concerning the Rate of Sand and Gravel Extraction by an Individual Dredge.

The rate of sand and gravel extraction by an individual dredge is an important factor affecting local 1/ river channel stability. The diameter and depth of the dredge hole as well as local degradation beyond the dredge hole increase as extraction rates increase. Local degradation and secondary impacts, such as bank erosion and channel widening, can be limited and greater local channel stability can be obtained by limiting the extraction rate of an individual dredge. Therefore, the maximum annual extraction rate by a single dredge regardless of its location on the river will be limited

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1/ The term local refers to the area directly impacted by a working dredge. This area could be relatively small, extending only a few hundred feet from the dredge, or it could be quite large, extending many hundreds of feet upstream and/or downstream of the dredge.

to 300,000 tons of material. The actual allowable extraction rate for a single dredging operation may be less than 300,000 tons of material and will depend upon the reach of river being dredged and the number of dredges operating within that reach.

IV. Restrictions Concerning the Length of Individual Permitted Dredging Operations.

The maximum length of any reach of river authorized for dredging under the terms of a single permit is 1.5 miles. This restriction is intended to allow the producers fair access to the river by preventing any producer from using the permitting process to create an unfair advantage over other producers by securing a permit for an excessively long reach of the river. This restriction applies to any new dredging operation permitted after implementation of this Regulatory Plan. It does not apply to a dredging operation permitted prior to implementation of the Plan, unless subsequent to implementation of the Plan that dredging operation is altered (such as the relocation of dredging boundaries) to an extent that those changes require the issuance of a new permit document.

V. Restrictions Concerning the Distance between Adjacent Permitted Dredging Boundaries.

A minimum distance of 2,000 feet is required between the permitted reaches of adjacent dredging operations. This restriction will limit dredging-induced local channel instability, by maintaining at least a 2,000-foot-long undredged reach of river between adjacent dredges. This restriction applies to any new dredging operation permitted after implementation of this Regulatory Plan. It does not apply to a dredging operation permitted prior to implementation of the plan, unless subsequent to implementation of the plan that dredging operation is altered (such as the relocation of dredging boundaries) to an extent that those changes require the issuance of a new permit document.

VI. Restrictions Concerning the Number of Dredges Authorized Under the Terms of an Individual Permit Document.

The maximum number of dredges authorized to operate within a single permitted reach of river is 1. This restriction will limit dredging-induced local channel instability, by limiting the number of dredges within each permitted reach of river.

VII. Restrictions Concerning Manmade Structures.

A. Bowersock Dam.

This hydroelectric dam is located near river mile 51.8. It was constructed in 1872 and was enlarged in 1926. The exact construction details of the dam are unknown. The structure is believed to be relatively unstable, since the elevation of the riverbed downstream of the dam is considered to be marginally

adequate to prevent sliding failure of the structure. The dam acts as a riverbed control structure, and if it should fail, it could induce severe riverbed degradation, bank erosion and channel widening for many miles upstream.

Due to the apparent unstable condition of Bowersock Dam and its importance as a riverbed control and hydroelectric generating facility, the following restrictions are being imposed on the reaches of river located immediately upstream and downstream of the dam:

1. Dredging activities upstream of Bowersock Dam will not be allowed within approximately 750 feet of the dam. The actual distance will be controlled by part C. of this section, since two bridges are located immediately upstream of the structure.

2. Dredging activities downstream of the dam will not be allowed within 2,250 feet of the structure.

3. The maximum volume of material that can be extracted annually between river mile 48.0 and Bowersock Dam is 150,000 tons.

Due to the uncertainties involved in evaluating the stability of Bowersock Dam, it is not possible to determine how many feet the downstream riverbed elevation can be lowered before the dam will fail. Therefore, the reach of river located immediately downstream of the dam will be closely monitored, and if dredging activities on the river appear to be jeopardizing the integrity of the structure, additional restrictions will be imposed.

Refer to Figure A-1 on page A-17 for additional clarification on the restrictions imposed on the reaches of river located immediately upstream and downstream of the dam.

B. Water Intake Structures and Associated Weirs and Jetties.

No dredging will be allowed within 500 feet of any water intake structure or an associated weir or diversion jetty. This restriction will limit the potential for dredging-induced local channel instability to adversely impact the operation of such structures. This restriction does not apply to irrigation intakes.

The following additional restrictions are being imposed to protect the Water District No. 1 1/ weir; the Sunflower Army ammunition Plant water intake structure and diversion jetty;

1/ Water District No. 1 refers to Water District No. 1 of Johnson County.

and the city of Topeka's water intake structures, diversion jetties and weir:

1. Water District No. 1 Weir.

This weir is an important riverbed control located near river mile 15.0. The weir was initially constructed in the mid-1960s in response to continually lowering water surface elevations in that reach of river. If riverbed elevations downstream of the weir drop several more feet, the structure may fail. Failure of the weir could induce severe riverbed degradation, bank erosion and channel widening upstream of the structure and could impact water supplies for Water District No. 1 of Johnson County.

Due to the importance of the weir to Water District No. 1 for its water supply and due to the structure's importance as a riverbed control, the following restrictions are being placed on the reaches of river located immediately upstream and downstream of the weir:

a. Dredging activities upstream of the weir will not be allowed within 500 feet of the structure.

b. Dredging activities downstream of the weir will not be allowed within 2,500 feet of the structure.

c. The maximum volume of material that can be extracted annually between river mile 12.4 (the upstream end of a natural rock deposit) and the Water District No. 1 weir is 300,000 tons.

Refer to Figure A-2 on page A-18 for additional clarification on the restrictions imposed on the reaches of river located immediately upstream and downstream of the weir.

2. Sunflower Army Ammunition Plant Water Intake Structure and Diversion Jetty.

The Sunflower Army Ammunition Plant has a water intake structure and a diversion jetty located between river miles 32.9 and 33.1. The intake structure was constructed in 1944 and is currently not in use. The Sunflower Plant has established a riparian water right to draw 60 million gallons of water a day from the river; and although the intake is not currently in service, it must be maintained in an operable condition to meet possible future national emergency mobilization requirements at the plant.

Kansas River low flow water surface elevations at the water intake are presently critically low to meet the water supply demands of the plant if it were operating at its fully mobilized potential. Therefore, any lowering of riverbed elevations at the intake would have a detrimental impact on the plant's ability to meet possible future water supply needs.

Riverbed degradation near the intake could also result in failure or diminished function of the diversion jetty located just upstream of the intake structure. The jetty diverts flows from the left riverbank to the intake on the right riverbank. Loss of the jetty or diminished function of the structure could severely impact the plant's ability to meet future water supply needs.

Due to the importance of the water intake structure and diversion jetty to meet possible future mobilization requirements at the Sunflower Plant, the following restrictions are being imposed:

a. Dredging activities upstream of the intake structure will not be allowed within 5,000 feet of the structure.

b. Dredging activities downstream of the intake structure will not be allowed within 5,000 feet of the structure.

Refer to Figure A-3 on page A-19 for additional clarification on the restrictions imposed on the reaches of river located immediately upstream and downstream of the water intake structure and diversion jetty.

3. City of Topeka Water Intake Structures, Diversion Jetties and Weir.

The city of Topeka has 2 water intake structures, 2 diversion jetties and a weir located between river miles 86.9 and 87.2. These structures provide the city with its entire water supply. Low flow water surface elevations at the intakes are marginally adequate to meet the city's needs; therefore, any lowering of water surface elevations at the intakes could have a detrimental impact on the city's ability to withdraw water from the river. The diversion jetties divert flows from the left riverbank to the right bank where the intake structures are located. The weir functions like a dam, raising water levels upstream of the structure and increasing water surface elevations at the intakes. Loss of one of the diversion jetties or the weir or diminished function of the structures could severely impact the city's ability to meet its water supply needs.

Due to the importance of the city of Topeka's diversion jetties and weir to meet the city's water needs, the following restrictions are being imposed:

a. No dredging will be allowed between the most upstream jetty and the weir.

b. Dredging activities upstream of the diversion jetties and weir will not be allowed within 1,000 feet of the most upstream diversion jetty.

c. Dredging activities downstream of the diversion jetties and weir will not be allowed within 2,000 feet of the weir.

Refer to Figure A-4 on page A-20 for additional clarification on the restrictions imposed on the reaches of river located immediately upstream and downstream of the diversion jetties and weir.

C. Bridges.

No dredging will be allowed within 500 feet of any bridge crossing the Kansas River. This restriction will limit the potential for dredging-induced local channel instability to adversely impact the structural integrity of bridges.

D. Pipelines.

Pipelines buried in the riverbed have a high potential to be adversely impacted by dredging activities. If degradation of the riverbed exposes a pipeline, damage could occur through sagging, buoyancy or displacement of the line downstream due to an accumulation of debris. The following restrictions will limit the potential for dredging-induced localized degradation to expose buried pipelines:

1. No dredging will be allowed within 200 feet of any pipeline that is buried 10 feet or more below the riverbed's surface.

2. No dredging will be allowed within 500 feet of any pipeline that is buried less than 10 feet below the riverbed's surface.

Additional restrictions may be required for any pipeline located on or above the riverbed. Such restrictions would be developed on a case-by-case basis.

Each applicant is responsible for determining the locations and elevations of any pipelines crossing the river within a proposed permit's boundaries and within the reaches of river extending 500 feet upstream and downstream of those boundaries. This information or a negative response, if no pipelines exist, must be provided to the Kansas City District before a proposed permit can be issued.

E. Bank Stabilization Structures.

No dredging will be allowed within 200 feet of any bank stabilization structure. When multiple structures (jetties, hardpoints, etc.) are utilized as components of a single project, no dredging will be allowed within 200 feet of the most upstream and downstream structures or landward of a line drawn parallel to the riverbank and located 200 feet riverward of the riverward edge of each structure. These restrictions

will limit the potential for dredging-induced local channel instability to adversely impact bank stabilization efforts.

Refer to Figure A-5 on page A-21 for additional clarification on restrictions concerning multiple bank stabilization structures.

F. Levees.

No dredging will be allowed within 150 feet of the riverward toe of any functional levee located along the river. This restriction will limit the potential for dredging-induced localized channel instability to adversely impact the structural integrity of levees.

G. Other Structures.

Restrictions regarding other manmade structures not identified in this section will be determined on a case-by-case basis.

VIII. Restrictions Concerning Natural Formations.

A. Natural Rock Deposits in the River Channel.

Natural rock deposits located on or in the riverbed may act as riverbed controls and/or may increase aquatic habitat diversity. The importance of a rock deposit is dependent upon its areal extent, its thickness and other relevant factors. Since the physical characteristics of rock deposits vary widely from one to another, and since the value of a deposit is based on its physical characteristics, it is not possible to develop restrictions which will consider all possible contingencies. Therefore, restrictions concerning natural rock deposits will be developed on a case-by-case basis (except for 1. and 2. below).

Restrictions concerning two important natural rock deposits are as follows:

1. Natural Rock Deposit between River Miles 12.2 and 12.4.

This natural rock deposit is an important riverbed control, and in addition, it provides valuable habitat diversity for fish and other aquatic organisms. The exact length, width and thickness of the deposit is unknown. The rock deposit functions as a riverbed control, retarding upstream bed degradation in the approximately 2 1/2-mile-long reach of river located between the deposit and the Water District No. 1 weir. If the rock deposit is displaced by dredging activities, it could induce severe riverbed degradation, bank erosion and channel widening in the reach of river between the deposit and the weir, which could ultimately result in failure of the weir.

Due to the importance of the rock deposit as a riverbed control

and as valuable habitat for fish and other aquatic organisms, the following restrictions are being imposed:

a. Dredging activities will not be allowed within the reach of river containing the rock deposit (river miles 12.2 - 12.4).

b. Dredging activities upstream of the rock deposit will not be allowed within 500 feet of the deposit.

c. Dredging activities downstream of the rock deposit will not be allowed within 2,500 feet of the deposit.

Refer to Figure A-2 on page A-18 for additional clarification on these restrictions.

2. Natural Rock Deposit between River Miles 21.8 and 22.8.

This approximately 1-mile-long natural rock deposit is an important riverbed control. It also provides valuable habitat diversity for fish and other aquatic organisms, and during low river stages, it becomes a foraging area for wading and shore birds. The deposit extends from the right riverbank to within 200 - 300 feet of the left riverbank. The heavily dredged 21.8-mile-long reach of river located downstream of the rock deposit has significantly lower riverbed elevations than the undredged reach of river located upstream of the deposit. If the rock deposit is displaced by dredging activities, headcutting would proceed upstream from the heavily dredged downstream area and could induce severe riverbed degradation, bank erosion and channel widening in the reach of river located upstream of the deposit.

Due to the importance of the rock deposit as a riverbed control, as valuable habitat for fish and other aquatic organisms and as a foraging area for birds, the following restrictions are being imposed:

a. Dredging activities will not be allowed within the reach of river containing the rock deposit (river miles 21.8 - 22.8.

b. Dredging activities upstream of the rock deposit will not be allowed within 500 feet of the deposit.

c. Dredging activities downstream of the rock deposit will not be allowed in the reach of river located between the deposit and a point 500 feet downstream of the Atchison, Topeka and Santa Fe Railway Company bridge located over the Kansas River near river mile 21.2).

Refer to Figure A-6 on page A-22 for additional clarification on these restrictions.

B. Riverbanks.

Dredges operating close to riverbanks have a high potential to adversely impact the stability of those banks, especially when dredging occurs near the outside of sharp river bends. Bank erosion induced by such dredging can result in the loss of land, damages to manmade structures, and adverse impacts to environmental resources. Therefore, the following restrictions are being imposed to limit the potential for dredging-induced local bed degradation to adversely impact riverbank stability:

1. No dredging will be allowed within 300 feet of the ordinary high water mark elevation 1/ of any riverbank on the outside of a river bend located in a reach of river which has experienced a significant degree of lateral migration in recent years.

Those river reaches are identified as:

River miles 40.5 - 42.0
River miles 47.5 - 48.0

2. No dredging will be allowed within 200 feet of the ordinary high water mark elevation of any riverbank on the outside of a sharp river bend which has a radius of curvature of 4,000 feet or less (provided that this restriction is not precluded by 1. above).

Those bends are identified as:

River Miles
26.0 - 27.0
27.3 - 29.0
34.0 - 35.5
35.5 - 37.0
39.2 - 40.0
40.5 - 42.0
43.2 - 44.5
44.5 - 45.3
46.7 - 47.3
47.3 - 48.3
55.0 - 56.5
57.0 - 58.6
78.0 - 79.3
79.5 - 80.2
114.3 - 114.8
114.9 - 115.3
117.4 - 119.0
120.0 - 120.3

1/ Ordinary High Water Mark - Refer to part E. of this section for a definition of this term.

124.0 - 125.0
130.7 - 131.3
131.5 - 132.2
132.2 - 133.6
133.7 - 134.1
139.0 - 139.5
140.6 - 141.2
141.7 - 142.2
142.5 - 143.6
143.6 - 144.4
146.2 - 147.3
150.1 - 150.5
150.6 - 151.3
151.9 - 152.6
153.5 - 154.7
164.9 - 165.3
166.0 - 167.0
168.0 - 169.3

3. Restrictions concerning areas of the river experiencing severe bank erosion and not identified in 1. and 2. above will be considered on a case-by-case basis.

4. No dredging will be allowed within 100 feet of the ordinary high water mark elevation of any riverbank not identified in 1. and 2. above unless special authorization is granted.

NOTE: The Kansas City District can provide ordinary high water mark elevations for any location on the river.

C. Islands.

Islands 1/ provide valuable ecological diversity by creating variability in water depths and current velocities. These factors are especially important to the river's fishery, since they are requirements for a diverse fish population. Islands also provide a refuge for birds and other wildlife.

Due to the infrequency of islands in the river and due to the importance of islands for the creation of a diverse fishery and to provide a refuge for birds and other wildlife, the following restrictions are being imposed:

1. No dredging will be allowed within 100 feet of the ordinary high water mark elevation of any island. This restriction applies to all islands, including those islands that form within a permitted reach of river after initiation of dredging operations in that reach.

1/ Islands - Refer to part E. of this section for a definition of this term.

2. No clearing of vegetation will be allowed from any island in the river to facilitate commercial dredging activities.

Natural processes influence the size, shape and abundance of islands over time. Several islands have formed in the river during recent years and more may be forming. Therefore, no attempt has been made to provide a comprehensive list of islands for this Plan. Kansas City District personnel will conduct field investigations to determine the presence or absence of an island, when such determinations are necessary.

Refer to Figure A-7 on page A-23 for additional clarification on the identification of an island.

D. Tributary Mouths.

A reduction in the Kansas River's bed elevations can induce riverbed degradation in its tributaries. Lowering of bed elevations in the tributaries can result in additional adverse impacts such as bank erosion, channel widening, alteration of aquatic and terrestrial habitat, and a reduction in the structural integrity of manmade structures located in and along those tributaries. The following restriction is being imposed to limit the potential for dredging-induced localized riverbed degradation to adversely impact the Kansas River's tributaries:

No dredging will be allowed within 100 feet of a tributary mouth. The undredged zone will extend 100 feet riverward (into the Kansas River) of a straight line drawn across the tributary mouth and connected to the ordinary high water mark elevations on the Kansas River's banks on each side of the tributary.

Refer to Figure A-8 on page A-24 for additional clarification on this restriction.

E. Definition of Terms.

The following definitions are provided to clarify potentially confusing terms found in this section:

1. The term ordinary high water mark is defined for purposes of this Regulatory Plan as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas.

2. The term island is defined for purposes of this Regulatory Plan as a land form that rises from within the river channel and which meets all of the following criteria: (a) it is permanent and not shifting from location to location within the river channel (unlike a sand bar); (b) it rises to an

elevation such that it has a distinct ordinary high water mark line, or its surface elevation is greater than the ordinary high water mark elevation on the adjacent riverbank; and (c) it is a discrete land form such that an unbroken contour line can be extended 360 degrees around its perimeter at or above the elevation of the ordinary high water mark on an adjacent riverbank.

NOTE: For purposes of this Regulatory Plan, the definition of an island does not require the presence of vegetation. In addition, islands may not be surrounded by water during low river stages.

IX. Restrictions Concerning Water Quality.

A. Dredged Return Water.

Water separated from the dredged slurry and returned to the river could affect water quality parameters. Dredged return water may contain inordinately high levels of silt and/or toxic substances liberated from the dredged material during processing. In addition, the return water may pick up a high concentration of suspended solids and/or toxic substances from the plant site if it is discharged directly onto the ground and allowed to run-off into the river. Therefore, the following restrictions are being imposed to limit the potential for dredged return water to adversely impact the river's water quality:

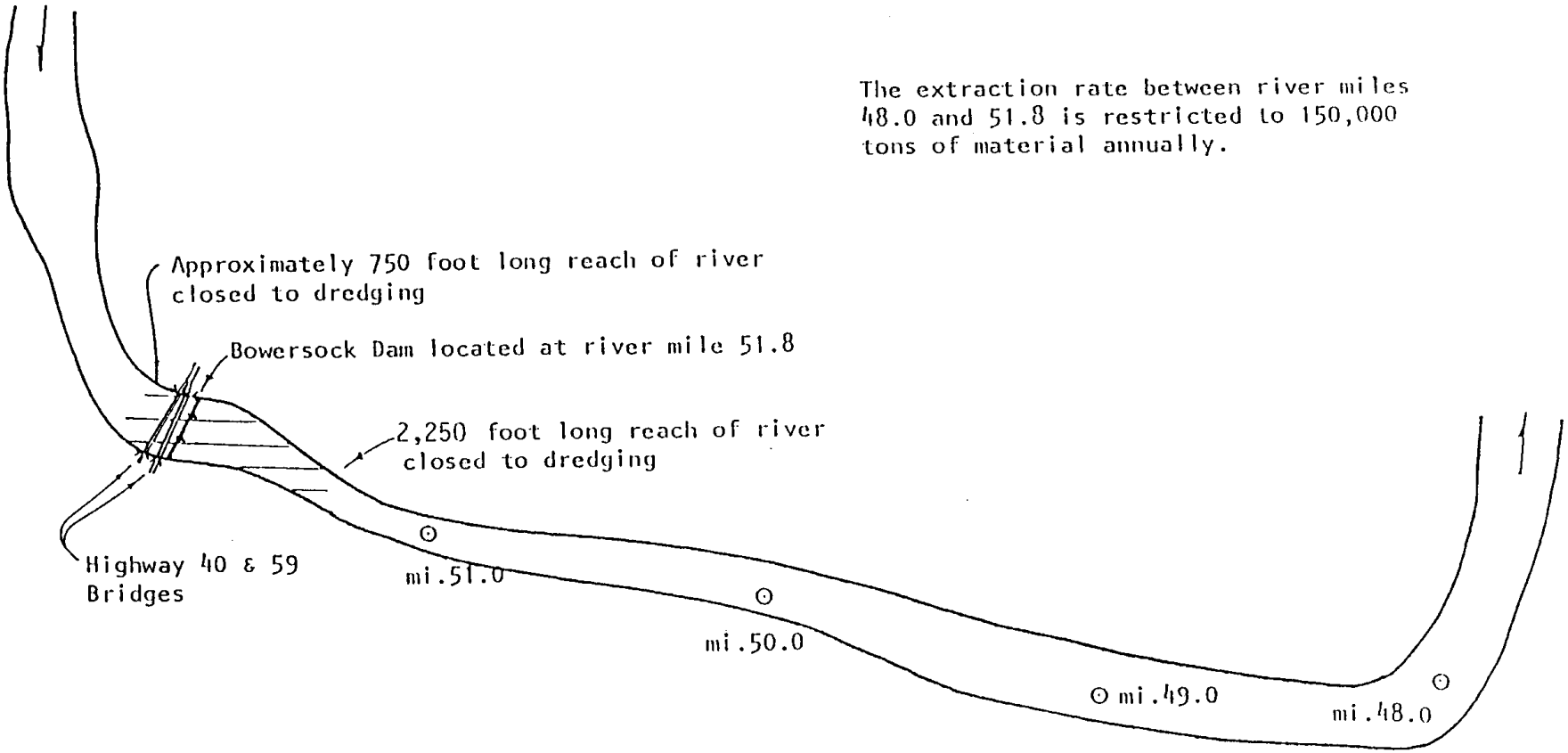
1. A requirement to pass dredged return water through a siltation basin prior to its reintroduction to the river will be considered on a case-by-case basis. If substrate conditions or other factors associated with a particular dredge location indicate that a potential water quality problem exists, the requirement for a siltation basin may be imposed.

2. Dredged return water must be conveyed from the processing facility to the river by sluiceway or by piping.

B. Dredged Silt And Miscellaneous Debris.

Silt collected in siltation basins and miscellaneous debris dredged from the river, such as wood, metal, paper and plastic cannot be returned to the water body. These waste materials must be disposed at a location and in a manner that will prevent their reintroduction to the river. This restriction will prevent dredged waste materials from adversely impacting water quality parameters in the river.

BOWERSOCK DAM



SCALE
2" = 1 mi.
APPROXIMATE

FIGURE A-1

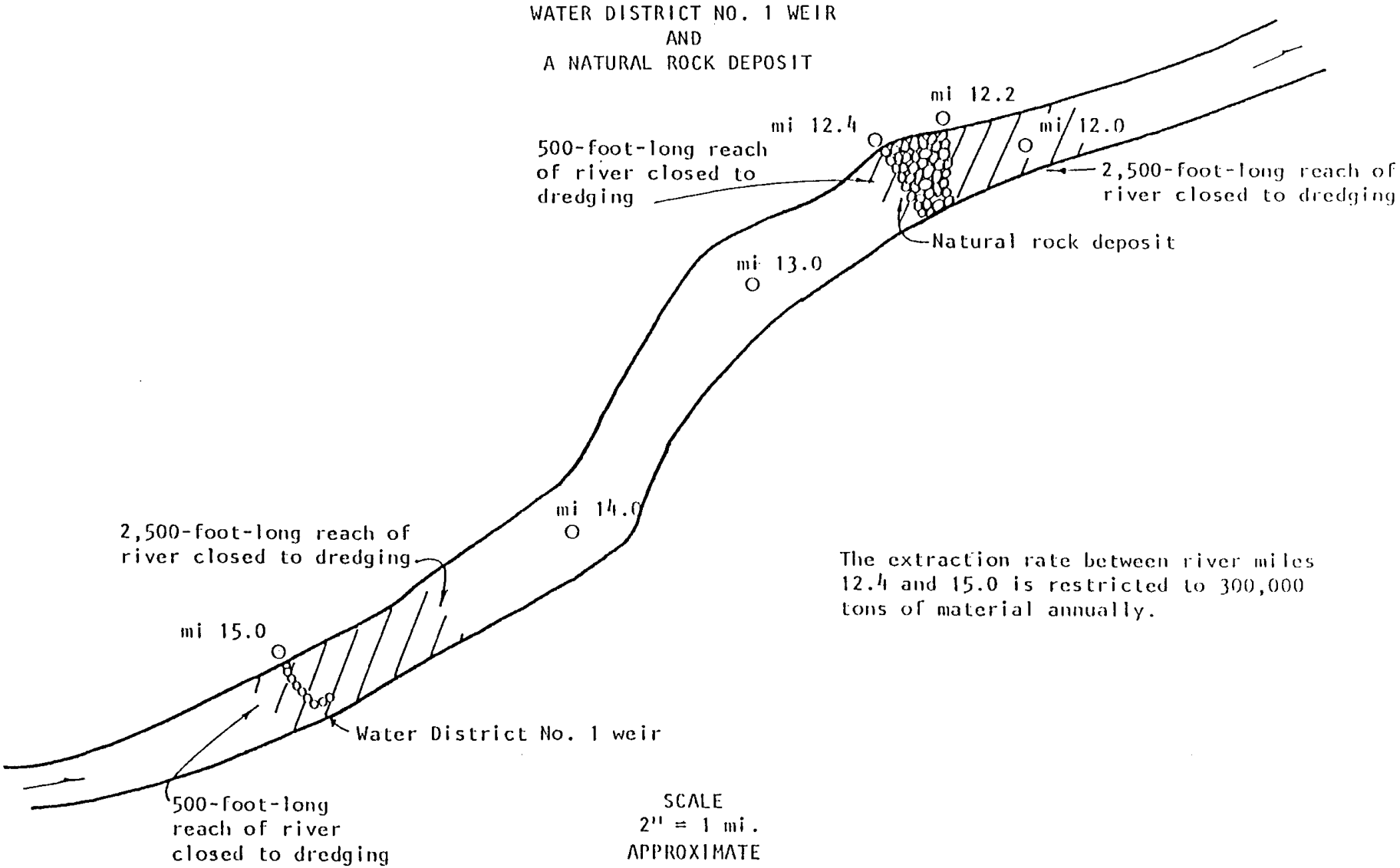
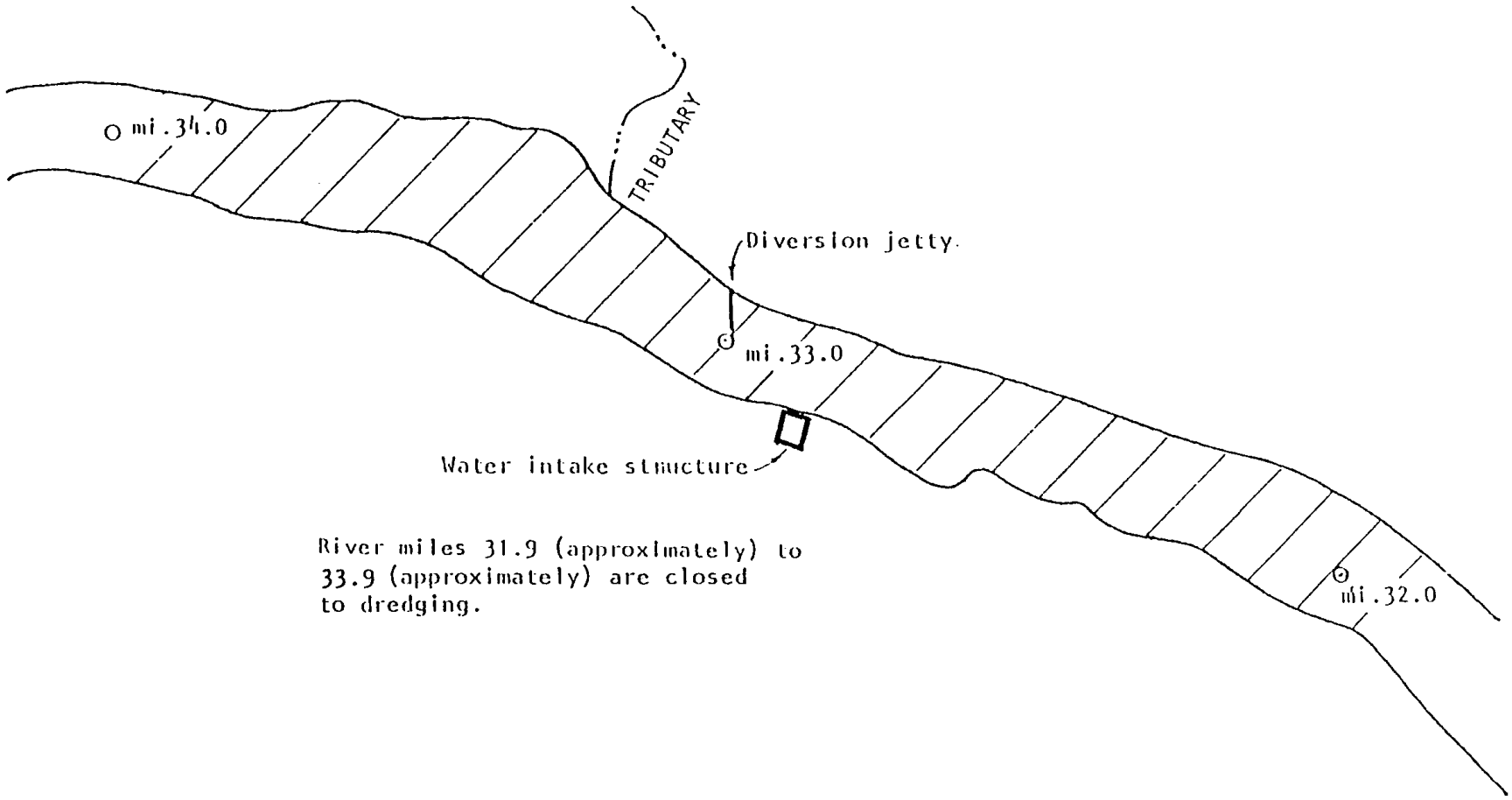

WATER DISTRICT NO. 1 WEIR
AND
A NATURAL ROCK DEPOSIT
mi 12.2
mi 12.4
mi 12.0
500-foot-long reach of river closed to dredging
2,500-foot-long reach of river closed to dredging
Natural rock deposit
mi 13.0
mi 14.0
2,500-foot-long reach of river closed to dredging
mi 15.0
Water District No. 1 weir
500-foot-long reach of river closed to dredging
SCALE
2" = 1 mi.
APPROXIMATE
The extraction rate between river miles 12.4 and 15.0 is restricted to 300,000 tons of material annually.

FIGURE A-2

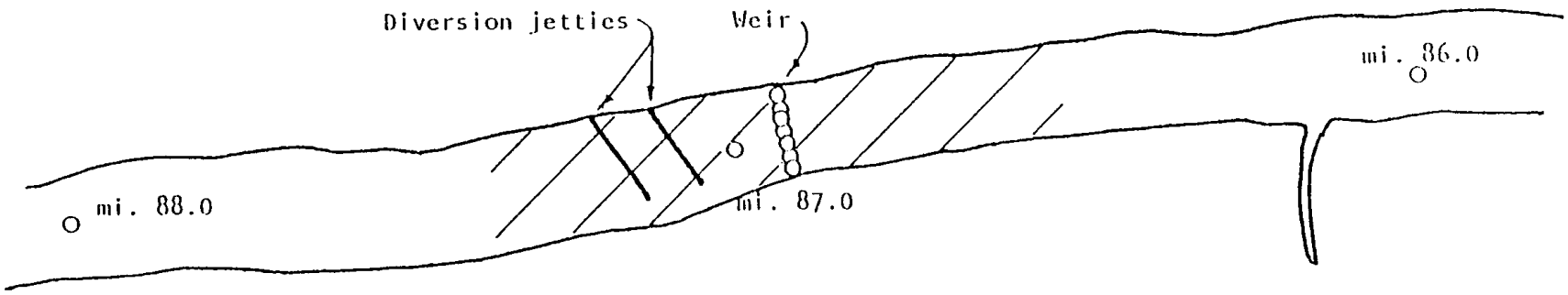
SUNFLOWER ARMY AMMUNITION PLANT
WATER INTAKE STRUCTURE AND DIVERSION JETTY



SCALE
4" = 1 mi.
APPROXIMATE

FIGURE A-3

CITY OF TOPEKA
DIVERSION JETTIES & WEIR

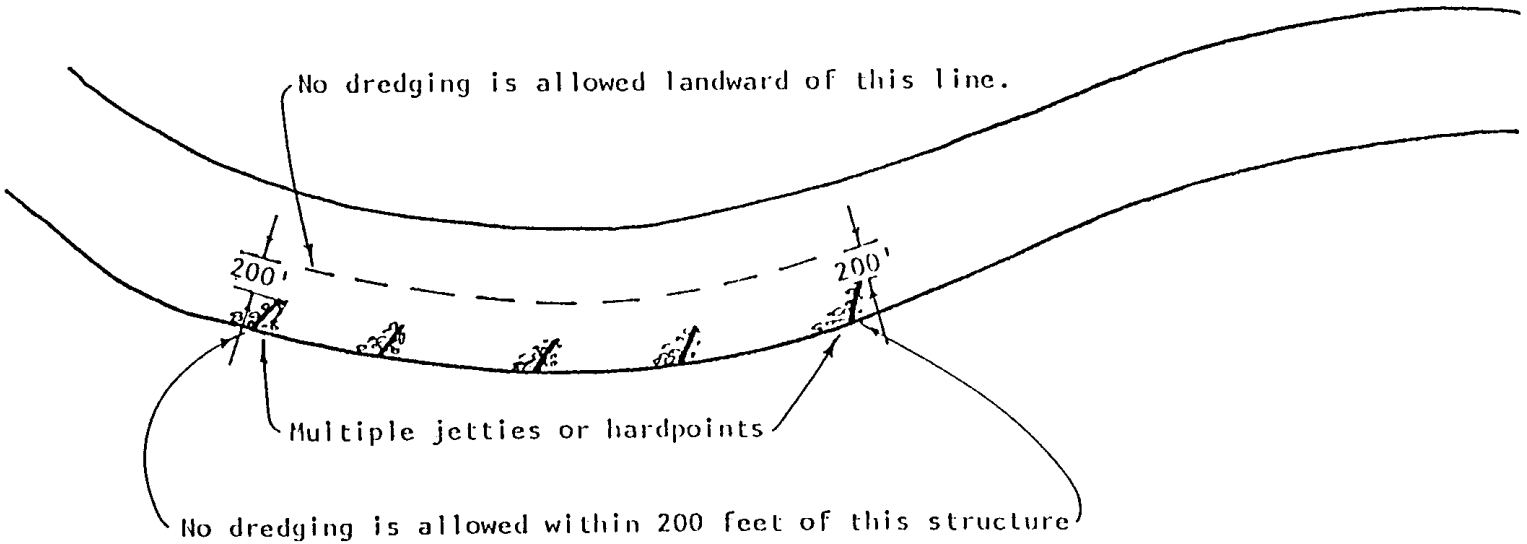


River miles 86.5 (approximately) to
87.4 (approximately) are closed to dredging.

SCALE
4" = 1 mi.
APPROXIMATE

FIGURE A-4

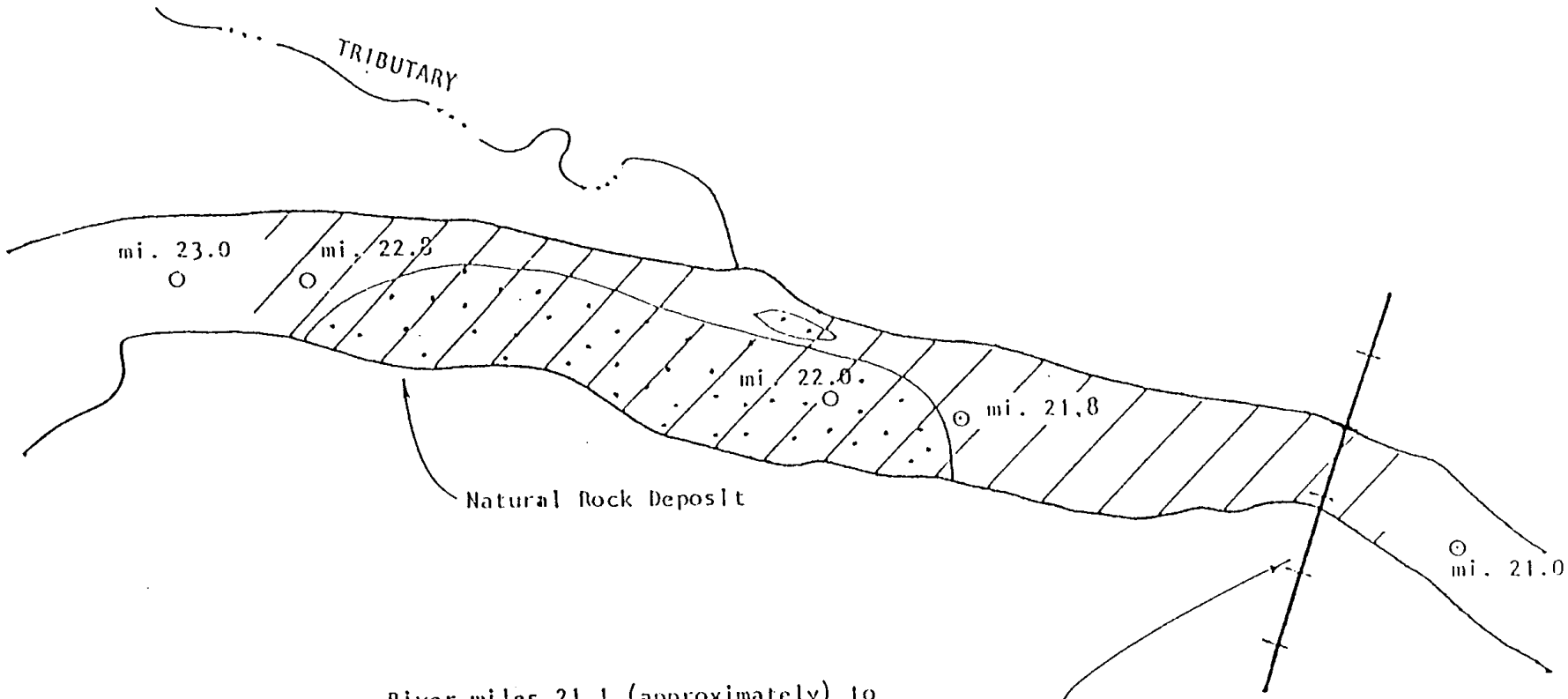
MULTIPLE BANK STABILIZATION STRUCTURES



TYPICAL PLAN VIEW

FIGURE A-5

NATURAL ROCK DEPOSIT



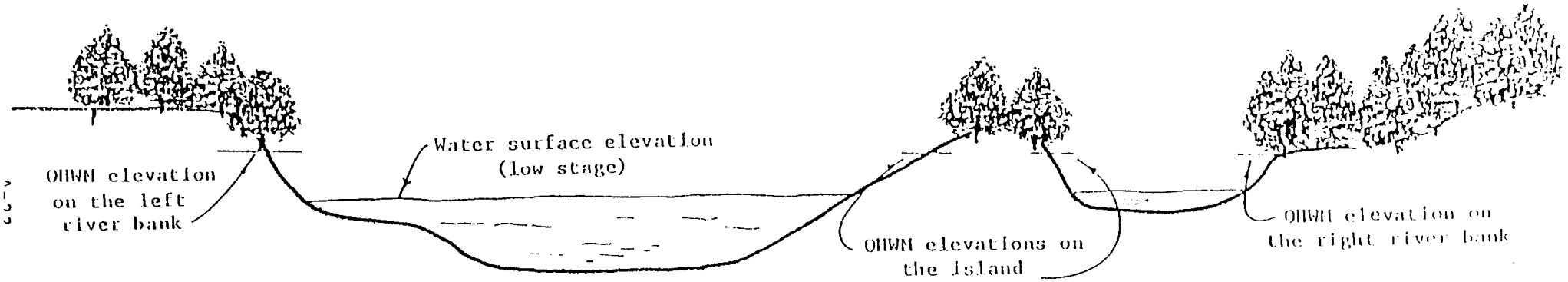
River miles 21.1 (approximately) to 22.9 (approximately) are closed to dredging.

Atchison Topeka & Santa Fe Railroad Bridge located at mi. 21.2

SCALE
4" = 1 mi.
APPROXIMATE

FIGURE A-6

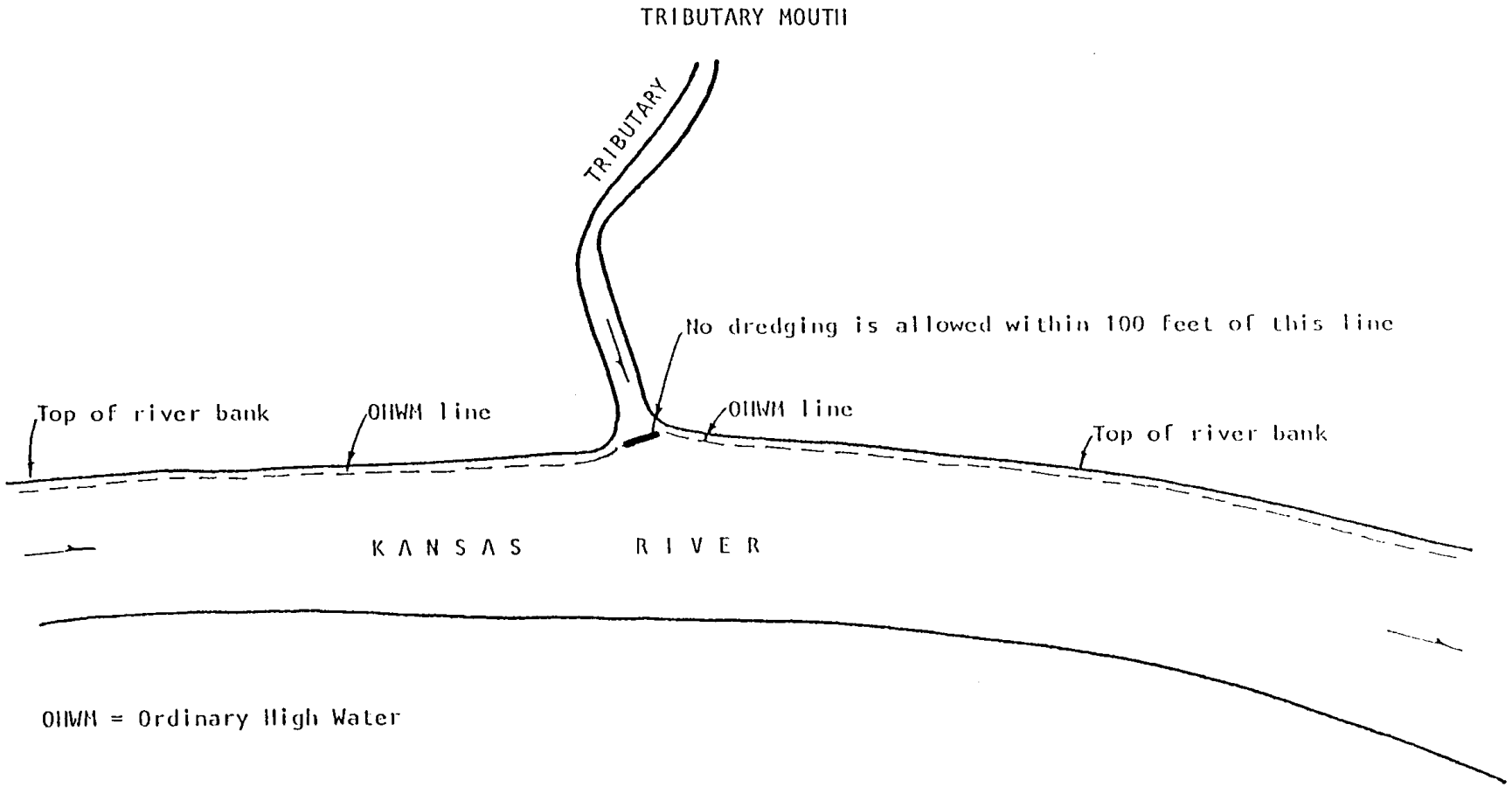
IDENTIFICATION OF AN ISLAND



OHWM = Ordinary High Water Mark

TYPICAL CROSS SECTION

FIGURE A-7



TYPICAL PLAN VIEW

FIGURE A-8

MONITORING PROGRAM

This section of the Regulatory Plan contains the criteria that have been developed to monitor the impacts of permitted dredging activities on the Kansas River. Data required to monitor dredging-related impacts must be collected by the sand and gravel producers on a routine basis and will be utilized by the Kansas City District to measure riverbed degradation and other parameters affecting the river channel's morphology. Implementation of the Monitoring Program in conjunction with the Dredging Restrictions will ensure that the established maximum acceptable level of impacts will not be exceeded.

I. General Information.

Reliable monitoring of dredging-related impacts is dependent upon the collection and utilization of various types of information. Certain data pertinent to monitoring efforts is currently available to the Kansas City District; other information which is not available to the Kansas City District must be provided to the District by the sand and gravel producers. Monumented control sites must be established at various locations along the river in order to provide some of the required information. Establishment and maintenance of the control sites is the responsibility of the producers. Information to be provided by the producers includes channel cross-section surveys, water surface elevations, aerial photography, and production figures. Field data required by the District must be accompanied by field notes containing pertinent raw data in a standard engineering format with appropriate dates, times and locations of data collections. Certain information may be requested in a preprocessed form, such as channel cross-section survey data plotted for each survey range line. In addition, requested information may be required in digital form on diskette in a format acceptable to the Kansas City District.

When a dredged reach of river is abandoned, the producers may be required to continue control site maintenance and data collections, within the abandoned reach, for a reasonable period of time. Such a requirement would depend upon the location of the abandoned reach, the impact of dredging activities on the reach and other factors pertaining to the river channel's stability within the reach. Termination of control site maintenance and data collection is at the discretion of the Kansas City District.

Contractors employed by the producers and the procedures and equipment utilized by those contractors to establish control sites and to furnish data, aerial photography and any other required information, must be approved by the Kansas City District. This document is not intended to provide all of the details concerning data collection and submittal requirements. The producers or the contractors employed by the producers must

contact the Kansas City District prior to the initiation of data collection efforts in order to assure that all data collection and submittal requirements are met.

The Monitoring Program is subject to modification by the Kansas City District at any time to ensure that the established maximum acceptable level of impacts is not being exceeded. Therefore, the sand and gravel producers are responsible for providing any additional information requested by the District to meet essential monitoring needs.

II. Control Sites.

At least one monumented control site must be established on each riverbank at the control site locations identified in Section III. A., B., and C. to provide channel cross-section survey ranges. The control sites will also be used to collect water surface elevations and to establish ground controls for aerial photography. Control sites will be established with x, y and z coordinates using approved surveying methodology.

III. Survey Ranges.

Monumented survey ranges must be established at the following locations:

A. Lower River (River Miles 0 - 51.8 (Bowersock Dam).

Monumented survey ranges will be located at approximately 1.5 mile intervals (any deviation must be approved by the Kansas City District) beginning at Turner Bridge near river mile 9.3 and ending within 1,000 feet of Bowersock Dam. In addition, a maximum of 5 monumented survey ranges will be located at 1,000 to 1,500-foot intervals through and/or adjacent to each permitted reach between Turner Bridge and Bowersock Dam. The actual number and location of ranges required in association with a permitted reach will be determined on a case-by-case basis and will depend on the length of the permitted reach and other pertinent factors. Existing monumented ranges, established by the Kansas City District, must be utilized when the locations of existing ranges coincide with required range locations. The use of existing ranges for the collection of required data will ensure continuity between historical and future data collections.

B. Topeka Area (Approximately River Miles 80 - 90).

Monumented survey ranges will be located at approximately 1.5 mile intervals (any deviation must be approved by the Kansas City District) beginning at least 5 miles below the most downstream permitted reach and ending at least 5 miles above the most upstream permitted reach. One range must be located within 500 feet of the downstream side of the Topeka water supply weir, which is located near river mile 86.9. In addition, a maximum of 5 monumented survey ranges will be

located at 1,000 to 1,500-foot intervals through and/or adjacent to each permitted reach. The actual number and location of ranges required in association with a permitted reach will be determined on a case-by-case basis and will depend on the length of the permitted reach and other pertinent factors. Existing monumented ranges, established by the Kansas City District, must be utilized when the locations of existing ranges coincide with required range locations. The use of existing ranges for the collection of required data will ensure continuity between historical and future data collections.

C. Isolated Dredging Operations.

Isolated dredging operations are permitted dredging operations that are not located within the monitored areas described in Section III. A. and B. Generally, 5 monumented survey ranges will be established to monitor each isolated dredging operation. However, the actual number of required ranges could be greater than 5 and will depend upon conditions present in the reach of river being dredged. Therefore, the number of ranges required to monitor an isolated dredge and the locations of those ranges will be developed on a case-by-case basis.

IV. Data Collection.

A. Channel Cross-Section Surveys.

A set of channel cross-section survey data consisting of at least 1 channel cross-section survey recorded along each monumented range line referenced in Section III. (Survey Ranges) must be collected as soon as possible after implementation of the Regulatory Plan, in order to provide base line data. A second set of channel cross-section data must be collected 4 years after implementation of the Regulatory Plan; and beginning 4 years after implementation of the Plan, sets of channel cross-section data must be collected at 2 year intervals (4,6,8,10,12,...). Channel cross-section surveys must be conducted during discharges of 10,000 cfs or less. Each set of channel cross-section data must be provided to the Kansas City District as soon as possible after the data has been collected.

B. Water Surface Elevations.

Two sets of water surface elevation data must be collected as soon as possible after implementation of the Regulatory Plan, in order to provide base line data. Water surface elevations must be recorded at each monumented survey range referenced in Section III. (Survey Ranges) twice during each of the data collection years specified in part A. of this section. One set of water surface elevation data must be recorded during discharges of approximately 1,500 cfs, and a second set must be recorded at discharges of approximately 5,000 cfs, during each data collection year. Water surface elevations must be collected under near steady-state conditions, such as constant

reservoir releases or near the crest of a runoff event. Each set of water surface elevation data must be provided to the Kansas City District as soon as possible after the data has been collected.

c. Sand and Gravel Production.

The total number of tons of material dredged from each permitted reach of the river must be provided to the Kansas City District semiannually. The number of tons of material extracted from each permitted reach from January 1 through June 30, and from July 1 through December 31, each year, must be provided to the District within 30 days of the close of the respective semiannual recording period.

V. Aerial Photography.

A complete set of aerial photographs must be taken of the Kansas River as soon as possible after implementation of the Regulatory Plan, in order to provide base line data. In addition, a complete set of aerial photographs must be taken of the river beginning 4 years after implementation of the Regulatory Plan and at 4-year intervals thereafter. Each set of photographs must begin at the confluence of the Kansas and Missouri Rivers and must extend to the confluence of the Kansas, Smoky Hill and Republican Rivers. Flight line coverage will have a minimum width extending from the top of the left riverbank to the top of the right riverbank and will include flagged bench marks. Flagged bench marks will consist of a standard mapping target (for a 1 inch equals 400 foot scale) located on each monumented control site. Each set of photographs will provide continuous stereographic (overlapping) coverage in color, with a scale of 1 inch equals 400 feet. Aerial photography must be performed during a discharge of 5,000 cfs or less, between late fall and late winter after deciduous trees have shed their leaves and when no snow cover exists. Each set of aerial photographs and the negatives must be provided to the Kansas City District as soon as possible after photographic work has been completed.