

## **Little Salt Creek Reach Summary**

Mainstem – Rock Creek Road to Davey Road

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**Location:** This reach of Little Salt Creek Mainstem flows south from Rock Creek Road to Davey Road.

### **Summary of Field Data Collection:**

This reach of the Little Salt Creek Mainstem is approximately 11,000 feet. There are 19 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these points.

### Vegetation

Canopy cover ranges from 0% approaching Davey Road to 100% downstream of Rock Creek Road. The corridor width consistently ranges from 50 and 100 with the exception where the farm fields are close to the top of bank. Here the corridor width is 0 to 10 feet. The vegetation through this reach is comprised of 12 to 18 inch trees.

### Channel Dimension

The channel bed width ranges from 4 to 12 feet. Bank heights range from 6 to 20 feet, and bank angles range from 60 to 90 degrees throughout the reach with a couple locations below 60 degrees. The lower limit of woody vegetation ranges from 6 and 12 feet, and the lower limit of perennial vegetation ranges from 1 to 4 feet.

### Material

The bed material throughout this reach is both unconsolidated silty clays and consolidated silty clays and gravel. The left and right bank material consists of clay and silty clay. Seeps are found along both banks along this reach at heights ranging from toe of slope to 1 foot with a couple locations where seeps are 6 and 7 feet above the water surface.

### Profile

There are 35 knickpoints and 1 riffle identified throughout this reach.

### Bar

There are 32 left, right, and center bars ranging from 0.25 to 1.5 feet in height. Four of these bars are center bars, and all but 2 are unconsolidated. The bars are of deposition in origin. There are 8 debris jams.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of bank scour as well as circular and wedge bank failures on the right and left descending banks. Mid bank scour is identified downstream of Rock Creek Road for

approximately 1,600 feet, while toe scour is identified for the remainder of the reach.

#### Crossings

There are no crossings along this reach.

#### Outfalls

Outfalls are identified in the form of gullies with 14 gullies identified through this reach of the Little Salt Creek Mainstem.

#### Photos and Notes

There are 106 photo points and 24 note points.

## **Little Salt Creek Reach Summary**

Mainstem – Davey Road to Branched Oak Road

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**Location:** This reach of Little Salt Creek Mainstem flows southeast from Davey Road to Branched Oak Road.

### **Summary of Field Data Collection:**

This reach of the Little Salt Creek Mainstem is approximately 9,900 feet. There are 21 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover ranges from 0% to 75%. The corridor width ranges from 50 and 100 feet downstream of Davey Road and decreases to 0 and 10 feet approaching Branched Oak Road. The vegetation through this reach is comprised of 8 to 18 inch trees and tall grasses.

### Channel Dimension

The channel bed width ranges from 5 to 9 feet downstream of Davey Road, then increases to 12 to 24 feet before decreasing back to 5 to 10 feet approaching Branched Oak Road. Bank heights range from 8 to 16, and bank angles range from 30 to 60 degrees throughout the reach with a couple locations of 90 degree bank angles. The lower limit of woody vegetation ranges from 3 and 9 feet.

### Material

The bed material throughout this reach is unconsolidated silty clays. The bed material is consolidated at locations where the data point was taken at a riffle. The left and right bank material consists of clay and silty clay. Seeps are found along both banks of this reach at heights ranging from toe of slope to 6 feet.

### Profile

There are 17 knickpoints throughout this reach. There are 19 riffles located within 3,800 feet downstream of Davey Road. There are no riffles identified continuing to Branched Oak Road.

### Bar

There are 26 left, right, and center bars ranging from 0.5 to 2 foot in height. Five of these bars are center bars, and 4 of the 26 are consolidated bars. The bars are of deposition and geomorphologic in origin. There are 24 debris jams.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks. Both circular failures and wedge failures occur within much of the upper half, where wedge failures occur in the lower half.

### Crossings

There are 2 stream crossings including Davey Road (double box culvert) and the 19<sup>th</sup> Street Bridge.

### Outfalls

Outfalls are identified in the form of gullies, tributaries or pipe outfalls. 2 tributaries, 23 gullies and 1 pipe outfalls are identified through this reach of the Little Salt Creek Mainstem.

### Photos and Notes

There are 114 photo points and 67 note points.

## **Little Salt Creek Reach Summary**

Mainstem – Branched Oak Road to Raymond Road

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**Location:** This reach of Little Salt Creek Mainstem flows southeast from Branched Oak Road passing under 12<sup>th</sup> Street to Raymond Road.

### **Summary of Field Data Collection:**

This reach of the Little Salt Creek Mainstem is approximately 11,000 feet. There are 21 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover is consistently 0% with little to no woody vegetation. The vegetation through this reach is comprised of a few stand alone trees, farm fields and tall grasses.

### Channel Dimension

The channel bed width downstream of Branched Oak Road ranges from 3 to 8 feet. Approaching 12<sup>th</sup> Street bridge and continuing approximately 3000 feet downstream of 12<sup>th</sup> Street, the channel widens to 12 to 20 feet. For the remainder of this reach, the channel width ranges from 5 to 12 feet. Bank heights from Branched Oak Road to 12<sup>th</sup> Street range from 6 to 10 feet. Immediately downstream of 12<sup>th</sup> Street, banks heights decrease to 4 feet for approximately 1,700 feet before increasing to 8 feet for the remainder of the reach. Bank angles range from 45 to 60 degrees throughout the reach with a couple locations of 90 degree bank angles approaching Raymond Road. Woody vegetation through this reach is limited to a few stand alone trees away from the top of bank. Lower limit of perennial vegetation ranges from 1 to 3 feet.

### Material

The bed material throughout this reach is unconsolidated silty clays. The left and right bank material consists of clay and silty clay. Seeps are found on both banks along this reach of the mainstem with salt deposits visible downstream of 12<sup>th</sup> Street. Seep heights range from toe of slope to 4 feet.

### Profile

There are 5 knickpoints between Branched Oak Road and 12<sup>th</sup> Street and one just downstream of 12<sup>th</sup> Street. Approximately 450 feet upstream of 12<sup>th</sup> Street a beaver dam is creating a 1 foot drop in water surface elevation. No riffles are identified through this reach of the mainstem.

### Bar

There are 10 unconsolidated center bars ranging from 0.5 to 1 foot in height downstream of 12<sup>th</sup> Street.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of wedge bank failures on both the right and left descending banks.

### Crossings

There are 5 stream crossings including Branched Oak Road Bridge, an old no longer used steel frame of a road bridge, and 2 barbed wire fence crossings.

### Outfalls

Outfalls are identified in the form of gullies or tributaries. 3 tributaries, 14 gullies and 2 gullies draining from wetlands are identified through this reach of the Little Salt Creek Mainstem.

### Photos and Notes

There are 112 photo points and 77 note points.

## **Little Salt Creek Reach Summary**

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Mainstem – Raymond Road to Mill Road

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**Location:** This reach of Little Salt Creek Mainstem flows southeast from Raymond Road passing under 1<sup>st</sup> Street to Mill Road.

### **Summary of Field Data Collection:**

This reach of the Little Salt Creek Mainstem is approximately 8,700 feet. There are 16 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover is consistently 0% with little to no woody vegetation. The vegetation through this reach is comprised of a few stand alone trees and tall grasses.

### Channel Dimension

The channel bed width ranges from 4 to 8 feet for most of this reach, and widens to 12 to 15 feet approaching Mill Road. Bank heights range from 6 to 13 feet, and bank angles range from 45 to 90 degrees throughout the reach. Where woody vegetation is present, the lower limit of woody vegetation is 7 feet. The lower limit of perennial vegetation ranges from 1 to 3 feet in the upper half.

### Material

The bed material throughout this reach is unconsolidated silty clays with the exception of immediately downstream of 1<sup>st</sup> Street bridge, where the bed material is consolidated. The left and right bank material consists of clay and silty clay. Seeps are found along both banks along this reach of the mainstem at heights ranging from toe of slope to 8 feet. Seeps higher up on the banks are found just downstream from 1<sup>st</sup> Street.

### Profile

There is 1 knickpoint with a 1-foot drop approximately 1,300 feet downstream of 1<sup>st</sup> Street. No riffles are identified through this reach of the mainstem.

### Bar

There are 6 bars identified, 5 of which are center bars and 1 bar on the right descending bank. With the exception of 2 unconsolidated bars, these bars are consolidated. Bar heights range from 0.5 to 1.5 feet. One bar that appears to have formed from a past wedge failure is approximately 5 foot high.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks. The

wedge failures are more abundant in the upper half of this reach, where both circular and wedge failures occur for much of the lower half.

#### Crossings

There are 3 stream crossings including Raymond Road Bridge, 1<sup>st</sup> Street Bridge and a barbed wire fence crossing.

#### Outfalls

Outfalls are identified in the form of gullies or tributaries. 1 tributary and 37 gullies are identified through this reach of the Little Salt Creek Mainstem.

#### Photos and Notes

There are 98 photo points and 96 note points.

## **Little Salt Creek Reach Summary**

Mainstem – Mill Road to Waverly Road

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**Location:** This reach of Little Salt Creek Mainstem flows southeast from Mill Road passing under 14<sup>th</sup> Street to Waverly Road.

### **Summary of Field Data Collection:**

This reach of the Little Salt Creek Mainstem is approximately 7,400 feet. There are 14 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover is consistently 0% with little to no woody vegetation. The vegetation through this reach is comprised of a few stand alone trees and tall grasses.

### Channel Dimension

The channel bed width upstream of 14<sup>th</sup> Street ranges from 10 to 30 feet, while the width ranges from 3 to 6 feet downstream of 14<sup>th</sup> Street. Bank heights range from 10 to 15 feet, and bank angles range from 45 to 90 degrees throughout the reach. Where woody vegetation is present, the lower limit of woody vegetation ranges from 8 and 12 feet. Lower limit of perennial vegetation is consistently 0.5 to 1 foot above the water surface.

### Material

The bed material throughout this reach is unconsolidated silty clays, and the left and right bank material consists of clay and silty clay. Seeps are found along both banks along this reach of the mainstem with seep heights ranging from toe of slope to 4 feet.

### Profile

There are a total of 13 knickpoints along this reach with 3 upstream and 10 downstream of 14<sup>th</sup> Street. No riffles are identified between Mill Road and Waverly Road.

### Bar

Bars and debris jams are not common. Only 1 debris jam is found approximately 600 feet downstream of Mill Road, and 1 consolidated bar just downstream of 14<sup>th</sup> Street.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks.

### Crossings

There are 2 stream crossings including Mill Road Bridge and the 14<sup>th</sup> Street Bridge.

### Outfalls

Outfalls are identified in the form of gullies or pipe outfalls. Approximately 21 gullies and 1 CMP are identified through this reach of Little Salt Creek Mainstem. The CMP is just downstream of Mill Road.

### Photos and Notes

There are 81 photo points and 26 note points.

## **Little Salt Creek Reach Summary**

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Mainstem – Waverly Road to Arbor Road

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**Location:** This reach of Little Salt Creek Mainstem flows southeast from Waverly Road and then south to Arbor Road.

### **Summary of Field Data Collection:**

This reach of the Little Salt Creek Mainstem is approximately 18,500 feet. There are 31 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover is consistently 0% with little to no woody vegetation. The vegetation through this reach is comprised of a few stand alone trees and tall grasses.

### Channel Dimension

The channel bed width through the upper half of this reach ranges from 6 to 20 feet, while the width ranges from 25 to 50 feet in the lower half. Bank heights range from 10 to 15 feet in the upper half and 15 to 20 feet in the lower half. Bank angles range from 45 to 90 degrees throughout the entire reach. Where woody vegetation is present, the lower limit of woody vegetation ranges from 2 and 7 feet. The lower limit of perennial vegetation in the upper half ranges from 1 to 4 feet, and there is no perennial vegetation on the banks in the lower half.

### Material

The bed material throughout this reach is unconsolidated silty clays. The bed material is consolidated at locations where the data point was taken at a riffle. The D90 at these locations ranges from gravel to 6 inch diameter. The left and right bank material consists of clay and silty clay. Seeps are found along both banks within this reach of the mainstem with salt deposits more apparent in the lower half. Seep heights range from toe of slope to 10 feet.

### Profile

There are 5 knickpoints in the upper half and 1 knickpoint in the lower half. There are 27 riffles through this reach of the mainstem with no consistent riffle spacing.

### Bar

There are 24 left, right, and center bars ranging from 0.5 to 2 foot in height. Almost all of these bars are found in the lower half of this reach. With the exception of a couple consolidated bars, these bars are unconsolidated.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks. The wedge failures are more prominent just downstream of Waverly, where circular failures occur for much of the lower half.

### Crossings

There are 5 stream crossing including Waverly Road Bridge, a pedestrian bridge, 2 barbed wire fence crossings, and field access road triple pipe culvert.

### Outfalls

Outfalls are identified as in the form of gullies, tributaries or pipe outfalls. 4 tributaries, 24 gullies and 4 pipe outfalls are identified through this reach of the Little Salt Creek Mainstem.

### Photos and Notes

There are 143 photo points and 62 note points.

## **Little Salt Creek Reach Summary**

Mainstem – Arbor Road to Salt Creek Confluence

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**Location:** This reach of Little Salt Creek Mainstem flows southeast from Arbor Road, crossing under Highway 80, continuing to the Salt Creek confluence.

### **Summary of Field Data Collection:**

This reach of the Little Salt Creek Mainstem is approximately 8,600 feet. There are 7 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover is consistently 0% with little to no woody vegetation. Just downstream of Arbor Road, the corridor width is 10 feet with an average tree diameter of 12 to 18 inches, but approaching the Salt Creek confluence only a few stand alone trees and tall grasses are present.

### Channel Dimension

The channel bed width ranges from 18 to 30 feet, and bank heights range from 12 to 24 feet. Bank angles range from 30 to 60 degrees and reaching 90 degrees in some locations. Lower limit of woody vegetation ranges from 6 to 12 feet near Arbor Road and decreases to 2 to 6 feet approaching the Salt Creek confluence. Lower limit of perennial vegetation ranges from 12 feet just downstream of Arbor Road to 2 feet near the confluence with Salt Creek.

### Material

The bed material throughout this reach is unconsolidated silty clays and sandy silts. The left and right bank material consists of clay and silty clay. Salt deposits and seeps are found on both banks along this reach of the mainstem. Seep heights range from toe of slope to 2 feet.

### Profile

There are 10 riffles through this reach of the mainstem. The riffle spacing decreases from approximately 1,600 feet near Arbor Road to approximately 600 feet approaching the confluence with Salt Creek.

### Bar

There are 25 left and right bars ranging from 0.5 to 1 foot in height. These bars are consolidated with the exception of a couple downstream of Highway 80 and approaching the Salt Creek confluence.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks.

### Crossings

Four bridges cross the Little Salt Creek: Arbor Road, Highway 80 off-ramp, west bound Highway 80 and east bound Highway 80.

### Outfalls

Outfalls are identified in the form of gullies or pipe outfalls. 19 gullies or swales and 3 pipe outfalls are identified through this reach of the Little Salt Creek Mainstem.

### Photos and Notes

There are 46 photo points and 21 note points.

## **Little Salt Creek Reach Summary**

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Tributary 05 – Aerial Photo Analysis

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**Location:** Tributary 05 flows west and south from 40<sup>th</sup> Street under Interstate 80, under Arbor Road to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 05 is approximately 8300 feet long. The tributary flows through Salmo silty clay loam throughout its length. The channel has been manipulated. The lowest 800 feet of channel appear strongly influenced by a large adjacent seep. This lowest reach appears particularly mobile and widening. Above the seep the manipulated (straightened) channel appears relative stable with some areas of local widening. From about 300 feet upstream of STA 3064.6514 the surface water is less visible though the flow path is still apparent. Arbor Road is a strong knick point. Above STA 6442.6582 the tributary is a managed ditch.

## **Little Salt Creek Reach Summary**

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Tributary 10 – Aerial Photo Analysis

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**Location:** Tributary 10 flows southwest from Waverly Road under 40<sup>th</sup> Street, under Bluff Road, under 27<sup>th</sup> Street to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 10 is approximately 20,000 feet long. The banks are denuded along most of the tributary. The lowest reach of the stream is dumped rubble. The lower reach, up to about STA 5320.4155 flows through Salmo silty clay loam. The channel is incised, and has been previously manipulated. There are failures along both banks and the top of banks have retreated. In the lower reaches, the top of bank width is about 50 feet and the base width is about 15 feet. There are some in-channel bars. The lower reaches do not appear to be undergoing accelerated meander advance. Above STA 5384.3433, the channel flows through tilled fields and is essentially a maintained channel.

## **Little Salt Creek Reach Summary**

Tributary 15 – Headwaters to 7<sup>th</sup> Street

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**Location:** This reach of Tributary 15 flows southeast from the headwaters upstream of W. McKelvie Road, passing under W. McKelvie Road and 1<sup>st</sup> Street to 7<sup>th</sup> Street.

### **Summary of Field Data Collection:**

This reach of the Tributary 15 is approximately 10,800 feet. There are 10 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover is consistently 0% with little to no woody vegetation with the exception of the reach just upstream of 1<sup>st</sup> Street where the canopy cover is 100%. The vegetation through this 0% canopy reach is comprised of a few stand alone trees and pasture and farm fields. Within the 100% canopy reach, the corridor width of 12 to 18 inch trees is 100 feet on the right descending bank and 20 feet on the left descending bank.

### Channel Dimension

The channel bed width through this reach ranges from 2 to 10 feet, and bank heights range from 3 to 4 feet and increase to 6 feet approaching 7<sup>th</sup> Street. With the exception of a couple data points in the upper headwaters, where bank angles are 30 degrees, bank angles range from 60 to 90 degrees. The lower limit of woody vegetation ranges from 1 and 5 feet, where woody vegetation is present. Lower limit of perennial vegetation ranges from 0.5 to 3 feet.

### Material

The bed material throughout this reach is unconsolidated silty clays. The left and right bank material consists of clay and silty clay. Seeps are found along both banks of this reach at heights ranging from toe of slope to 0.5 feet.

### Profile

There are 12 knickpoints and 3 riffles identified throughout this reach. The 3 riffles are located in the headwaters upstream of W. McKelvie Road and have a spacing of 80 feet.

### Bar

There is 1 left and 1 right consolidated bar and formed past geomorphic bank failures. Those 2 bars along with 7 debris jams are located between McKelvie and 1<sup>st</sup> Street.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks. The wedge failures are more abundant just upstream of McKelvie, where circular failures occur more downstream of 1<sup>st</sup> Street. There are also a couple locations of toe and mid-bank scour.

### Crossings

There are 6 stream crossing including McKelvie Road with a double 8'W x 6'H box culvert, 1<sup>st</sup> Street with a double 12'W x 7'H concrete box culvert, 7<sup>th</sup> Street double 8'W x 5'H concrete box culvert, 2 barbed wire fence crossings, and field access road with a large iron pipe culvert.

### Outfalls

Outfalls are identified as in the form of gullies. 6 gullies are identified through this reach of Tributary 15.

### Photos and Notes

There are 87 photo points and 26 note points.

## **Little Salt Creek Reach Summary**

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Tributary 15 – 7<sup>th</sup> Street to Little Salt Creek Confluence

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**Location:** This reach of Tributary 15 flows east and northeast from 7<sup>th</sup> Street, passing under 14<sup>th</sup> Street to the Little Salt Creek confluence.

### **Summary of Field Data Collection:**

This reach of Tributary 15 is approximately 15,600 feet. There are 14 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover is ranges from 50% to 100% in areas just downstream of 7<sup>th</sup> Street and approximately half way between 14<sup>th</sup> Street and the confluence with Little Salt Creek. Canopy cover is 0% with little to no woody vegetation near the confluence with Little Salt Creek. Where there is canopy cover, the corridor width of 10 to 12 inch trees ranges from 10 to 50 feet. The vegetation where canopy cover is 0% is comprised of a few stand alone trees and pasture and farm fields.

### Channel Dimension

The channel bed width through this reach ranges from 2 to 12 feet. Bank heights range from 3 to 6 feet upstream of 14<sup>th</sup> Street and increase to a range of 6 to 20 feet downstream of 14<sup>th</sup> Street, approaching the confluence with Little Salt Creek. Bank angles range from 45 to 90 degrees throughout the reach. The lower limit of woody vegetation ranges from 2 and 8 feet, where woody vegetation is present. Lower limit of perennial vegetation ranges from 0.5 to 1 feet.

### Material

With the exception of one data point downstream of 7<sup>th</sup> Street where the bed material was consolidated, the bed material throughout this reach is unconsolidated silty clays. The left and right bank material consists of clay and silty clay. Seeps are found along both banks of this reach with salt deposits more apparent approaching the confluence with Little Salt Creek. Seep heights range from toe of slope to 8 feet and are more common as you approach the confluence with Little Salt Creek.

### Profile

There are 26 knickpoints and 1 riffle identified throughout this reach. The riffle is located approximately 700 feet downstream of 14<sup>th</sup> Street.

### Bar

There is 1 right bar, 1 center bar and 19 debris jams throughout this reach of Tributary 15. The debris jams are denser in the areas of more canopy cover.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks. There are also a couple isolated locations of toe scour downstream of 14<sup>th</sup> Street.

### Crossings

There are 6 stream crossings including 14<sup>th</sup> Street bridge, a pedestrian bridge, and 4 field access roads with a large iron pipe culvert, a 48" RCP, 18" CMP, and concrete bridge. These crossings are all downstream of 14<sup>th</sup> Street.

### Outfalls

Outfalls are identified in the form of gullies, tributaries and pipes. 28 gullies, 2 tributaries, and 2 CMPs are identified through this reach of Tributary 15.

### Photos and Notes

There are 153 photo points and 42 note points.

## **Little Salt Creek Reach Summary**

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Tributary 20 – Mill Road to Waverly Road

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**Location:** This reach of Tributary 20 flows south from Mill Road to Waverly Road.

### **Summary of Field Data Collection:**

This reach of the Tributary 20 is approximately 8,900 feet. There are 9 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover ranges from 0% to 75% just upstream of Waverly Road. The vegetation where canopy cover is 0% is comprised of a few stand alone trees and pasture and farm fields. Where there is canopy cover, the corridor width of 10 to 18 inch trees ranges from 30 to 100 feet.

### Channel Dimension

The channel bed width through this reach ranges from 3 to 10 feet. Bank heights range from 3 just downstream of Mill Road and increasing to 10 feet approaching Waverly Road. Bank angles range from 60 to 90 degrees just downstream of Mill Road and 45 to 60 degrees approaching Waverly Road. The lower limit of woody vegetation ranges from 3 and 8 feet, and lower limit of perennial vegetation ranges from 0.5 to 1 feet.

### Material

The bed material throughout this reach is unconsolidated silty clays. The left and right bank material consists of clay and silty clay. Seeps are found along both banks of this reach at heights ranging from toe of slope to 3 feet.

### Profile

There are 10 knickpoints and no riffle is identified throughout this reach. Many of the knickpoints just downstream of Mill Road are beaver dams.

### Bar

There is 1 depositional bar on the right descending bank located approximately half way between Mill Road and Waverly Road. Just downstream of Mill Road there is series of 4 beaver dams. There are 4 other debris jams scatter throughout the remainder of this reach.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks. There is toe scour just upstream of Waverly Road.

### Crossings

There are 2 stream crossings including a barbed wire fence and Waverly Road with a natural bottom concrete structure. This concrete structure is approximately 12' high, 12' wide and 75 foot long.

### Outfalls

Outfalls are identified in the form of gullies. 14 gullies are identified through this reach of Tributary 20.

### Photos and Notes

There are 96 photo points and 19 note points.

## **Little Salt Creek Reach Summary**

Tributary 20 – Waverly Road to Little Salt Creek Confluence

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**Location:** This reach of Tributary 20 flows southwest from Waverly Road, passing under 27<sup>th</sup> Street to the Little Salt Creek confluence.

### **Summary of Field Data Collection:**

This reach of Tributary 20 is approximately 7,700 feet. There are 9 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover ranges from 0% to 25% for much of the reach. Midway between Waverly Road and 27<sup>th</sup> Street, the canopy cover increases to 50%, but there is little to no corridor. Vegetation includes pasture grasses and 4 to 18 inch stand alone trees.

### Channel Dimension

Downstream of Waverly Road, the channel bed width ranges from 2 to 3 feet. Approaching 27<sup>th</sup> Street, the channel bed width widens to 10 to 15 feet, and then decreases to 3 and 4 feet downstream of 27<sup>th</sup> Street. Bank heights range from 6 to 10 feet, and bank angles range from 45 to 90 degrees. The lower limit of woody vegetation ranges from 1 and 6 feet.

### Material

The bed material throughout this reach is unconsolidated silty clays except for a point just downstream of 27<sup>th</sup> Street where it is consolidated pea gravel. The left and right bank material consists of clay, silty clay and sandy silty clays. Seeps are found along both banks of this reach at heights ranging from toe of slope to 2 feet.

### Profile

There are 6 knickpoints and no riffle is identified throughout this reach. All of the knickpoints are identified between Waverly and 27<sup>th</sup> Street.

### Bar

There are 10 debris jams, three of which are beaver dams. All debris jams and beaver dams are located between Waverly Road and 27<sup>th</sup> Street.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks.

### Crossings

There are 2 stream crossings including a low water cattle crossing with a 12" RCP culvert and the 27<sup>th</sup> Street bridge.

### Outfalls

Outfalls are identified in the form of gullies and tributaries. 12 gullies and 2 tributaries are identified through this reach of Tributary 20.

### Photos and Notes

There are 59 photo points and 18 note points.

## **Little Salt Creek Reach Summary**

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Tributary 25 – Aerial Photo Analysis

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**Location:** Tributary 25 flows east under 14<sup>th</sup> Street to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 25 is approximately 5800 feet long. This tributary has three impoundments. One is at about STA 1862.4987, the second is at STA 3601.6497 and the third is west of 14<sup>th</sup> Street about 450 feet west of STA 5485.4497. Near the confluence and up to the first impoundment, the stream flows through Salmo silty clay loam and thereafter it flows through Nodaway silt loam. From the confluence to the first pond, the stream banks are deeply dissected. Bank failures and deep gullies are common and the bank tops are ragged and scalloped. There are sinks and white features nearby. Between the two lower impoundments, the surface water is intermittently visible. Upstream of the 2<sup>nd</sup> pond, the channel is largely graded out though the path is discernable. West of 14<sup>th</sup> Street is a short reach of natural channel with woody corridor.

## **Little Salt Creek Reach Summary**

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### Tributary 30 – Aerial Photo Analysis

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**Location:** Tributary 30 flows southeast and east under N. 1<sup>st</sup> Street, under Waverly Road, under N. 14<sup>th</sup> Street to the Little Salt Creek Mainstem confluence.

#### **Summary of Aerial Photo Analysis:**

Tributary 30 is approximately 19,800 feet long. The lower reach has dense gullies and the tops of the denuded banks have retreated. This pattern continues from the confluence to a few hundred feet west of STA 1283.0542 where the stream adopts a much more sinuous course and has a variable woody corridor. The stream from this point to 10716.1973 (Waverly Road) appears relatively stable. Though approaching the driveways and infrastructure near Waverly Road, there are local instabilities some of them severe. For short reaches such as between 3487.3877 and 4677.9244, there are bare banks near sink areas. Nevertheless there are far fewer gullies and apparent bank failures through most of the stream. Heavy tree cover west of N 14<sup>th</sup> Street makes it difficult to evaluate channel conditions however there is no clear evidence of tree fall or other indicators of bank failures. Approaching STA 8341.3159 the woody corridor narrows dramatically (tilled fields) though the channel condition still appears stable. North of Waverly Rd. the channel is graded out in a tilled field for several hundred feet. It regains a more natural course at about STA 11892.9814 where it flows through a barren scrub. Upstream of the confluence with Tributary 230, the channel is very small; surface water is not always visible and some reaches have been graded out. Where a distinct channel is visible, it appears stable up to the impoundment at STA 17755.9075.

## **Little Salt Creek Reach Summary**

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Tributary 35 – Aerial Photo Analysis

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**Location:** Tributary 35 flows south under Waverly Road then southwest to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 35 is approximately 5200 feet long. There is evidence of previous channel manipulation. It appears that the channel is shortened by about 400 feet. The lower channel flows through Salmo silt loam and white features occur on and near the top of bank. The lower 250 feet of the channel is very narrow, not really measurable on the image. Approaching Waverly Road, STA 631.4174 the channel widens to about 12-15 feet. The banks are unforested and failures are evident on both banks. From about 250 feet north of STA 1469.8959, the channel is plowed out.

## **Little Salt Creek Reach Summary**

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Tributary 40 – Aerial Photo Analysis

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**Location:** Tributary 40 flows southwest from Mill Street to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 40 is approximately 4900 feet long. Just upstream of the main channel the tributary was shortened by about 1000 feet. The confluence and lower 400 feet flow through Salmo silt loam. The 250 feet upstream is Salmo silty clay loam followed by Colo-Nodaway silty clay loam. The stream flows through this soil until about 270 feet upstream of STA 1492.3976 where the soil becomes Nodaway silt loam to the headwaters. The channel is more deeply entrenched near the confluence with the main stem than it is about 800 feet upstream. The crows feet gully pattern occurs near the confluence. The channel width varies considerably and approaching STA 14.92.3796, a thin band of trees lines the banks. There are no obvious signs of channel widening (no clear sign that trees are falling in) though some bank erosion is evident. About 200 feet downstream of STA 2088.4763 the surface water disappears for about 130 feet. There are multi-threaded gullies at the headwaters; the channels appear downcut. There is little evidence of widening here. Small side gullies perpendicular to the channel are common.

## **Little Salt Creek Reach Summary**

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Tributary 45

**Location:** Tributary 45 flows southwest from approximately 4,900 feet upstream of 14<sup>th</sup> Street, passing under 14<sup>th</sup> Street, passing under Mill Street to the Little Salt Creek Mainstem confluence.

### **Summary of Field Data Collection:**

Tributary 45 is approximately 7,000 feet. There are 5 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

The first 1600 feet of Tributary 45 consists of a drainage swale through a farm field with 0% canopy. Canopy cover ranges from 50% to 100% from the farm field to just upstream of 14<sup>th</sup> Street, where the canopy changes to 0% for the remainder of the reach. Corridor width of 4 to 18 inch diameter trees ranges from 50 to 100 feet where there is canopy cover. Where canopy cover is 0%, vegetation consists of tall grasses and a few stand alone trees.

### Channel Dimension

The channel bed width ranges from 2 to 4 feet with the exception of just before 14<sup>th</sup> Street where the channel bed widens to 9 feet. Bank heights range from 4 to 8 feet, and downstream of Mill Street, the bank height increase to 10 to 12 feet. Bank angles range from 45 to 90 degrees, but just before 14<sup>th</sup> Street, banks angles range from 20 to 45 degrees. The lower limit of woody vegetation ranges from 2 and 4 feet, and the lower limit of perennial vegetation ranges from toe of slope to 3 feet.

### Material

The bed material throughout this reach is consolidated clays and gravel except for a one data point where the material is unconsolidated silty clay. The left and right bank material consists of clay and silty clay. There are 4 seeps found along both banks of this reach at the toe of slope.

### Profile

There are 2 knickpoints downstream of 14<sup>th</sup> Street and one riffle approximately 1,000 feet upstream of 14<sup>th</sup> Street.

### Bar

There are 4 debris jams and 1 bar on the left descending bank upstream of 14<sup>th</sup> Street.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks.

### Crossings

There are 10 stream crossings including 4 wire or barbed wire fences, a wooden foot bridge, a steel pole foot bridge, Mill Road with a 9'W x 6'H concrete box culvert, and 14<sup>th</sup> Street with a triple 9'W x 7'H box culvert.

### Outfalls

Outfalls are identified as in the form of gullies. 4 gullies are identified through this reach of Tributary 45.

### Photos and Notes

There are 40 photo points and 12 note points.

## **Little Salt Creek Reach Summary**

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Tributary 50 – Aerial Photo Analysis

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**Location:** Tributary 50 flows south under Branched Oak Road, under Raymond Road then southwest to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 50 is approximately 15,000 feet long. This stream flows through Nodaway silt loams. The lower reaches of the stream flow through bare land with extensive marshes and sinks. The channel has in-channel bars and the banks are ragged. There is no clear evidence of advancing bars but lots of long bank failures along both banks. This condition extends as far as STA 5537.5127. North of this point, the stream acquires more of a woody corridor though it is sometimes sparse on the right descending bank. The channel is discernable but the channel features are unclear. However, there are some signs of in-channel bars and active (unhealed) erosion on both banks though it is much less pronounced than the downstream reaches. North of STA 7989.0508 the channel is managed as a ditch through tilled fields for the most part. There are reaches with a narrow woody corridor and another small impoundment of the stream. There are areas of local erosion but no indications of large scale instability.

## **Little Salt Creek Reach Summary**

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Tributary 55 – Aerial Photo Analysis

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**Location:** Tributary 55 flows northeast under N. 1<sup>st</sup> Street to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 55 is approximately 4000 feet long. This tributary flows through the Nodaway silt loam near the confluence and the Colo-Nodaway elsewhere though a short reach is bounded by Salmo silt loam. The stream flows through terrain with notable sinks and marshes. The stream at the confluence appears roughly ½ the width of the channel about 800 feet upstream. The channel has no woody corridor and some gullying is evident along the banks. The headwaters of this tributary are impounded just west of STA 3884.3103.

## **Little Salt Creek Reach Summary**

Tributary 60 – Rock Creek Road to Davey Road

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**Location:** This reach of Tributary 60 flows southeast from approximately 850 feet upstream of Rock Creek Road, passing under Rock Creek Road, passing under 12<sup>th</sup> Street, then south to Davey Road.

### **Summary of Field Data Collection:**

This reach of the Tributary 60 is approximately 8,700 feet. There are 8 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### **Vegetation**

Canopy cover is 0% upstream of Rock Creek Road with little to no woody vegetation. Downstream of Rock Creek Road, the canopy cover ranges from 50% to 100%. Between Rock Creek Road and 12<sup>th</sup> Street, the corridor width is 10 to 20 feet of 6 to 20 inch diameter trees. Downstream of 12<sup>th</sup> Street, the corridor is 100 feet on each bank with the exception of some locations where the creek flows through pasture areas. The tree diameter ranges from 12 to 24 inches with exposed barked roots in isolated locations.

### **Channel Dimension**

The channel bed width through this reach ranges from 4 to 5 feet. Bank heights range from 6 to 10 feet, and bank angles range from 45 to 90 degrees. The lower limit of woody vegetation ranges from 1 and 7 feet, and lower limit of perennial vegetation ranges from toe of slope to 6 feet. Scour is identified at each of the channel dimension data points.

### **Material**

The bed material throughout this reach is unconsolidated silty clays with the exception of just downstream of 12<sup>th</sup> Street where the bed material is consolidated silty clay and gravel. The left and right bank material consists of clay and silty clay. Seeps are found along both banks at the toe of slope.

### **Profile**

There are 29 knickpoints upstream of 12<sup>th</sup> Street and 11 knickpoints downstream of 12<sup>th</sup> Street. There are no riffles identified through this reach.

### **Bar**

There are 19 debris jams and 4 left and right bars throughout this reach of Tributary 60. Bar heights range from 0.5 to 1.5 feet and are both depositional and geomorphological in origin. The depositional bars are unconsolidated.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular bank failures on both the right and left descending banks on the outside of meanders. The bank failures are more consistent downstream of 12<sup>th</sup> Street.

### Crossings

There are 5 stream crossing including Rock Creek Road with a 7'W x 7'H concrete box culvert, 12<sup>th</sup> Street with an 8'W x 6'H concrete box culvert, a wooden pedestrian bridge, a barbed wire fence crossing just upstream of Davey Road, and Davey Road with a double 12'W x 8'H concrete box culvert.

### Outfalls

Outfalls are identified in the form of gullies, tributaries or pipe outfalls. 2 tributaries and 2 gullies and 4 pipe outfalls are identified through this reach of Tributary 60.

### Photos and Notes

There are 64 photo points and 9 note points.

## **Little Salt Creek Reach Summary**

Tributary 60 – Davey Road to Branched Oak Road

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**Location:** This reach of Tributary 60 flows south from Davey Road to Branched Oak Road.

### **Summary of Field Data Collection:**

This reach of the Tributary 60 is approximately 13,500 feet. There are 13 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover ranges from 0% to 50%. Corridor is 50 feet on the right descending bank just downstream of Davey Road, otherwise vegetation consists of isolated trees and groups of trees, pasture, and tall grasses. The tree diameter ranges from 4 to 24 inches with exposed barked roots in isolated locations.

### Channel Dimension

The channel bed width through this reach ranges from 4 to 10 feet downstream of Davey Road and increasing to 10 to 15 feet approaching Branched Oak Road. Bank heights range from 6 to 15 feet, and bank angles range from 45 to 90 degrees. The lower limit of woody vegetation ranges from 1 and 6 feet, and lower limit of perennial vegetation ranges from 1 to 3 feet. Scour is identified at the channel dimension data points just downstream of Davey Road.

### Material

The bed material throughout this reach is unconsolidated silty clays, and the left and right bank material consists of clay and silty clay. Seeps are found along both banks from the toe of slope to 4 feet above the water surface.

### Profile

There are 4 knickpoints located just downstream of Davey Road. There are no riffles identified through this reach.

### Bar

There are 23 debris jams are identified throughout this reach of Tributary 60.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks.

### Crossings

There are 3 stream crossings including a barbed wire fence, a pasture access crossing with a 48" metal pipe culvert, and the Branched Oak Road bridge.

### Outfalls

Outfalls are identified as in the form of gullies, pipe outfalls or tributaries. 8 gullies and 1 pipe outfall, and 3 tributaries are identified through this reach of Tributary 60.

### Photos and Notes

There are 87 photo points and 21 note points.

## **Little Salt Creek Reach Summary**

Tributary 60 – Branched Oak Road to Little Salt Creek Confluence

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**Location:** This reach of Tributary 60 flows south from Branched Oak Road to the Little Salt Creek Confluence.

### **Summary of Field Data Collection:**

This reach of the Tributary 60 is approximately 6,100 feet. There are 5 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover ranges is 0% with little to no woody vegetation. Vegetation consists of isolated trees and groups of trees, pasture, and tall grasses.

### Channel Dimension

The channel bed width through this reach ranges from 3 to 10 feet, and bank heights range from 4 to 8 feet. Bank angles range from 45 to 90 degrees. The lower limit of woody vegetation is 4 feet just downstream of Branched Oak Road, where there is woody vegetation.

### Material

The bed material throughout this reach is unconsolidated silty clays, and the left and right bank material consists of clay and silty clay. Seeps are found along both banks from the toe of slope to 5 feet above the water surface.

### Profile

There is 1 knickpoint identified approximately 1,400 feet upstream from the Little Salt Creek confluence. There are no riffles identified through this reach.

### Bar

There are 2 debris jams identified throughout this reach of Tributary 60.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks. Wedge failures are consistent in the upper portions of this reach, where circular failures appear in the lower portions.

### Crossings

There are no stream crossings through this reach of Tributary 60.

### Outfalls

Outfalls are identified as in the form of gullies and pipe outfalls. 11 gullies and 1 HDPE pipe outfall are identified through this reach of Tributary 60. Many of the gullies are stemming from wetland located near the top of the left descending bank.

### Photos and Notes

There are 36 photo points and 42 note points. An additional 9 photo points and 3 note points are included at the top of the left descending bank in a wetland area, near Tributary 60.

## **Little Salt Creek Reach Summary**

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Tributary 65 – Aerial Photo Analysis

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**Location:** Tributary 65 flows northeast under W. Raymond Road to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 65 is approximately 10,200 feet long. The soils near the confluence are Salmo silty clay loam or Salmo silt loam. Upstream the soils are dominated by the Nodoway or Colo series. Sinks and marsh are common in the downstream reaches. There is very little tree cover. Upstream of STA 1152.3333 the stream seems relatively stable though where the vegetative cover is sparse, there is localized severe gulying. There is likely widening between STA 7236.9326 and 3119.1508. By STA 7823.7876 the channel is scarcely discernable with intermittent open water.

## **Little Salt Creek Reach Summary**

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Tributary 80 – Aerial Photo Analysis

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**Location:** Tributary 80 flows south under W. Rock Creek Road and under W. Davey Road to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 80 is approximately 16,800 feet long. This stream flows through Nodaway silt loam in its lower reaches and through clay loams throughout. The reach from the confluence to about STA 2112.5183 has a woody corridor ranging from 30 to 90 feet wide and shows no clear evidence of tree fall or of significant bank movement. From STA 2112.5189 to about STA 4268.0039 the ragged banks, in channel bars and asymmetry of bank failures suggest meander advance. At STA 4268.0039 there is a large pond (1400 feet long) on the tributary and a sub tributary has also been impounded as well. Upstream the channel is very narrow (4-11 feet wide). Preceding upstream the stream has moved around a lot but previous adjustments look healed. North of 12249.2441 there are many crow's foot gullies and eroded banks but the banks have some woody vegetation established. Approaching STA 13645.4668 the channel is deeply dissected but vegetated. The channel is previously incised. North of this station, the woody corridor becomes more dense and the channel is barely discernable. North of STA 15410.8701 the channel is graded to a ditch. The headwaters are impounded 560 feet north of STA 1656.2793.

## **Little Salt Creek Reach Summary**

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Tributary 85 – Aerial Photo Analysis

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**Location:** Tributary 85 flows east just south of W. Davey Road to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 85 is approximately 5200 feet long. This tributary is controlled by several ponds. It has better tree cover than most in its upper reaches and close to the confluence. The confluence is obscured by tree cover. Examination of the field photos revealed a knickpoint at the confluence and a short reach of incision. About 550 feet upstream of the confluence is a 730 foot long pond. The stream upstream of the largest pond appears very shallow with intermittent open water. Just downstream of the pond near STA 5056.1299 the channel is clearer and gullying is apparent.

## **Little Salt Creek Reach Summary**

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Tributary 110 – Aerial Photo Analysis

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**Location:** Tributary 110 flows west under 40<sup>th</sup> Street to the confluence with Tributary 10.

### **Summary of Aerial Photo Analysis:**

Tributary 110 is approximately 3200 feet long. Tributary 110 is maintained as a ditch between tilled fields up to about STA 1455.7357 at 40<sup>th</sup> street. North east of 40<sup>th</sup> Street, the stream flows for about 2200 feet through pasture land (Judson silt loam) before reverting to managed ditch upstream. In the pasture reach, both banks are retreating with some indication of in channel bars though the stream is very narrow and the photo is not definitive.

## **Little Salt Creek Reach Summary**

Tributary 160 – Aerial Photo Analysis

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**Location:** Tributary 160 flows south from Branched Oak Road then west under N. 1<sup>st</sup> Street to the Little Salt Creek Mainstem confluence.

### **Summary of Aerial Photo Analysis:**

Tributary 160 is approximately 5600 feet long. The confluence and lower reaches of this stream flow through Salmo soils. The lower reaches are marshy with sinks and many abandoned channels. The channel is discernable but is largely a series of marsh areas up to STA 1878.4071. Beyond this the channel intermittently appears shallow and lacks surface water. There is a pond at STA 3304.0552 and another near 4160.1104.

## **Little Salt Creek Reach Summary**

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Tributary 220

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**Location:** Tributary 220 flows southwest from approximately 2,000 feet upstream of 40<sup>th</sup> Street to the Tributary 20 confluence.

### **Summary of Field Data Collection:**

Tributary 220 is approximately 8,700 feet. There are 9 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

With the exception of just upstream of Waverly Road where the canopy cover is 0%, Tributary 220 has a canopy cover of 100%. Corridor width ranges from 10 to 100 feet, and tree diameter ranges from 6 to 24 inch. Exposed barked roots are present on both banks throughout the reach.

### Channel Dimension

The channel bed width ranges from 2 to 6 feet, and bank heights range from 6 to 9 feet at angles ranging from 45 to 90 degrees. The lower limit of woody vegetation ranges from 2 and 7 feet, and the lower limit of perennial vegetation ranges from toe of slope to 9 feet.

### Material

The bed material throughout this reach is unconsolidated silty clays except for a couple locations where there are consolidated cobbles. The D90 cobbles are 3 to 4 inches in diameter, and the D5 is pea gravel. The left and right bank material consists of clay and silty clay. Seeps are found along both banks of this reach at the toe of slope.

### Profile

There are 30 knickpoints and no riffle is identified throughout this reach.

### Bar

There are 18 debris jams, a left and right bar. Both bars are geomorphic in origin with a channel to bar ratio of 0.667. The left bar is 1.5 foot high and the right bar is 1 feet high.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks. Scour is also evident throughout this reach with it more prominent at and upstream of 40<sup>th</sup> Street.

### Crossings

There are 7 stream crossings including Waverly Road with a 10'W x 8'H concrete box, 3 wire fences, a private drive wooden bridge, 40<sup>th</sup> Street with a 12'W x 6'H concrete box, and a field access crossing with a 6' diameter pipe. The concrete box culvert under 40<sup>th</sup> Street is inverted approximately 2.5 feet at the downstream side.

### Outfalls

Outfalls are identified as in the form of gullies and pipes. 8 gullies and 1 36" CMP are identified through this reach of Tributary 220.

### Photos and Notes

There are 90 photo points and 19 note points.

## **Little Salt Creek Reach Summary**

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Tributary 260

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**Location:** Tributary 260, located south of Davey Road, flows southwest to the confluence with Tributary 60.

### **Summary of Field Data Collection:**

Tributary 260 is approximately 2,100 feet. There are 2 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover ranges from 25% to 75%. Vegetation consists of tall grasses and a few standalone of 4 inch diameter trees.

### Channel Dimension

The channel bed width ranges from 6 feet just downstream of the confluence with Tributary 1165 to 15 feet approaching the confluence with Tributary 60. Bank heights are approximately 8 feet high with banks angles ranging from 45 to 90 degrees. The lower limit of woody vegetation ranges from 2 and 3 feet.

### Material

The bed material is unconsolidated silty clay, and the left and right bank material consists of clay and silty clay. Two seeps are found along both banks of this reach at the toe of slope.

### Profile

There are no knickpoints or riffles identified.

### Bar

There is 1 debris jam and no bars identified. The debris jam is located approximately 1,000 feet upstream from the confluence with Tributary 60.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks.

### Crossings

There is one concrete bridge field access crossing the channel.

### Outfalls

There is one gully on the left descending bank identified through this reach of Tributary 260.

### Photos and Notes

There are 11 photo points and 3 note points.

## **Little Salt Creek Reach Summary**

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Tributary 360

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**Location:** Tributary 360, located south of Rock Creek Road, flows south paralleling 12<sup>th</sup> Street to the confluence with Tributary 60.

### **Summary of Field Data Collection:**

Tributary 360 is approximately 1,600 feet. There are 2 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover is 100% throughout this reach of Tributary 360. Corridor width is 100 feet of 18 to 24 inch trees on both banks. Exposed barked roots are present on both banks throughout the reach as well as overhanging trees.

### Channel Dimension

The channel bed width upstream of the private drive crossing is 4 feet and 8 feet downstream. Bank heights are 7 feet upstream of the private drive and 9 to 15 feet downstream of the private drive. Bank angles range from 40 to 60 degrees both upstream and downstream of the private drive. The lower limit of woody vegetation ranges from 2 and 5 feet, and the lower limit of perennial vegetation ranges from 1 to 6 feet.

### Material

The bed material throughout this reach is unconsolidated silty clays. The left and right bank material consists of clay and silty clay. Two seeps are found along both banks along this reach at the toe of slope.

### Profile

There are 4 knickpoints and 2 riffles identified upstream of the private drive crossing. The riffles are spacing is approximately 60 feet.

### Bar

There are 2 debris jams, a left and 2 center bars. All three bars are geomorphic in origin. One of the debris jams is at the confluence with Tributary 60.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular bank failures on both the right and left descending banks consistently on the outside of meanders. The failures occur upstream of the private drive crossing. Approximately 900 feet upstream from the confluence with Tributary 65, there is a circular failure, on the outside of a meander. There is a garage at the top of this 25 foot high bank.

### Crossings

There is a private drive crossing with a 10 foot diameter CMP culvert.

### Outfalls

No outfalls are identified through this reach of Tributary 360.

### Photos and Notes

There are 13 photo points and 2 note points.

## **Little Salt Creek Reach Summary**

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Tributary 1260

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**Location:** Tributary 1260, located south of Davey Road, flows south to the confluence with Tributary 260.

### **Summary of Field Data Collection:**

Tributary 1260 is approximately 1,500 feet. There are 2 data points through this reach where vegetation, channel dimension and material data are taken. Additional data is collected between these data points.

### Vegetation

Canopy cover ranges from 25% to 75%. Vegetation consists of tall grasses and a few groves of 8 to 12 inch diameter trees

### Channel Dimension

The channel bed width ranges from 2 feet in the headwaters to and 6 feet approaching the confluence with Tributary 260. Bank heights range from 1.5 to 6 feet with banks angles ranging from 45 to 60 degrees. The lower limit of woody vegetation ranges from 1.5 and 4 feet.

### Material

The bed material is consolidated silty clay in the headwaters and unconsolidated silty clay approaching the confluence with Tributary 260. The left and right bank material consists of clay and silty clay. Two seeps are found along both banks of this reach at the toe of slope.

### Profile

There are no knickpoints or riffles identified.

### Bar

There is 1 debris jam and no bars identified. The debris jam is located approximately 1,300 feet upstream from the confluence with Tributary 260.

### Erosion and Mass Wasting

There is erosion and mass wasting throughout this reach in the form of circular and wedge bank failures on both the right and left descending banks consistently on the outside and inside of meanders.

### Crossings

No crossings are identified through this reach of Tributary 1260.

### Outfalls

No outfalls are identified through this reach of Tributary 1260.

### Photos and Notes

There are 7 photo points and 1 note point.

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