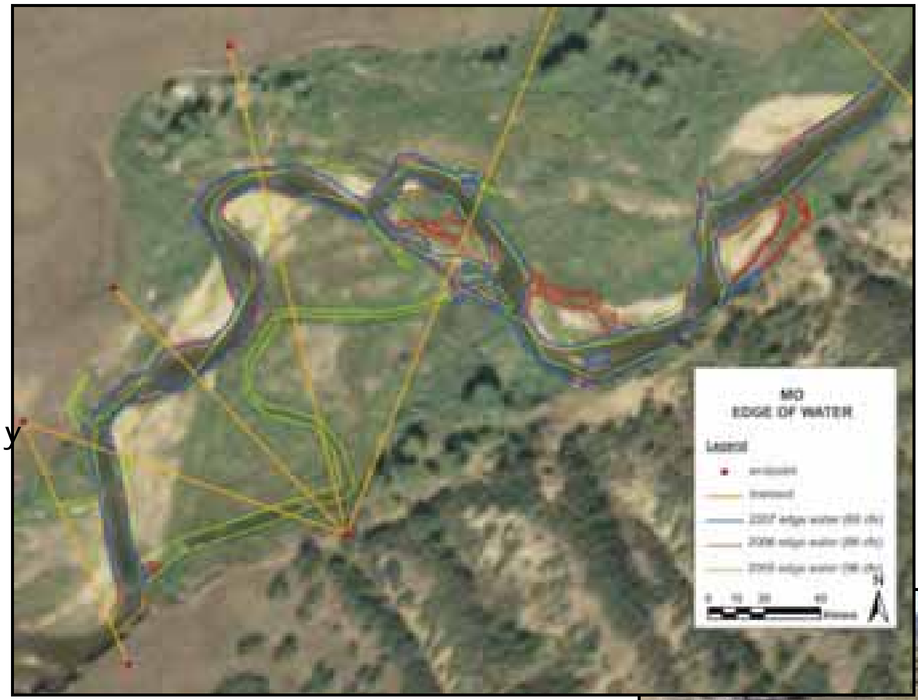
SIXTH WATER AND DIAMOND FORK CREEKS

FINAL 2007 MONITORING REPORT

January 2009



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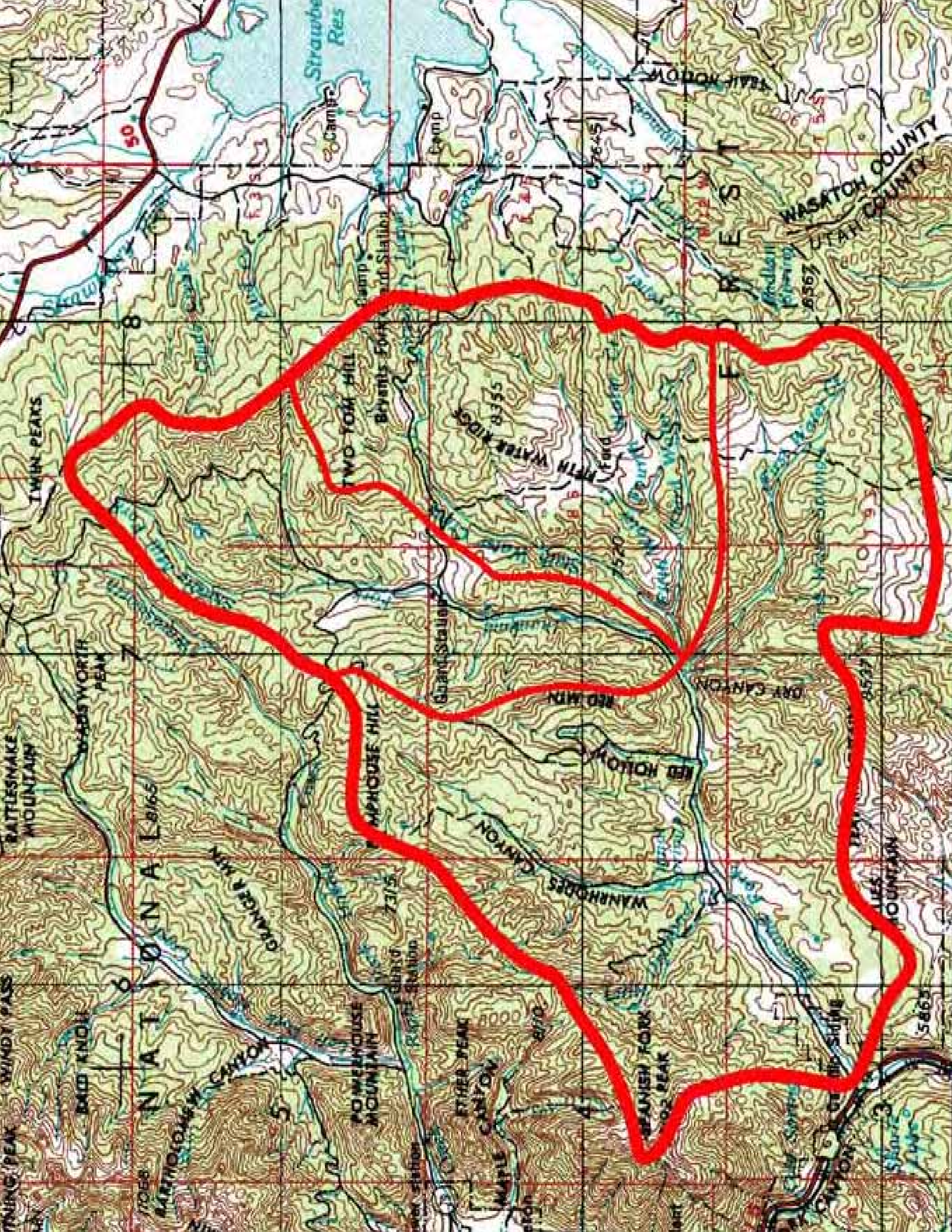
1.0 INTRODUCTION

1.0 INTRODUCTION

Diamond Fork Creek and its tributary, Sixth Water Creek, are part of the Spanish Fork River Watershed (Figure 1.1). Between 1916 and 2004, these two streams conveyed water diverted from Strawberry Reservoir in the Uinta Basin to the Wasatch Front. This trans-basin diversion increased flows in Diamond Fork Creek and Sixth Water Creek, and caused severe impacts to the stream channels and aquatic ecosystem. Currently, the Diamond Fork System of the Bonneville Unit, Central Utah Project, completed in 2004, delivers the imported water directly into Diamond Fork Creek just upstream of its confluence with Spanish Fork River (Figure 1.2). Water deliveries from Strawberry Reservoir, with the exception of releases for instream flows, can now completely bypass Sixth Water Creek and Diamond Fork Creek in most years. Opportunities for managing water deliveries into the two streams for ecological restoration objectives may now exist.

The Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) initiated a monitoring project, in conjunction with State and Federal agencies, in order to assess existing geomorphic and ecologic conditions, monitor stream channel response to the altered flow regime, and address aquatic and riparian habitat restoration objectives. The overall mitigation commitments concerning Sixth Water Creek and Diamond Fork Creek are as follows: monitoring Ute ladies'-tresses (*Spiranthes diluvialis*) populations, riparian vegetation, leatherside chub (*Gila copei*) populations, water quality and stream channel responses to altered flow regimes following completion of the Diamond Fork System; supporting the June Sucker Recovery Program, and planning and implementing restoration measures to the Sixth Water and Diamond Fork ecosystems. This report describes the geomorphic and benthic macroinvertebrate portions of the monitoring project and documents the results of the first 3 years for the initial 3-year program following completion of the Diamond Fork System. Riparian vegetation and rare plant surveys for the threatened Ute ladies'-tresses have been monitored for the past 2 years and are covered in a separate report (BIO-WEST 2008).

The report is organized by topic, starting with an overall introduction and project description. The introduction is followed by chapters describing the monitoring methods and results in the following order: Chapter 2 (cross-section and longitudinal profile surveys), Chapter 3 (substrate), Chapter 4 (seasonal siltation during summer and fall instream flows), Chapter 5 (benthic macroinvertebrates), and Chapter 6 (discussion and recommendations). Chapters 2 and 3 detail the survey methods used to complete cross-section and longitudinal profile surveys, as well as size distribution of bed materials of specific study sites, and discusses the results of the 2005, 2006, and 2007 surveys. Cobble embeddedness and siltation have been observed in 2005 and 2006, especially in lower Diamond Fork Creek. As a result, measurements were made in 2007 to quantify fine-grain sediment buildup over the summer and fall months when instream flows between 60-80 cubic feet per second (cfs) are active. Chapter 4 describes the results of monthly sedimentation measurements at the existing study sites. Chapter 5 discusses the methods and results of benthic macroinvertebrate sampling throughout the general study area and above and below the sulfur-impacted reach in Diamond Fork Creek above Three Forks. The report concludes with Chapter 6, which is a discussion of results and includes recommendations along with possible long-term management implications.


Strawberry Res
Camp
WASATCH COUNTY
UTAH COUNTY
N A T I O N A L
F O R E S T
TWIN PEAKS
TWO TOM HILL
FIFTH WATER RIDGE
8355
RED MTN
DRY CANYON
RED HOLLOW
WANRHODES CANYON
RATTLESNAKE MOUNTAIN
WADSWORTH PEAK
GRANGER MTN
BALD KNOLL
WINDY PASS
POWERHOUSE MOUNTAIN
BARTHOLOMEW CANYON
SPANISH FORK PEAK
MAPLE CANYON
7315
8567
5863
8
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6
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3

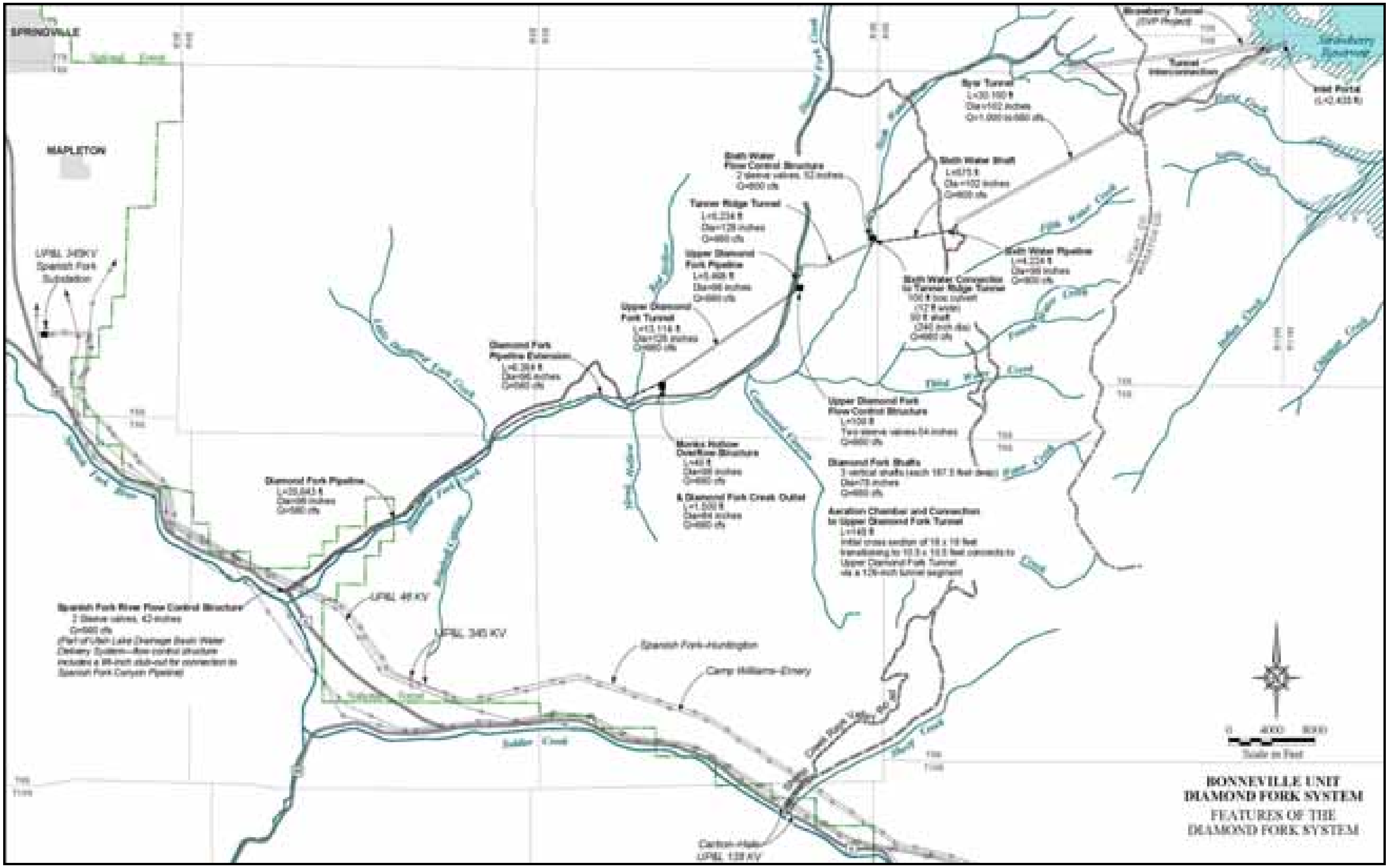


Figure 1.2. The Diamond Fork System, comprised of a series of tunnels and pipelines, delivers water from Strawberry Reservoir to the Spanish Fork River and avoids placing flows directly into Sixth Water Creek and Diamond Fork Creek. Strawberry Tunnel was replaced by Syar Tunnel, but it is still used to convey instream flows to Sixth Water Creek (map provided by the Central Utah Watery Conservancy District [CUWCD]).

1.1 WATERSHED DESCRIPTION

The Diamond Fork Creek Watershed (Figure 1.1) covers over 150 square miles and is the largest headwater tributary of the Spanish Fork River. Streams in the upper watershed are generally high-gradient and confined between steep side-slopes or within canyons. The lower reaches of Diamond Fork Creek are flatter and much less confined within a relatively wide alluvial valley (Plate 1.1). Historically, the watershed has been used for agriculture, timber harvesting, livestock grazing, and recreation. Only small portions of the watershed are still used for agriculture and grazing. Some of the watershed is part of the Uinta National Forest and managed by U.S. Forest Service. Recently, the Diamond Fork Watershed has become a popular recreation area because of its many recreational uses including both motorized and non-motorized activities. Numerous improved and unimproved roads exist to allow access to most parts of the watershed. Geology, soil and slope disturbances, and erosion rates vary throughout the watershed. Some impacted areas of the watershed appear to exhibit “above natural” erosion rates and likely exacerbate siltation problems in the watershed’s streams (Plate 1.2).

Diamond Fork Creek and Sixth Water Creek were used as early as 1916 to divert water to the Spanish Fork River from Strawberry Reservoir through Strawberry Tunnel in order to support irrigation needs in the lower watershed area and Utah County (Mitigation Commission 2000). These streams carried a significant amount of imported water during the irrigation season, thereby creating artificially high flows for an extended duration; causing significant changes in the sediment-transport regime; and affecting channel dimensions, pattern, profile, and its interaction with the floodplain. The channel in the lower reaches was braided to a certain degree and constantly shifting around the valley bottom. These morphological impacts to the channel and floodplain have in turn affected the type and extent of riparian and wetland vegetation, water quality, and aquatic communities. Currently, the channel is primarily single threaded and the network of abandoned channels are being “masked” with riparian vegetation. However, many of these abandoned channels are still becoming inundated and flowing during peak flows.

1.2 BACKGROUND HISTORY OF THE COLORADO RIVER STORAGE PROJECT ACT (CRSP), CENTRAL UTAH PROJECT (CUP), AND CENTRAL UTAH PROJECT COMPLETION ACT (CUPCA)

The Diamond Fork System is a series of tunnels and pipelines that transport water from Strawberry Reservoir in the Colorado River Basin to Spanish Fork River in the Bonneville Basin. This system is a part of the Bonneville Unit of the Central Utah Project (CUP), which develops a portion of the water from the Upper Colorado River system allocated to Utah under interstate compacts. The CUP was authorized by Congress in 1956 through the Colorado River Storage Project Act (CRSP) of 1956 (43 U.S.C. Sec 620 et seq.). The Bonneville Unit is the largest unit of the CUP (USBOR 2005). The Central Utah Water Conservation District (CUWCD) operates and manages the Bonneville Unit water, which is allocated to municipal and industrial uses, irrigation, and instream flows for areas in Utah. Other systems in the Bonneville Unit include the Starvation Collection System, the Strawberry

Plate 1.1. Channel gradient and floodplain widths are extremely varied between the upper watershed (Sixth Water Creek below Syar Tunnel, top) and lower reaches of Diamond Fork Creek (bottom).

Plate 1.2 Roads, unstable slopes, and other nonpoint sources of pollution have been observed to increase sedimentation problems from stormwater runoff at many locations throughout the Diamond Fork Watershed (top and bottom photos were taken in areas of recent construction in the upper Diamond Fork above Three Forks portion of the watershed).

Aqueduct and Collection System, the Municipal and Industrial System, and the Utah Lake Drainage Basin Water Delivery System.

Before the present-day Diamond Fork System was completed, imported water went directly into the headwaters of Sixth Water Creek via Strawberry Tunnel. The Strawberry Valley Project, completed by the U.S. Bureau of Reclamation, pre-dates the CUP by several decades. Strawberry Tunnel transported water from Strawberry Reservoir into the headwaters of Sixth Water Creek, down Diamond Fork Creek and Spanish Fork River. In 1990 the Syar Tunnel was constructed as a CUP feature to replace Strawberry Tunnel. By 1996 water from Syar Tunnel flowed through the Sixth Water Aqueduct and entered Sixth Water Creek 6 miles farther downstream than it had when Strawberry Tunnel was the primary flow conveyance. Strawberry Tunnel is now used to convey minimum instream flows to the head of Sixth Water Creek (USBOR 2005).

In 1992 the U.S. Congress enacted the Central Utah Project Completion Act (CUPCA) (Title II through VI of Public Law 102-575, as amended), which authorized further construction to complete the Bonneville Unit of the CUP that was started in 1966. The CUPCA also provided the authorization to plan and construct several modifications to the original design of the Bonneville Unit. This legislation also established a minimum instream flow requirement. Currently, this requirement is 25-32 cfs for Sixth Water Creek and 60-80 cfs for Diamond Fork Creek.

Under CUPCA in 1996, construction began on the Diamond Fork Pipeline, also known as Phase 1 of the Diamond Fork System of the CUP. This phase was completed in 1997 (Mitigation Commission 2000). Construction on Phase 2, the Diamond Fork Tunnel Alternative, was started in 2000 and completed in 2004. The Diamond Fork Tunnel Alternative is a pipeline and tunnel system that carries water from Syar Tunnel to the Diamond Fork Pipeline. The Diamond Fork Pipeline and Diamond Fork Tunnel provide the operational capability to remove most of the flows imported from Strawberry Reservoir to Sixth Water Creek and Diamond Fork Creek, except for minimum instream flows, during most years.

The CUPCA also established the Mitigation Commission, a Federal agency responsible for mitigating impacts from construction of the Bonneville Unit on fish, wildlife, and related recreation resources. Congress also established standards for the Mitigation Commission to follow when coordinating and implementing plans for mitigation projects.

1.3 IMPACTS TO THE DIAMOND FORK SYSTEM

Prior to completion of the Diamond Fork System, trans-basin imports from Strawberry Reservoir increased flow in Sixth Water Creek and Diamond Fork Creek, particularly in the summer growing season during periods of high irrigation demand (Figure 1.3). These artificially high flows caused channel widening and incision, especially in the upper reaches of Sixth Water Creek, in order to accommodate the higher and longer-duration peak flows. The channel also widened and braided in

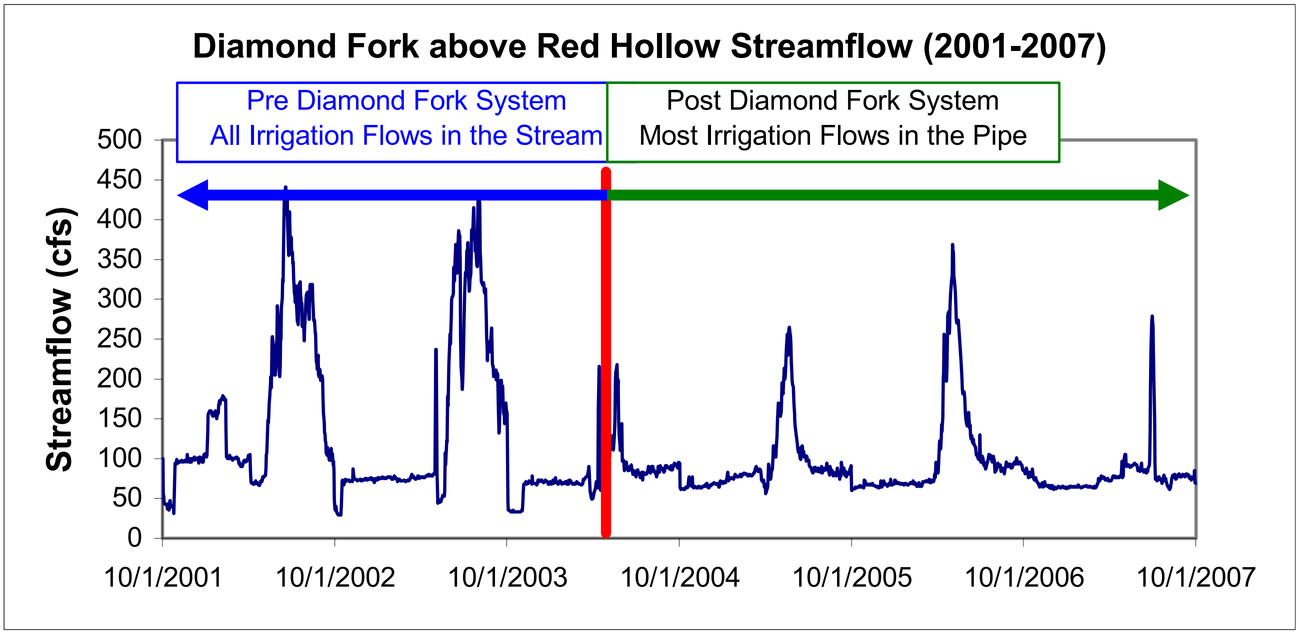


Figure 1.3. Annual Hydrographs before and after construction of the Diamond Fork System (U.S. Geological Survey gage 10149400 Diamond Fork above Red Hollow near Thistle, Utah).

the lower reaches of Diamond Fork Creek in order to accommodate increased sediment loads. The changes in stream geomorphology and flow regime resulted in “severely limited fish production, loss of soils, loss of riparian and wetland habitat, and reduced recreation experiences” (Mitigation Commission 2005).

Before it was used to transport water from Strawberry Reservoir, Diamond Fork Creek was most likely a single-thread, meandering channel with minor backwaters and an active floodplain estimated to be about 200-300 feet wide (Mitigation Commission 2000) from its mouth to Brimhall Canyon. Runoff was largely controlled by spring snowmelt, with peak flow occurring in mid May. Flows would return to baseflow by late June with periodic, short-term increases in flow caused by storms. Gage station data show annual peak flows before 1915 at 200 cfs near Red Hollow and 250 cfs near Brimhall Canyon (Mitigation Commission 2000).

Using the streams to convey imported water resulted in changes in magnitude, duration, and timing of peak flows (Figure 1.3), which in turn caused major changes to the geomorphology and adjacent riparian areas in both Sixth Water and Diamond Fork Creeks. From 1915 until 2004, when imported water was taken out of the streams, the annual hydrographs of Sixth Water Creek and Diamond Fork Creek were primarily controlled by the releases from Strawberry Reservoir, not natural runoff. Peak flows were approximately 450 cfs sustained for the duration of irrigation season, which lasted approximately 140 days (Mitigation Commission 2000). In Sixth Water Creek bank erosion occurred, and the channel incised an average of 12-15 feet. Compared with 1939 conditions, parts of Diamond Fork Creek have become much wider, straighter, and steeper, particularly in the lower 3 miles (Mitigation Commission 2000). Diamond Fork Creek has incised an average of 2-4 feet where the channel is confined. In areas where the valley is wide, the channel has become braided in response to higher sediment loads and increased flows (Mitigation Commission 2000).

Removal of much of the riparian forest in the early 1900s for agriculture compounded the impacts of increased flow on the channel and riparian areas. Rapid lateral migration, estimated as much as 40 to 60 feet per year, further impacted the existing riparian forest. High summer flows altered riparian and wetland communities by increasing the duration and extent of floodplain inundation as well as artificially increasing ground water elevations.

A plant species of particular concern is the Ute ladies'-tresses, which is listed as threatened by the Federal government. According to recent surveys, populations of this orchid were not documented in the Diamond Fork Watershed until 1992. Currently, the Diamond Fork Watershed populations are thought to contain about 95 percent of all individuals known to occur along the Wasatch Front area of Utah. The species grows in moist areas, particularly near springs and perennial streams. The plants occur primarily within the 2- to 10-year floodplain and seem to be adapted to areas disturbed by channel migration or other sources of disturbance in the floodplain. Much of current habitat for the Ute ladies'-tresses in the Diamond Fork Watershed seems to have developed in areas where lateral stream migration is occurring and willows (*Salix* spp.), cottonwoods (*Populus* spp.), and other types of riparian vegetation have been flooded out. It is possible that impacts from substantially increased flows in Diamond Fork Creek have created conditions that are favorable for Ute ladies'-tresses establishment (Mitigation Commission 2000).

Impacts have also occurred because of Diamond Fork Tunnel Alternative construction activities. Sulfur springs in the watershed were tributary to Diamond Fork Creek prior to tunnel construction. During the construction of Phase 2, an unexpected source of hydrogen sulfide-laden water began flooding the original tunnel. This tunnel was closed and abandoned. A new tunnel with an alternative design route was constructed to complete Phase 2 (CUWCD 2003). The hydrogen sulfide associated with drilling during construction of the original tunnel continues to leak into Diamond Fork Creek upstream of Three Forks, causing some water quality impacts that likely affect fish and benthic macroinvertebrates. Other impacts related to construction of the pipeline have been mitigated with varying amounts of erosion and sediment control, stream restoration, and riparian area restoration.

1.4 ISSUES AND PURPOSE OF STUDY

Mitigation of impacts resulting from the Diamond Fork System is required under CUPCA (1992). The Mitigation Commission has committed to several general areas of mitigation: monitoring Ute ladies'-tresses, riparian vegetation, leatherside chub populations, water quality and stream channel responses to altered flow regimes following completion of the Diamond Fork System; supporting the June Sucker Recovery Program; and planning and implementing restoration measures to the Sixth Water and Diamond Fork ecosystems. These commitments have led the Mitigation Commission to establish a long-term monitoring program to assess the existing geomorphic and ecological conditions and evaluate changes related to altering the flow regime by piping imported water instead of sending it through Sixth Water Creek and Diamond Fork Creek. This report addresses the commitment to assess and evaluate geomorphic and ecological changes in Sixth Water Creek and Diamond Fork Creek as these riverine ecosystems respond to changes in the flow regime.

The need for physical and biological monitoring is threefold:

1. Quantify baseline conditions of the channel affected by altered flow regimes related to transmitting irrigation water deliveries.

2. Acquire adequate data to analyze changes over time in order to set and prioritize restoration efforts and adaptively maintain the riverine and riparian ecosystem in a desirable and functional condition.

3. Use best available scientific knowledge to ensure that the Mitigation Commission meets all commitments to Sixth Water Creek and Diamond Fork Creek as set forth under CUPCA (1992).

The purpose of the work reported herein is to establish and implement a long-term monitoring program that involves periodically measuring channel cross sections, channel longitudinal profiles, areas of inundation, substrate particle-size distribution, sediment loads, and benthic macroinvertebrate assemblages in specific study sites in Sixth Water Creek and Diamond Fork Creek. Monitoring of ULT populations and riparian vegetation communities in 2006 and 2007 is reported separately (BIO-WEST 2008). Work in 2007 included measurements of sedimentation rates throughout the summer and fall instream flow period in order to better understand how the high instream flows may be negatively affecting aquatic life in the lower reaches of Diamond Fork Creek. Monitoring results will assist the Mitigation Commission with establishing and prioritizing restoration efforts and returning Sixth Water Creek and Diamond Fork Creek to desirable conditions with functional ecologic, hydrologic, and geomorphic processes.

1.5 MONITORING PLAN

The study area includes four study sites and six sediment monitoring bridges (Figure 1.4). Three study sites are located in the lower reaches of Diamond Fork Creek, and one study site is located on Sixth Water Creek. Channel monitoring, substrate monitoring, and benthic macroinvertebrate monitoring occurred at all four study sites. Channel monitoring consisted of surveying cross sections and longitudinal profiles at low flow. Substrate monitoring consisted of conducting pebble counts through cross sections and on distinct depositional patches, as well as substrate mapping. Benthic macroinvertebrate sampling was also conducted twice at each study site, once during both the spring and fall. Additional study sites were established for macroinvertebrate sampling above and below the area affected by hydrogen sulfide inputs on Diamond Fork Creek above Three Forks.

The six bridges along Diamond Fork Creek and Sixth Water Creek were chosen for sediment sampling sites. Sediment-load monitoring consisted of taking bedload and suspended-sediment samples from the bridge locations throughout the year; most of the samples were collected during the spring runoff period. Bedload samples were also taken during low flow at each sediment sampling site to determine whether the minimum flows were high enough to maintain transport of coarse sediment. Sediment samples were only collected in 2005 and 2006 (BIO-WEST 2006 and 2007), and were replaced with seasonal sedimentation sampling in 2007. The seasonal sedimentation sampling occurred at all four study sites, the riparian vegetation study site at Ray's Crossing, and a

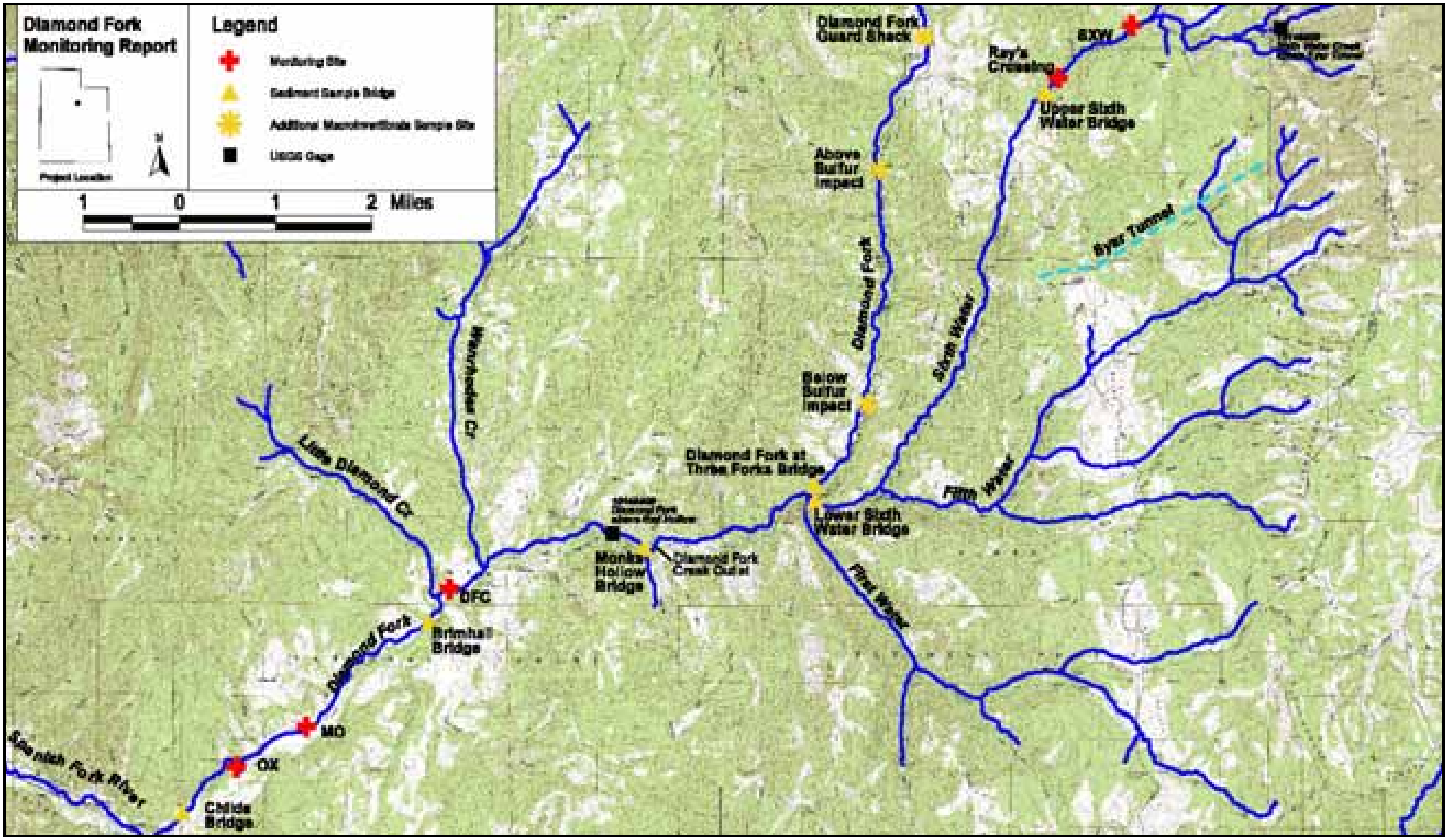


Figure 1.4. Map of the study area showing drainage names and study sites. The Ray's Crossing study site in upper sixth Water only includes data for the riparian vegetation transects (BIO-WEST 2008).

“paired watershed” study site in Hobble Creek that was used in order to compare results in an adjacent watershed that is not affected by instream flows.

2.0 CROSS SECTIONS AND LONGITUDINAL PROFILES

2.0 CROSS SECTIONS AND LONGITUDINAL PROFILES

2.1 INTRODUCTION

Initial surveys of the established, permanent transects (cross sections) and longitudinal profile were completed at each of the four study sites in the Diamond Fork Watershed in spring 2005 (BIO-WEST 2005). These surveys were repeated in fall 2006 (BIO-WEST 2006) and fall 2007. The 2005 baseline survey data were compared with 2006 and 2007 survey data to monitor changes in channel geometry, bed complexity, and slope over time. These data may also be used in hydraulic modeling and other analyses that are often the basis for flow recommendations and other adaptive maintenance activities for Diamond Fork and Sixth Water Creeks. Such recommendations and activities will assist the Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) and Central Utah Water Conservation District (CUWCD) with restoring the streams to a desirable condition. Monitoring data will also help the Mitigation Commission meet all other commitments to restore the Diamond Fork Watershed, particularly those concerning Ute ladies'-tresses (*Spiranthes diluvialis*) habitat.

2.2 METHODS

2.2.1 Data Collection

In April 2005 BIO-WEST established permanent transects (cross sections) in each of the four study sites. The four study sites are Sixth Water (SXW) (Figure 2.1), Diamond Fork Campground (DFC) (Figure 2.2), Mother (MO) (Figure 2.3), and Oxbow (OX) (Figure 2.4). The site names "MO" and "OX" are taken from long-standing Ute ladies'-tress monitoring protocols. The SXW and MO sites each contain six transects. The DFC site contains seven transects, and the OX site contains eight transects. Transects were also established at the downstream side of each sediment sampling bridge (Figure 1.4). The bridges include Upper Sixth Water (SXW-U), Lower Sixth Water (SXW-L), Diamond Fork at Three Forks (DI), Monks (MK), Brimhall (BR), and Childs (CH). Transects at these bridges were originally surveyed in 2005. High flows in 2005 washed out the culvert at the DI Bridge. Hence a new cross section upstream of the former bridge location was established in November 2006.

Each transect is denoted by two endpoints, one on each side of the stream, that are marked with a cap and anchored to the ground by rebar. The endpoints mark either the left endpoint (LEP) or right endpoint (REP), corresponding to the side of the stream while facing downstream. The endpoint cap is also stamped with the study site abbreviation and transect number. Some transects share endpoints; therefore, each transect associated with an endpoint has the transect number stamped onto the cap. For example, the LEP for transects 5, 6, and 7 at the DFC site are located on a single cap stamped as "DFC LEP 5, 6, 7." A sub-meter-grade global positioning system (GPS) was used to determine real-world horizontal coordinates in NAD83 data and elevations in NAVD 1988 feet for transect endpoints at the study sites and bridges.

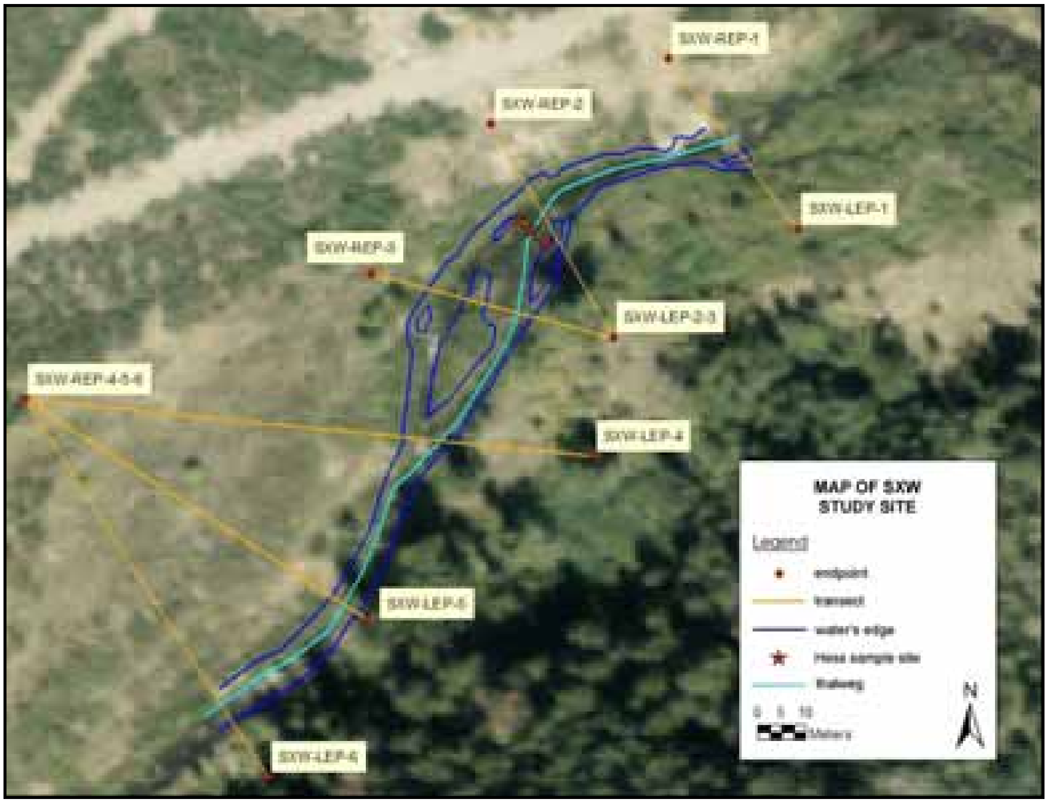


Figure 2.1. Sixth Water (SXW) study site map. Flow is from right to left. Aerial photo from 2006.

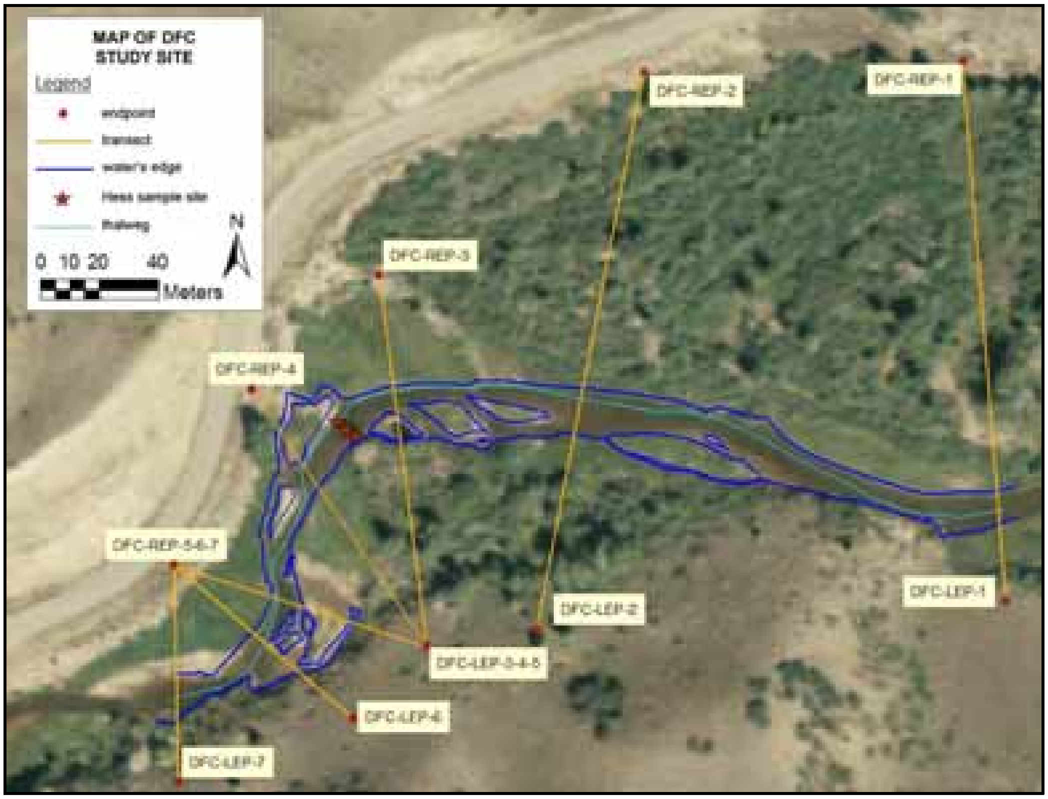


Figure 2.2. Diamond Fork Campground (DFC) study site map. Flow is from right to left. Aerial photo from 2006.

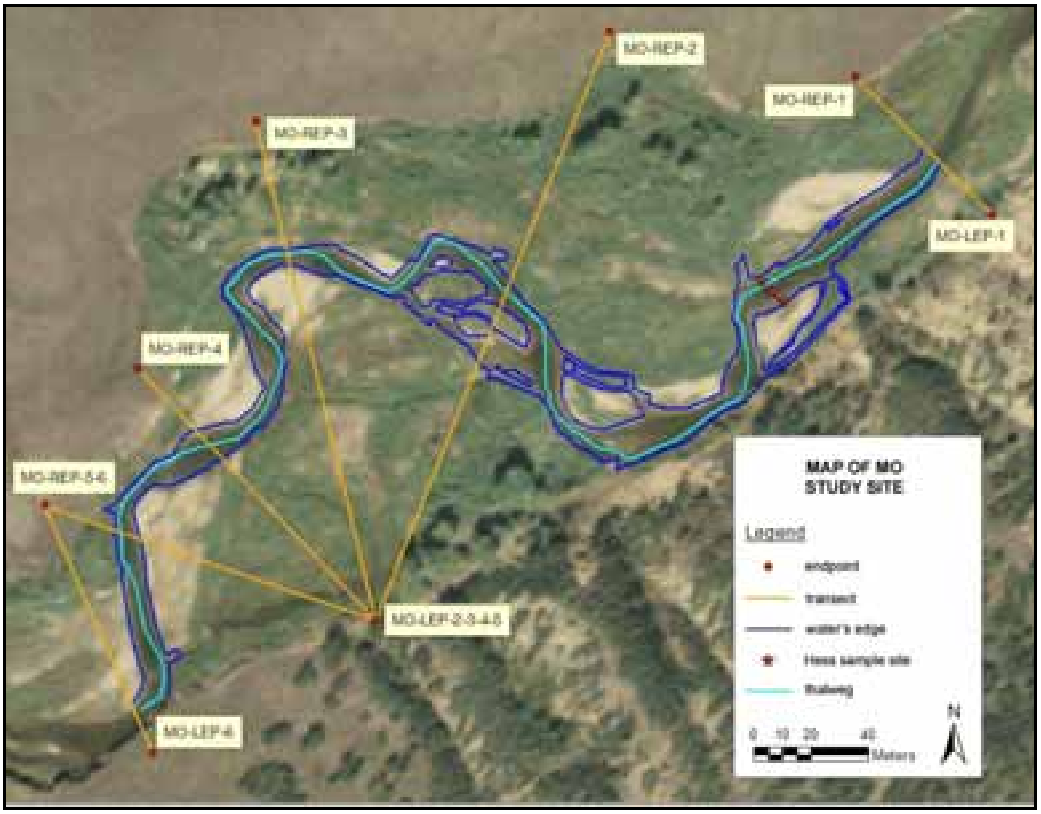


Figure 2.3. Mother (MO) study site map. Flow is from right to left. Aerial photo from 2006.

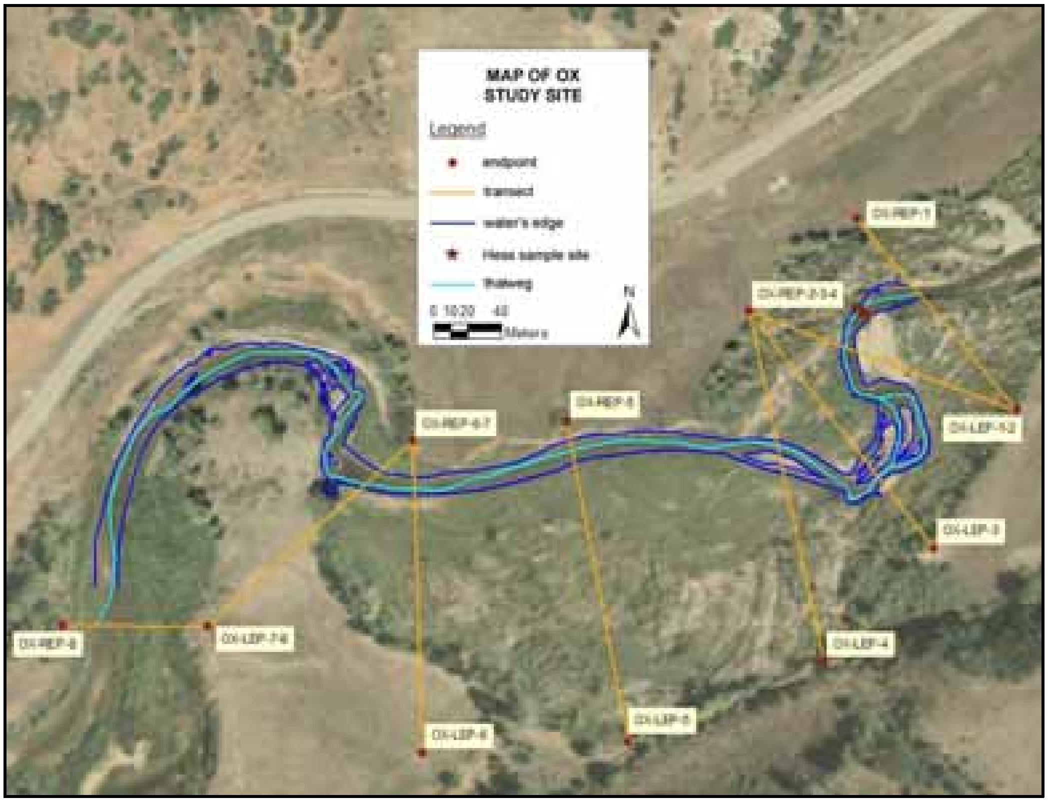


Figure 2.4. Oxbow (OX) study site map. Flow is from right to left. Aerial photo from 2006.

Transect surveys were conducted April 14–20, 2005, using a theodolite (total station), data collector, and prism/rod. In 2006 transects were surveyed in late summer and fall, with survey dates chosen based on accessability and vegetation. Sixth Water site transects were surveyed August 8-9, 2006. During this survey, the SXW site endpoints were resurveyed with a total station to improve accuracy. Transects at the DFC, MO, and OX sites were surveyed November 8–10, 2006. The SXW site was surveyed earlier because rain and snow make the site inaccessible later in the year. The other sites were surveyed after vegetation, particularly leaves, had fallen, since dense, leafed-out trees often block the line of site along the transect.

The 2007 transect monitoring also occurred in fall. As in the past, the SXW transects were surveyed on October 10, prior to survey of the other sites. The DFC site was surveyed on October 24, the OX site on October 25, and the MO site on October 26.

To complete a transect, the total station was set up over one endpoint and assigned real-world coordinates of that endpoint in the datalogger. The corresponding transect endpoint with real-world coordinates was used as the backsight. The survey data have northings, eastings, and elevations relative to the two endpoint caps, thereby placing the subsequent transect survey data in the coordinate system with elevations in NAVD 1988.

At each transect, the backsight endpoint cap was resurveyed with the total station to check for differences between the total station survey coordinates and the GPS coordinates for the endpoint. The rod person then placed the rod at points in a straight line (0 degrees plus or minus 5 minutes) between the two endpoints (Figure 2.5). Surveyed points included major changes in topography, both the left and right edges of water, edges of backwaters, changes in vegetation, channel features such as bars and islands, presence of large woody debris, and the thalweg (deepest part of the stream at the transect). Four photographs of each transect were also taken to show the REP, LEP, and upstream and downstream views of the transect (Appendix 2.1).

In 2005 the longitudinal profile was surveyed concurrently with the transects at SXW and MO during low flow. The sub-meter GPS was used to survey the longitudinal profile and edge of water during low flow at OX and DFC. The total station was used to survey the longitudinal profiles and edge of water at each site in 2006 and 2007.

2.3 RESULTS

2.3.1 Endpoint Coordinates

Real-world coordinates for study site transect endpoints are compiled in Table 2.1. Bridge transect endpoint coordinates, including the coordinates for the new Diamond Fork at Three Forks transect, are shown in Table 2.2. Northing and easting values are provided in NAD83 UTM meters. Elevations are in NAVD 1988 feet. Transects corresponding to an endpoint are denoted by number on the endpoint label. As described earlier, some study site transects share endpoints. All transects corresponding to a specific endpoint are stamped on the endcap that marks the transect endpoint.

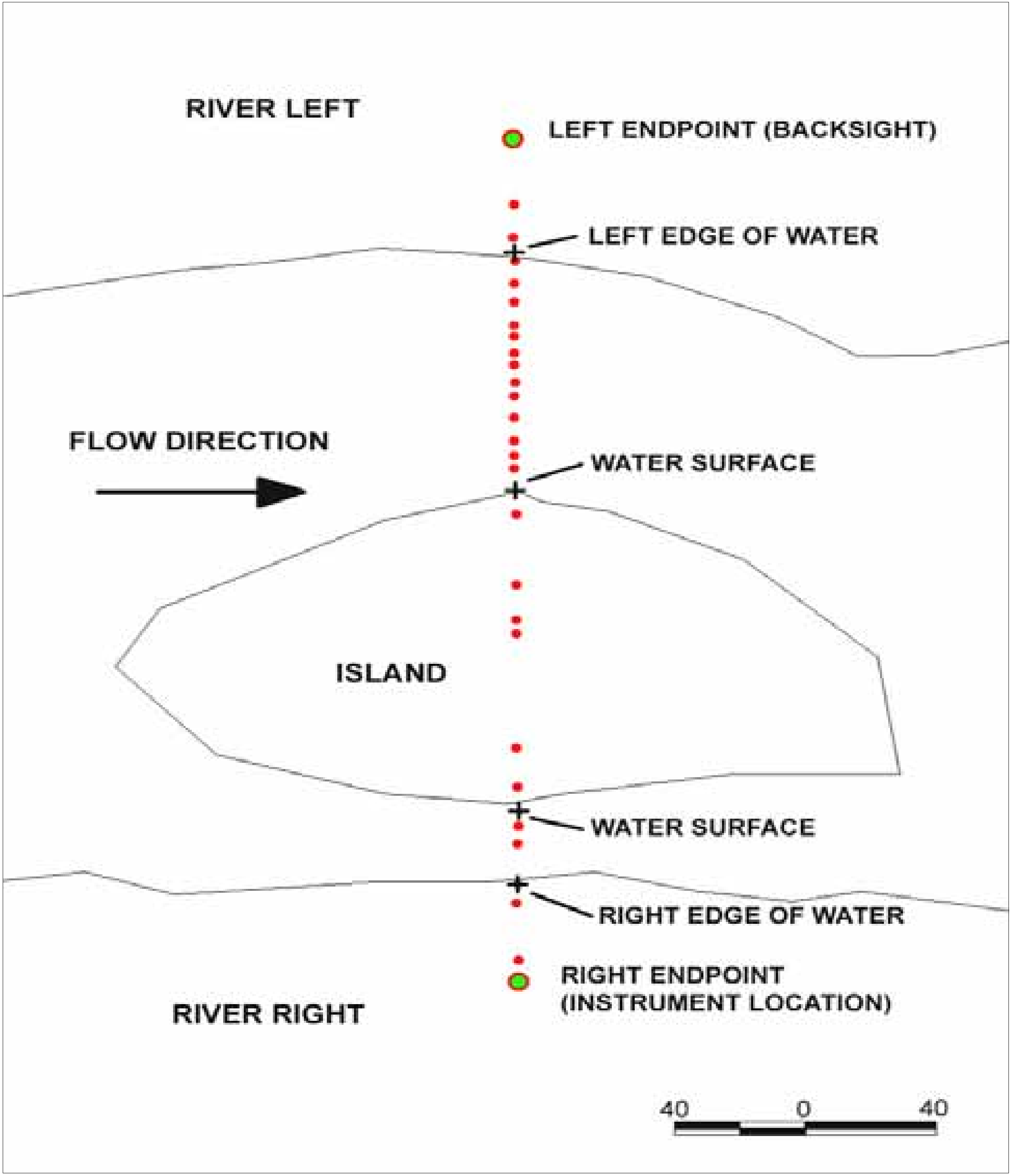


Figure 2.5. Methods for surveying permanent cross sections using a total station. The instrument is set over a permanent endpoint (a labeled aluminum cap on a 3-foot rebar stake) with known coordinates. Survey points are taken along the transect between the endpoints at 20-foot intervals or when the bed elevation changes by more than 0.5 foot. Large cobbles and boulders, therefore, can be seen on cross-section plots. A laser on the total station, not tapes and taglines, is used to align the survey points and determine distances between the endpoints.

Table 2.1. Endpoint coordinates for cross sections in study sites using NAD83 UTM meters.

CROSS-SECTION ENDPOINT[a]	NORTHING (METERS)	EASTING (METERS)	ELEVATION (NAVD88 FEET)
SXW 1 REP	4,445,801.13	476,057.70	6,952.05
SXW 2 REP	4,445,787.82	476,020.79	6,949.62
SXW 3 REP	4,445,756.59	475,995.48	6,916.38
SXW 4-5-6 REP	4,445,731.04	475,922.93	6,928.65
SXW 1 LEP	4,445,764.73	476,084.76	6,926.19
SXW 2-3 LEP	4,445,742.51	476,046.11	6,923.57
SXW 4 LEP	4,445,717.89	476,041.60	6,921.66
SXW 5 LEP	4,445,684.05	475,994.53	6,914.02
SXW 6 LEP	4,445,652.31	475,973.60	6,920.56
DFC 1 REP	4,435,557.77	462,855.08	5,190.97
DFC 2 REP	4,435,553.85	462,746.59	5,194.35
DFC 3 REP	4,435,484.22	462,656.15	5,178.00
DFC 4 REP	4,435,445.24	462,612.84	5,185.31
DFC 5-6-7 REP	4,435,385.24	462,586.02	5,183.52
DFC LEP 1	4,435,372.65	462,869.86	5,197.23
DFC LEP 2	4,435,363.03	462,709.62	5,207.53
DFC 3-4-5 LEP	4,435,357.40	462,672.33	5,206.85
DFC 6 LEP	4,435,332.72	462,647.07	5,206.43
DFC 7 LEP	4,435,310.52	462,587.46	5,203.44
MO 1 REP	4,432,997.96	460,101.28	5,073.03
MO 2 REP	4,433,013.97	460,015.58	5,075.86
MO 3 REP	4,432,982.20	459,892.22	5,069.28
MO 4 REP	4,432,895.62	459,850.80	5,065.26
MO 5-6 REP	4,432,848.00	459,818.58	5,061.64
MO 1 LEP	4,432,949.67	460,149.02	5,081.36
MO 2-3-4-5 LEP	4,432,807.72	459,933.75	5,082.52
MO 6 LEP	4,432,761.33	459,856.05	5,073.54
OX 1 REP	4,432,364.02	458,756.92	5,031.04
OX 2-3-4 REP	4,432,308.61	458,693.33	5,028.13
OX 5 REP	4,432,244.07	458,585.88	5,021.99
OX 6-7 REP	4,432,232.76	458,495.21	5,031.94
OX 8 REP	4,432,123.25	458,288.55	5,007.85
OX 1-2 LEP	4,432,250.13	458,850.94	5,026.19
OX 3 LEP	4,432,169.14	458,802.24	5,024.20
OX 4 LEP	4,432,102.14	458,737.36	5,025.39
OX 5 LEP	4,432,054.02	458,621.93	5,020.37
OX 6 LEP	4,432,047.81	458,500.76	5,019.39
OX 7-8 LEP	4,432,122.37	458,374.45	5,017.11

[a] SXW = Sixth Water, DFC = Diamond Fork Campground, MO = Mother, OX = Oxbow, LEP = left endpoint, and REP = right endpoint.

Table 2.2. Endpoint information for bedload sediment sampling bridge cross sections in NAD83 UTM meters.

BRIDGE ENDPOINT[a]	NORTHING (METERS)	EASTING (METERS)	ELEVATION (NAVD88 FEET)
SXW-U (UPPER) REP	4,444,563.95	474,339.22	6,678.93
SXW-U (UPPER) LEP	4,444,547.85	474,351.87	6,680.31
SXW-L (LOWER) REP	4,437,175.55	469,738.65	5,532.54
SXW-L (LOWER) LEP	4,437,148.74	469,724.09	5,538.27
MK REP	4,436,163.28	466,530.07	5,345.31
MK LEP	4,436,144.34	466,532.04	5,345.20
BR REP	4,434,815.50	462,310.67	5,148.17
BR LEP	4,434,809.78	462,324.34	5,148.63
CH REP	4,431,335.68	457,521.45	4,977.31
CH LEP	4,431,322.12	457,538.52	4,976.35

[a] SXW-U = Upper Sixth Water, SXW-L = Lower Sixth Water, MK = Monks, BR = Brimhall, CH = Childs, LEP = left endpoint, and REP = right endpoint.

2.3.2 Cross Sections

Photographs of each cross section are included in Appendix 2.1. Cross-section plots for the entire transect (from endpoint to endpoint), and close ups of the channel are compiled in Appendix 2.2.A. These plots include baseline (2005) cross sections, the 2006 transect plots, and the 2007 transect plots. Distance and elevation data from the 2007 cross-section surveys are provided in Appendix 2.2.B. Plots of changes in the position of the low-flow edge of water from 2005 to 2007 are shown in Figures 2.6, 2.7, 2.8, and 2.9. Thalweg location shifts are shown in Figures 2.10, 2.11, 2.12, and 2.13.

The SXW site cross sections are on Sixth Water Creek between Strawberry Tunnel and Syar Tunnel. This area was formerly used to deliver water from Strawberry Reservoir to Spanish Fork via Strawberry Tunnel. When Syar Tunnel was completed, minimal flow was sent through Strawberry Tunnel. All six transects are in straight-channel riffle areas, which are typical of the reach. Transect SXW3 crosses the toe of an island, and transect SXW6 is in a wider part of the channel compared with upstream transects.

The SXW site is extremely stable, with no indication of change between 2005 and 2007 despite having higher-than-average peak flows in 2005 and 2006. Cross-section plots show little to no change in cross-section shape between the 2005, 2006, and 2007 surveys. Some small difference in cross-section elevations between 2005, 2006, and 2007 in the SXW site may be related to placing the rod next to (versus on top of) large, boulder-sized material in the channel.

The DFC transects are all downstream of Diamond Fork Campground. Transects DFC1 and DFC2 are in a straight, run-type section. Transect DFC3 marks the transition into a meander and island complex. Transect DFC4 is primarily a riffle, with flow split around islands. Transects DFC5 and DFC6 are in a riffle-type section with many small islands and large woody debris. Transect DFC6 contains a deep pool to river left that starts just downstream of transect DFC5. Transect DFC7

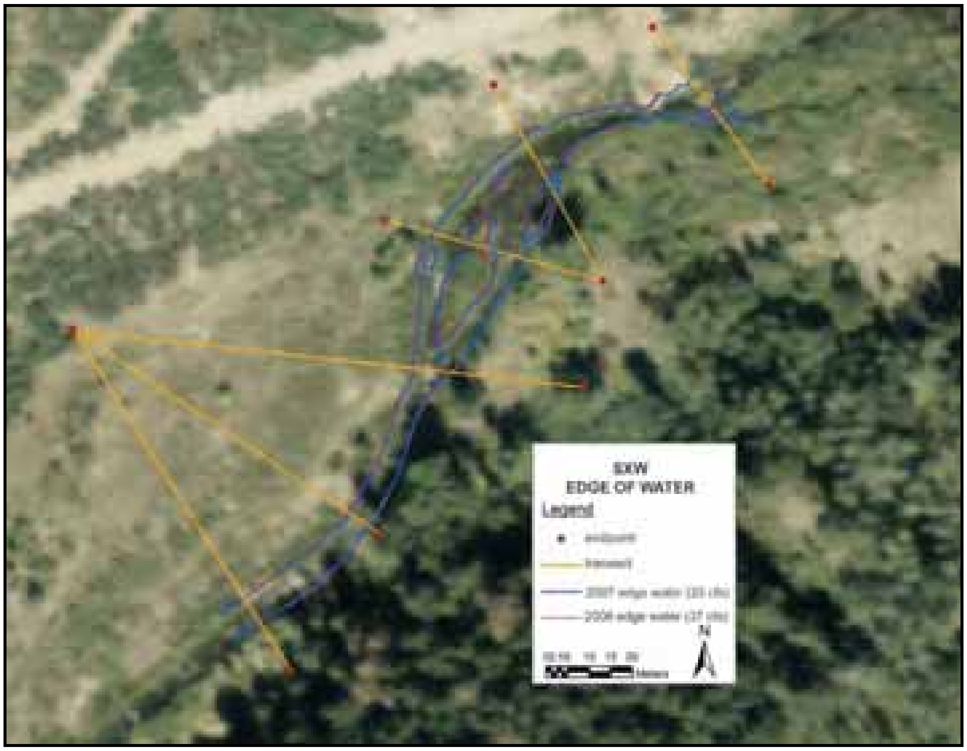


Figure 2.6. Location of the surveyed edge of water at the Sixth Water (SXW) site in 2006 (37 cfs) compared with 2007 (33 cfs). Aerial photograph from 2006.

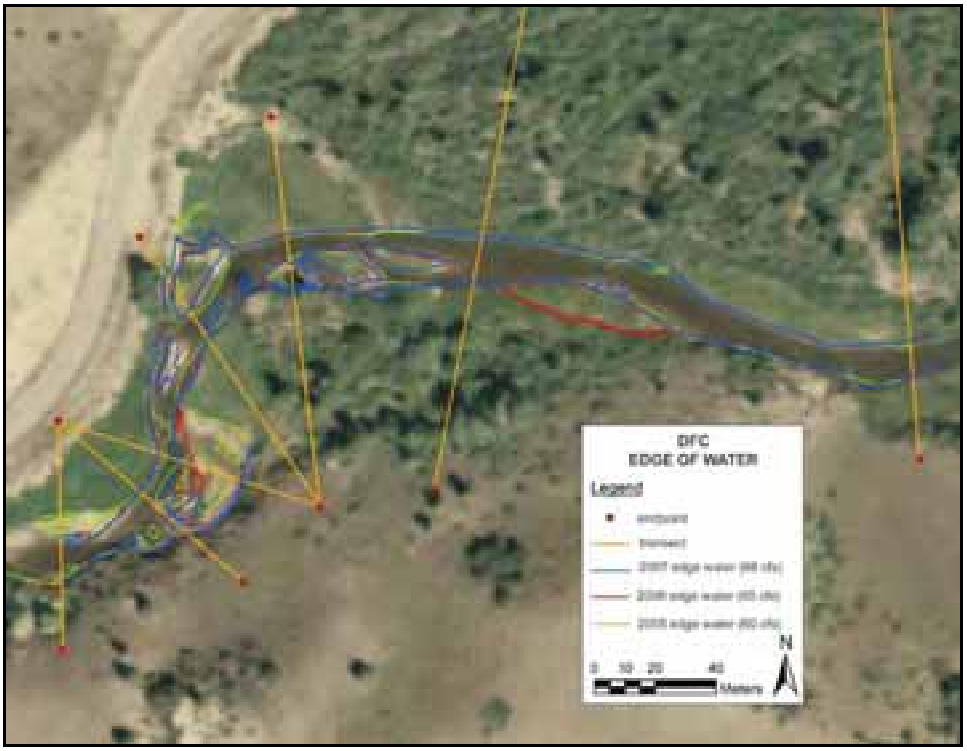


Figure 2.7. Location of the surveyed water edge at the Diamond Fork Campground (DFC) site in 2005 (60 cfs) compared with 2006 (65 cfs) and 2007 (68 cfs). Aerial photograph from 2006.

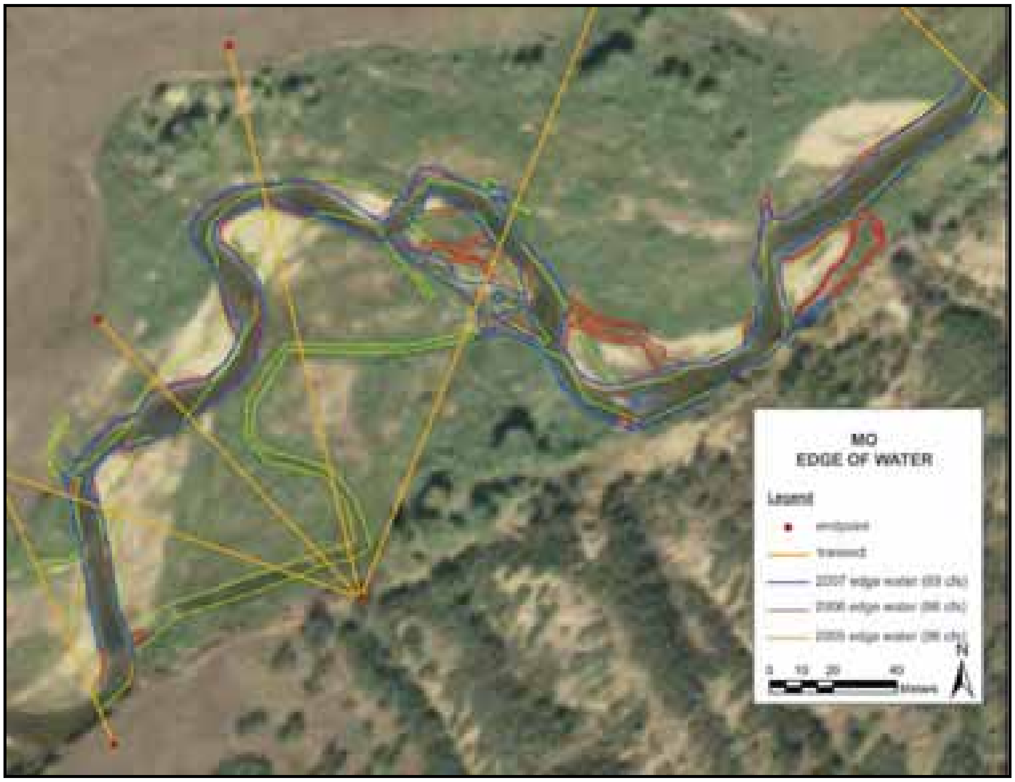


Figure 2.8. Location of the surveyed water edge Mother (MO) site in 2005 (96 cfs) compared with 2006 (66 cfs) and 2007 (69 cfs). Aerial photograph from 2006.

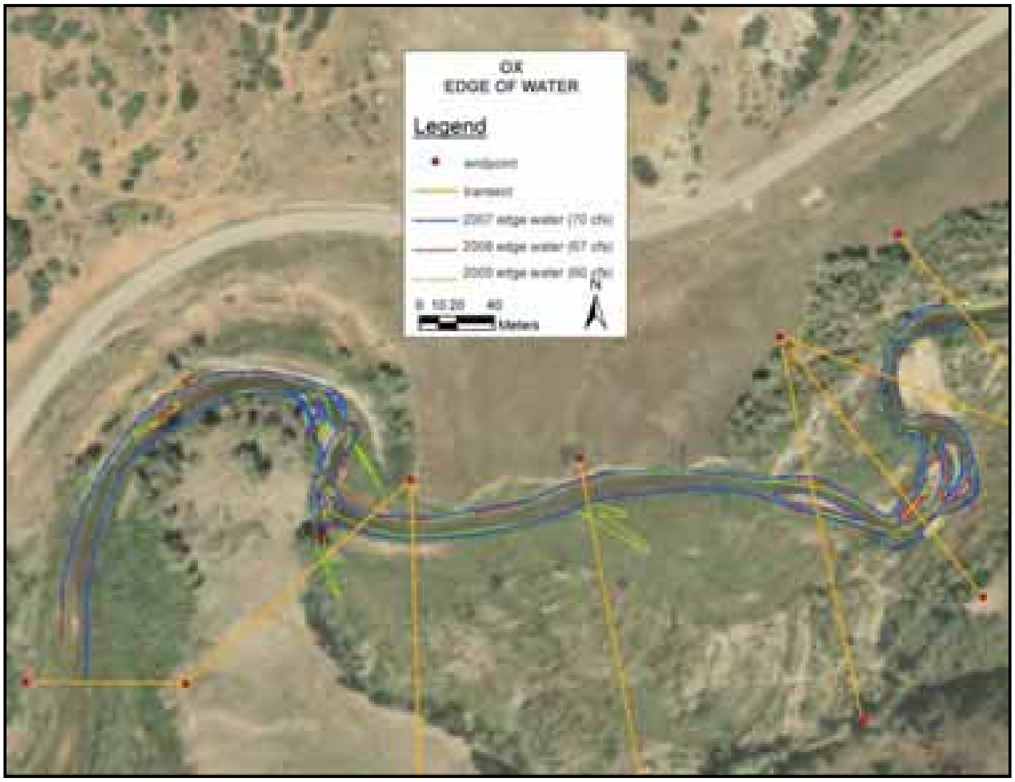


Figure 2.9. Location of the surveyed edge of water at the Oxbow (OX) site in 2005 (60 cfs) compared with 2006 (67 cfs) and 2007 (70 cfs). Aerial photograph from 2006.

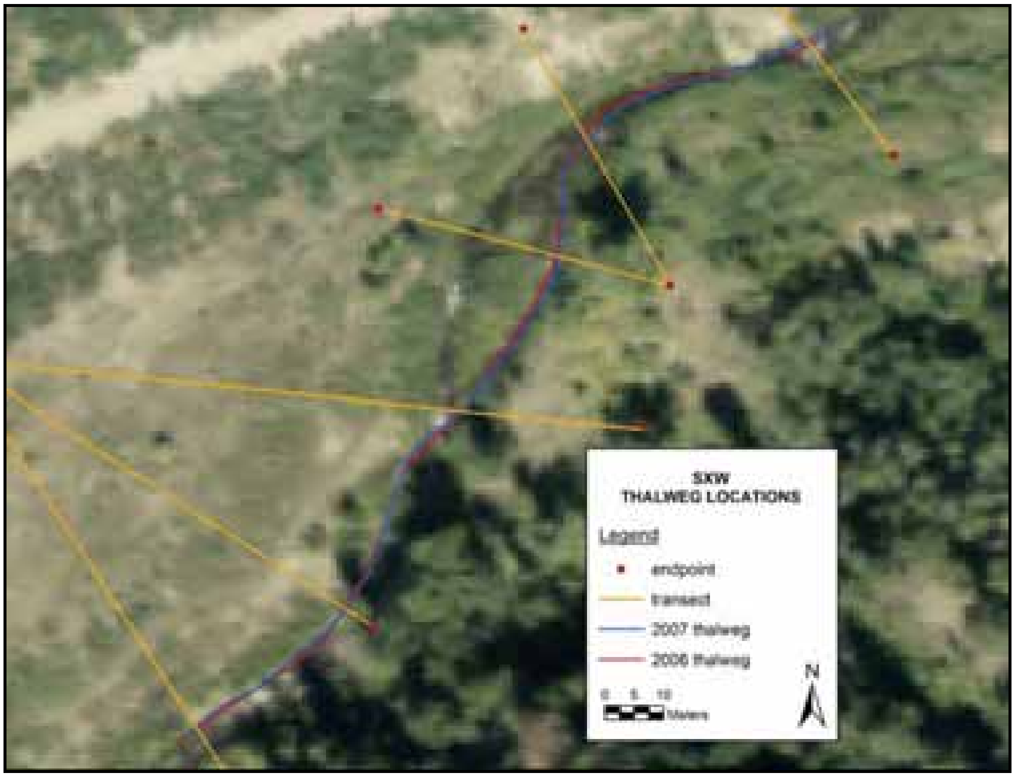


Figure 2.10. Location of the surveyed thalweg at the Sixth Water (SXW) site in 2006 compared with 2007.

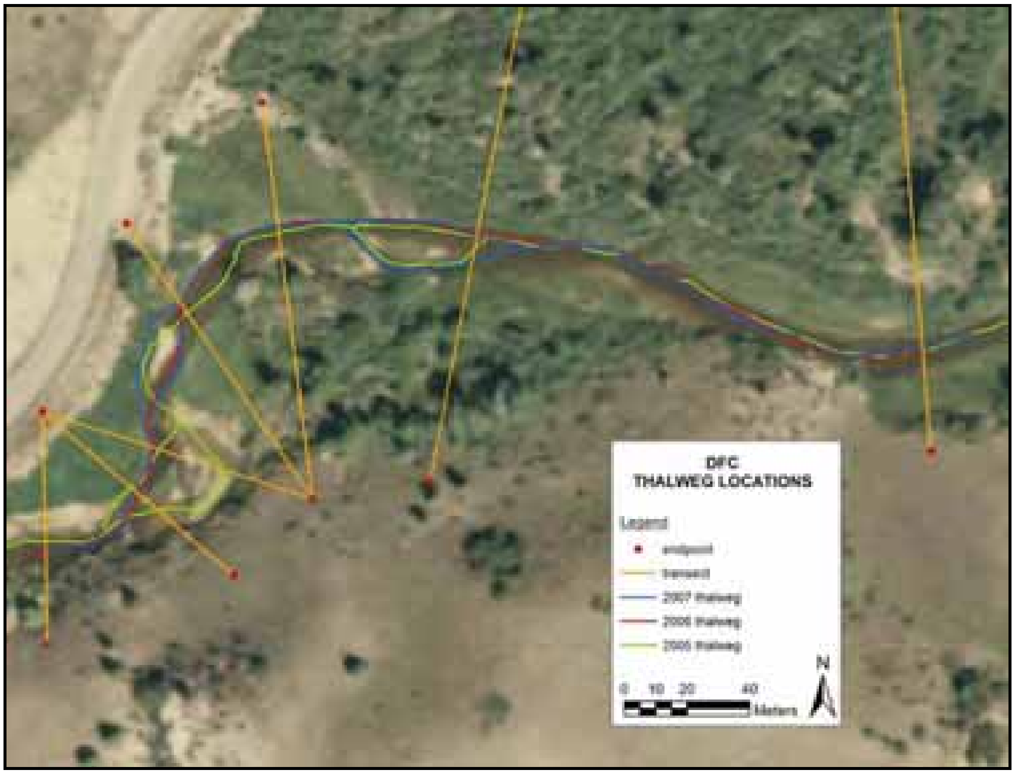


Figure 2.11. Location of the surveyed thalweg at the Diamond Fork Campground (DFC) site in 2005 and 2006 compared with 2007.

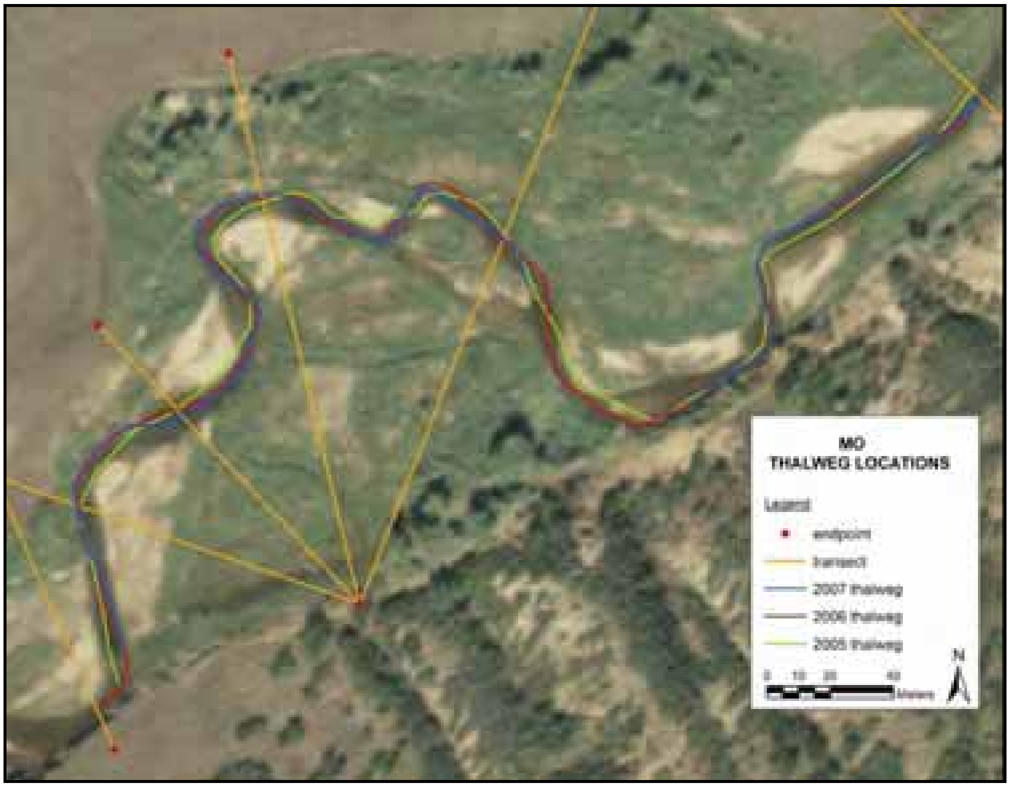


Figure 2.12. Location of the surveyed thalweg at the Mother (MO) site in 2005 and 2006 compared with 2007.

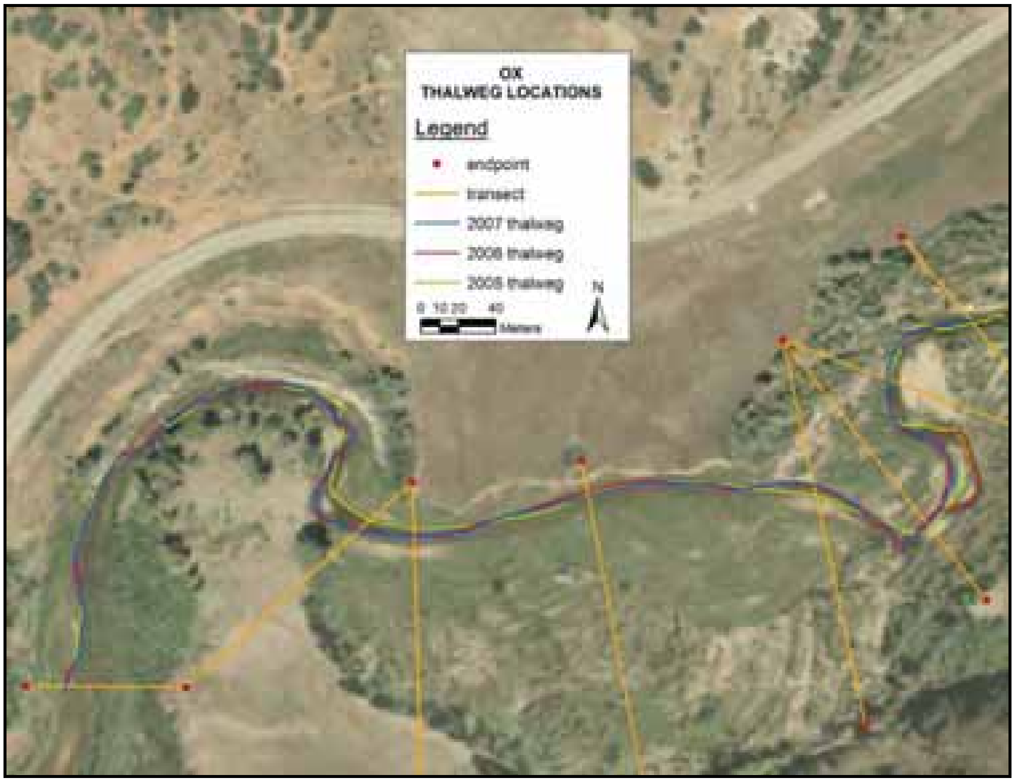


Figure 2.13. Location of the surveyed thalweg at the Oxbow (OX) site in 2005 and 2006 compared with 2007.

crosses an island on river right. Transect DFC7 is farthest downstream and located where the stream channel starts to cut back toward the road.

Changes at the DFC site transects are shown in close-up cross-section plots (see Appendix 2.2.A) that show only the main channel portion of the transect. The large change at DFC1 on the right bank shown in the 2006 report is an artifact of survey point locations and was corrected for this report. This area is a fairly stable hill slope with piles of dead willows (*Salix* spp.) at the toe of the slope. There is little change from 2005 to 2007 at DFC 1 other than the thalweg filling less than 1 foot between 2005 and 2006 surveys. Transects DFC 2 and DFC 3 show very little change from the 2005 to the 2007 surveys. However, the plots indicate some aggradation on the bed at transect DFC2, small amounts of erosion on the right bank, and the bar development on the left bank at transect DFC3. Transect DFC7 shows little change between 2005 and 2007, with only a small amount of deposition occurring in 2007. All of these transects are in a relatively straight section of the site.

Cross section changes between the 2005 and 2006 surveys are more noticeable in transects DFC4, DFC5, and somewhat at DFC6. The channel begins to meander in this part of the site. Additionally, the channel narrows and then becomes substantially wider just before transect DFC5. In this wider channel area, the in-stream features—such as bars and location of pools, riffles, and side channels—are more dynamic.

At transect DFC4, most change occurred in between 2005 and 2006, with small adjustments occurring between the 2006 and 2007 surveys. The 2007 survey indicates that the island near the right bank is stabilizing. Although the left bank shows some erosion from 2005, the channel width appears similar between 2006 and 2007. However, the main channel seems to be deepening and creating a new thalweg approximately 250 feet from the LEP. If the main channel becomes deeper, it will capture the majority of water at lower flows and the side channel will be active only during higher flows.

Most changes at DFC5 occurred at 150-200 feet from the LEP. The transect shows deepening of the pool along the outside meander at transect DFC5 each year. In 2007 the portion of the channel along the old left bankline is filling in, and the cross section is changing from multi-threaded to single-threaded. Large, woody debris exists at the 2006 left bank location. Aggradation along this backwater area about 90 feet from the LEP can also be seen in transect DFC7. This transect seems to indicate that the channel at this location is becoming deeper and single threaded at baseflow, with the bars and islands becoming more stable. The channel at DFC5 may also be laterally migrating.

Change at transect DFC6 is marked by potential hillslope erosion on the left and an overall narrowing of the main channel. The bar that formed in 2006 continued to be built up in 2007. The right bank appears stable from 2005 to 2007.

The plots of water edge and thalweg changes also reflect the relatively stable nature of the upstream half of the DFC site and the more dynamic nature of the downstream half of the site (Figure 2.7, Figure 2.11). In addition to shifts in the size and shape of islands, the spring floods in 2005 and 2006 eroded a large portion (about 15-feet wide and 25-feet long) of the right bank just upstream of DFC5. This area appears to have continued to erode slightly in 2007 (Figure 2.7). Another significant change was the erosion of the gravel bar that was attached to the island spanned by DFC4 in 2005 and the deposition of a new gravel bar downstream between DFC4 and DFC5 (Figure 2.7).

By 2007 the main channel had narrowed between transects DFC4 and DFC5. The main channel also now flows to the right of the bar complex along transect DFC5, abandoning the large portion of the channel left of the bar complex. In 2007 only a backwater remained in this area.

The most change at DFC occurred between 2005 and 2006. High peak flows contributed to the magnitude of change seen at this site. Between 2006 and 2007, the areas that continued to adjust were along the bend area between transect DFC4 and DFC6. As expected the run-type, straighter channel areas showed little change over the 3-year monitoring period.

The MO transects are in a geomorphically complex and relatively flat section of Diamond Fork Creek, which contains many small islands and bars. Transect MO1 is in a straight, run-type section. Transects MO2 and MO3 are farther downstream in the meandering section of the study site. These transects cross an island and two side channels. Transects MO4 and MO5 have deep pools on river right and cross the side channel closest to the left bank. Transect MO6 is the farthest downstream cross section and in a riffle section with flow split around an island. This cross section is also downstream of the active side channel crossed by transects MO2-MO5.

Comparison of 2005 and 2006 plots of the MO transects shows significant change at each transect in the site. As with DFC, fewer changes occurred between 2006 and 2007, likely due to the smaller peak flows. In 2006 Transect MO1 showed approximately 3 feet of erosion on the left bank and aggradation in the channel and floodplain. The 2007 survey indicates little to no change from 2006 other than slightly more erosion of the bank and aggradation of the bed. Transect MO2 shows aggradation of up to 2 vertical feet in the channel from 2005 to 2006. In 2007 the bed eroded approximately 1 foot but, as with Transect MO1, there is substantially less change noted in the 2007 survey than in 2006. Since substrate tends to be cobble sized or smaller in this section of the stream, measured elevational differences reflect true channel bed changes, not just the difference between placing the survey rod on top of or in between boulders. At MO3 the thalweg had readjusted in 2007, becoming shallower compared with 2006 as the scour hole filled in slightly. Erosion on the right bank also indicates that the channel is shifting toward the REP.

Transect MO4 showed the most change between 2005 and 2006. The channel made some additional adjustments in 2007 with some areas eroding and others showing deposition. The left bank did not erode further in 2007. The large side channel continues to fill with sediment. There was fairly minimal change across the remainder of the transect. Transect MO5 continues to show incision in the main channel. Data plots of MO5 show the trends noted in 2006 continuing including erosion on the right bank and channel deepening. The main channel at transect MO6 deepened and widened because of erosion of the bar deposit on the right side of the thalweg in 2006. In 2007 the top width remained the same but sediments deposited in the channel, essentially narrowing the channel and reducing the main channel flow capacity. The side channels on river right were vegetated in 2006 and 2007.

Although very dynamic in nature between 2005 and 2006, the MO site changed less between 2006 and 2007 (Figure 2.8, Figure 2.12). This stability is mostly related to relatively low peak flows in 2007 compared with 2006. As with the changes observed at the surveyed transects, mostly small adjustments and shifts also occurred between transects. In 2006 the side channel along the right side of the point bar upstream of MO2 became active at low flow, but it was dry in 2007 (Figure 2.8). The side channel to the left of the islands crossed by MO2 carried more flow in 2006 than in 2005 and remain active in 2007 (Figure 2.8). In 2007 the significant bank erosion along the outside of the bends within the lower half of the site is less evident, suggesting that sinuosity increased primarily between 2005 and 2006 and the channel made smaller adjustments in 2007 (Figure 2.8). This trend is also reflected in the thalweg plots, which show a large difference in the 2005 survey compared with both the 2006 and 2007 surveys (Figure 2.12).

The OX site is the farthest downstream monitoring site in the watershed and contains eight transects. Transect OX1 is the farthest upstream and crosses a relatively narrow section of the stream at a riffle. Transect OX2 is similar to OX1, except it crosses the stream at a bend. Transect OX3 crosses a mid-channel island that splits flow around the island. This transect is located on a meander bend. Transect OX4 crosses a riffle at the downstream end of the bend. Transect OX5 is located in the middle of a relatively straight section of Diamond Fork Creek. This straight section has a large floodplain area to the south and an eroding terrace to the north. Transect OX5 also crosses a backwater that extends farther into the floodplain. Transect OX6 marks the lower boundary of the straight section and is the start of a large meander bend. Transect OX7 crosses this meander bend just below OX6. The transect cuts across a point bar and part of a backwater that is initiated farther downstream. Transect OX8 is the most downstream cross section. Like OX1 this cross section is in a straight, single-channel section of the stream with no major in-channel features or backwaters. Because of their length, all transects in the OX site also cover the active, present-day floodplains, as well as large areas of abandoned floodplains that formed as Diamond Fork and Sixth Water Creeks began to downcut when these channels were used to transport irrigation water prior to the completion of the Diamond Fork System.

As with the other sites, the changes between 2006 and 2007 were smaller compared with changes seen in the transects from 2005 to 2006. Transects OX1, OX6, and OX8 did not change appreciably during the entire monitoring period between 2005-2007. Edge of water and thalweg plots indicate relatively stable conditions within this straight, central portion of the study site (Figure 2.9, Figure 2.13).

In-channel changes from 2006 to 2007 are seen at transects OX2, OX3, OX4, OX5, and OX7. These transects show small amounts of erosion and deposition occurring in the active channel and little to no change on the remainder of the transects. Transect OX2 showed some deepening (1.3 feet) of the thalweg in 2006 and some deposition and bar building. Changes at OX2 seen in 2007 include a general narrowing in the deeper part of the channel with some erosion on the left. The transect remains similar outside the active channel. Although transect OX3 was the most dynamic transect at OX in 2006, there were only small adjustments in 2007. Changes seen in 2006 at OX3 include the thalweg moving to the right and eroding part of the mid-channel island, and the stream depositing material near the left bank. Some of this deposition might have been material from the left bank upstream of transect OX3, which eroded substantially between the 2005 and 2006 surveys (Figure 2.9). In 2007 the thalweg migrated back left about 7 feet and became shallower. There were small pockets of erosion and deposition on the right bank side of the channel. The changes at OX4 are primarily bed aggradation in the main channel resulting in a maximum increase in bed elevation of about 1 foot. In 2006 at OX4, the thalweg migrated toward the right bank and deposition converted what was previously a shallowly inundated gravel bar into a flow-splitting, mid-channel bar (Figures 2.9 and 2.13). The 2007 survey indicates that this bar was stable between 2006 and 2007. Plots of OX5 show some deposition in the backwater area to the left of the main channel in 2006. In 2007 transect OX5 seems to show some deposition in the bed. Transect OX7 shows erosion and a

2.4 DISCUSSION AND SUMMARY

The original 2005 study site cross sections showed that the study sites span a range of channel types from the relatively simple, single-threaded channel in the SXW site to highly complex cross sections that traverse side channels, backwaters, and/or islands and bars, particularly at MO. Even though the SXW site has an island, it is the least complex of the study sites; the channel is more confined and primarily single threaded in the stream reach. The MO site is the most geomorphically complex site, with a side channel that remains active at high flows and a wide floodplain. The DFC and OX study sites are between the SXW and MO study sites in channel complexity. As expected, the longitudinal profiles show SXW as a steep and fairly straight channel, while the other sites have lower slopes with more channel complexity in the lower study sites.

The 2006 and 2007 data verify these findings. Comparisons of 2005, 2006, and 2007 data indicate that the Sixth Water site is relatively static, whereas some change has occurred in most sites in the lower watershed since 2005. The lower three sites show areas of change such as bank erosion, deposition onto surfaces, or change in location or depth of the thalweg. Some channel shifting also occurred.

The 2005, 2006, and 2007 data seem to indicate that the lower three sites are actively changing and adjusting, particularly in the meandering sections of the river. However, most of this adjustment occurred from 2005 to 2006. The meandering areas showed a trend toward increasing sinuosity and evidence of aggradation in 2006. Smaller changes are noted between the 2006 and 2007 surveys, with no further evidence supporting site-wide aggradation at any study sites. The 2007 data seem to further indicate trends toward areas becoming a slightly narrower, primarily single-thread channel.

Throughout the 3-year monitoring period, straight sections of the lower three sites appear relatively stable. Unlike in 2006, none of the sites showed particularly large changes in transects in 2007. The MO site showed the most noticeable geomorphic change over the 3-year period. The DFC site and the OX site still show some change at the bends containing substantial bar formation and islands. However, these results are only indicative of a relatively short period (3 years) after pipeline completion. More importantly, the 2006 data showed dramatic changes related to very high peak flows. The 2007 peak flows were much lower and would not have had the same effect. Given more time, vegetation encroachment and continuing geomorphic processes will also affect the channel. Moreover, many changes occurred over the entire reach and may not have been indicated by the cross sections alone. In addition to the edge of water surveys (Figures 2.6–2.9), these changes are shown in the substrate maps in Chapter 3, and additional cross sections used to measure seasonal changes in sedimentation in Chapter 4.

3.0 CHANNEL SUBSTRATE

3.0 CHANNEL SUBSTRATE

3.1 INTRODUCTION

Channel substrate provides habitat for many aquatic species and constitutes spawning areas for some fish species in Diamond Fork Creek. This chapter describes the methods and results of 3 years of monitoring channel substrate in the Diamond Fork Creek study sites and its tributary, Sixth Water Creek. Monitoring substrate determines what substrate is present and what changes in substrate have occurred over time, which is important relative to habitat condition and as an indication of recent geomorphic activity. Monitoring substrate can help determine whether restoration efforts are required to maintain Diamond Fork Creek in a desired condition and the Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) is fulfilling its commitments concerning Diamond Fork Creek.

3.2 METHODS

3.2.1 Substrate Mapping

Substrate classifications throughout each monitoring site were hand delineated in the field on plots generated from the topographic surveys (see Chapter 2) completed in fall 2006 (Table 3.1). To help ensure consistency in substrate-size classification, a single individual conducted the mapping, which was done at low flow. This individual delineated substrate into visibly homogeneous substrate types based on dominant and sub-dominant particle sizes. Classification was based on a modified Wentworth scale (Table 3.2).

Table 3.1. Substrate mapping dates and flows.

SITE [a]	DATE(S) OF MAPPING	AVERAGE FLOW DURING MAPPING (cfs) [b]		
	2007	2007	2006	2005
SXW	11/9/07	28	37	48
DFC	11/18/07	67	66–67	98
MO	11/9/07 11/16/07	67 66	63–66	144
OX	11/19/07	66	63–64	95 and 144

[a] SXW = Sixth Water, DFC = Diamond Fork Campground, MO = Mother, OX = Oxbow.
[b] cubic feet per second.

In 2005 detailed classification of main channel substrate was not possible because of poor visibility caused by turbid water conditions (BIO-WEST 2006). In 2006 and 2007 mapping was completed in the fall, when conditions were less turbid, and main channel areas were classified based on specific percentages of the substrate types listed in Table 3.2. At the Diamond Fork Campground (DFC), Mother (MO), and Oxbow (OX) sites, it was not possible to map several areas because flows were too deep or fast for wading; these areas were classified as “unknown” substrate polygons.

Table 3.2. Size classes used for substrate mapping.

SIZE CLASS (millimeters)	DESCRIPTION	ABBREVIATION
<2	sand/silt	SA/SI
2–8	fine gravel	FG
8–32	medium gravel	MG
32–64	large gravel	LG
64–256	cobble	C
>256	boulder	B

Substrate maps were digitized into a geographic information system (GIS) layer using ArcMAP® software with the 2006 National Agricultural Imagery Program (NAIP) orthophotos as base images. Within ArcMAP® each substrate patch (polygon) was attributed with the percentage of the polygon in each substrate size class. These values were multiplied by the area of each polygon to determine the total area of each size class within the entire monitoring site. For mapping purposes, a simplified dominant size class was also identified for each polygon.

3.2.2 Island and Riparian Vegetation Mapping

As in 2005 and 2006, the 2007 qualitative mapping of island and streamside riparian vegetation types was completed in conjunction with substrate mapping effort at the DFC, MO, and OX sites. Riparian mapping was not completed at the Sixth Water (SXW) site in 2006 or 2007. Mid-channel deposits containing grass (*Gramineae* spp.) were mapped as islands rather than as substrate polygons, even if they had significant portions of bare cobble, gravel, sand, or silt as well as grass. Riparian vegetation was only mapped along the immediate streamside area visible from the main channel. Riparian vegetation growing in floodplain areas beyond the streamside corridor was not mapped as part of this effort. It should also be noted that this mapping effort is not intended to be a species-specific or quantitatively accurate technique; rather, it is a simple way to collect general information on dominant vegetation categories and observe general changes through time.

Areas were mapped according to the combination of vegetation (e.g., grasses, willows [*Salix* spp.], cottonwoods [*Populus* spp.]) and ground cover (e.g., sand/silt, gravel, rock [rip-rap]) present. Some island and bar areas contained cobble-sized material in addition to gravel. In order to keep categories relatively simple, no “cobble” category was specified; rather, the “gravel” category was used more broadly to include both gravel- and cobble-sized material. The “bare” category was used for streamside areas devoid of vegetation such as tall eroding terraces, rip-rap banks, or deposits of clean cobble or gravel material.

Riparian maps were digitized into a GIS layer using ArcMAP® software with the 2006 NAIP orthophotos as base images. Within ArcMAP® each riparian patch (polygon) was attributed with its vegetation category as well as any additional notes (e.g., qualitative estimate of vegetation height, maturity, density).

3.2.3 Pebble Counts

In addition to the visual substrate mapping effort, quantitative pebble counts (Wolman 1954) were completed at discreet patches and cross sections within each monitoring site. Within each site, three to four riffles or shallow runs were sampled. The results of the 2007 riffle pebble counts were compared with results of measurements made in the same locations in 2005 and 2006 to assess temporal trends in main channel substrate-size characteristics. Two to three depositional bar areas were also sampled within each site. Because annual flooding altered the locations of bars from year to year at the DFC, MO, and OX sites, the locations of these bar pebble counts shifted between 2005, 2006, and 2007. Results were integrated and compared to assess annual trends in the size of depositional features at the sites.

Six total pebble counts were completed at each of the four monitoring sites. Each pebble count consisted of 100 pebbles. Particles were grouped into 10 size classifications (upper limits of 2 millimeter [mm], 4 mm, 8 mm, 16 mm, 32 mm, 64 mm, 128 mm, 256 mm, 512 mm, and 1,024 mm) and plotted to determine grain sizes of the D16, D25, D50, D75, and D84 particles.

3.3 RESULTS

3.3.1 Substrate Maps

Maps of individual substrate polygons for each monitoring site are included in Appendix 3.1A. Accompanying attribute tables are provided Appendix 3.1B.

The maps of major/dominant substrate types illustrate some differences in streambed particle-size distributions among the different monitoring sites (Figures 3.1a–d). The differences observed among sites in 2007 (Figure 3.2) are similar to those observed in 2005 and 2006 (BIO-WEST 2006, BIO-WEST 2007). The SXW site generally contains coarser bed material than the downstream monitoring sites and has the smallest percentage of area in the sand/silt category. The coarseness of the site is a function of the site's high position within the watershed, steep slope, and confined channel condition. As in previous years, MO has a slightly finer-grained overall substrate distribution (more than 50 percent of the site is medium gravel-sized or finer) relative to OX and DFC. Changes in substrate composition of the SXW site between 2006 and 2007 were minimal (Figure 3.3, Figure 3.4); therefore, the 2007 field map for SXW was not digitized or re-analyzed, and the 2006 results are used for comparison to the downstream sites. There were no measurable changes in substrate particle sizes at SXW over the 2005–2007 monitoring period.

As is 2006, the DFC, MO, and OX sites are all dominated by gravel-sized material (Figures 3.1b–d, Figure 3.2). The amount of area in the sand and silt substrate category generally shows an increasing trend at the DFC, MO, and OX sites from 2005–2007 (Figures 3.3 and 3.4). Percent of the mapped area covered in sand and silt increased by approximately 10 percent at all lower Diamond Fork monitoring sites. The proportion of the site area in the gravel size class also generally increased by 3–11 percent over the 3-year monitoring period, whereas the proportion of cobble generally decreased by 14–20 percent. Therefore, there has been a general fining trend over the past 3 years in the lower Diamond Fork monitoring sites as determined by the substrate mapping efforts.

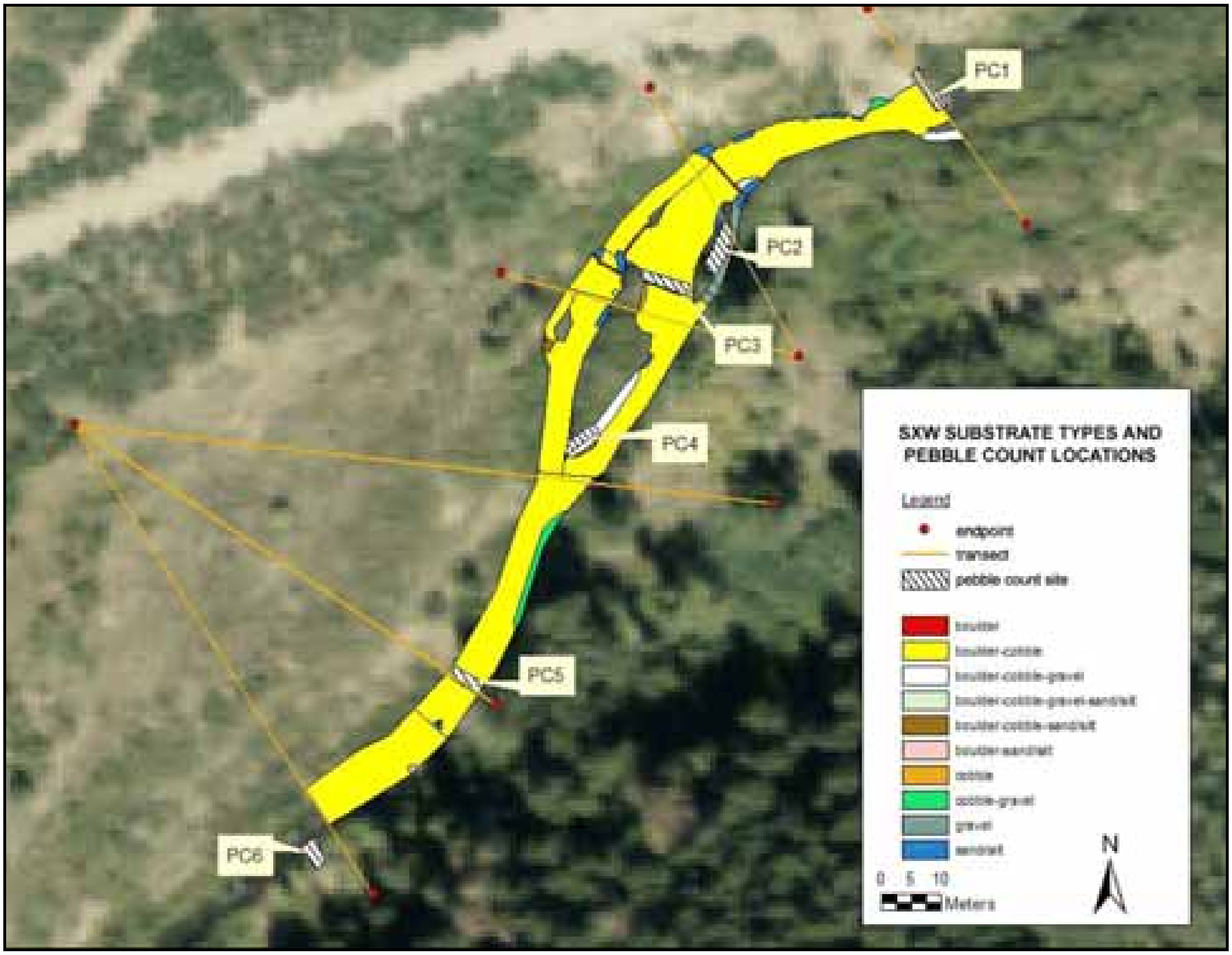


Figure 3.1a. Major substrate types (2006 data) and pebble count patch locations at the Sixth Water (SXW) monitoring site. Aerial photo from 2006.

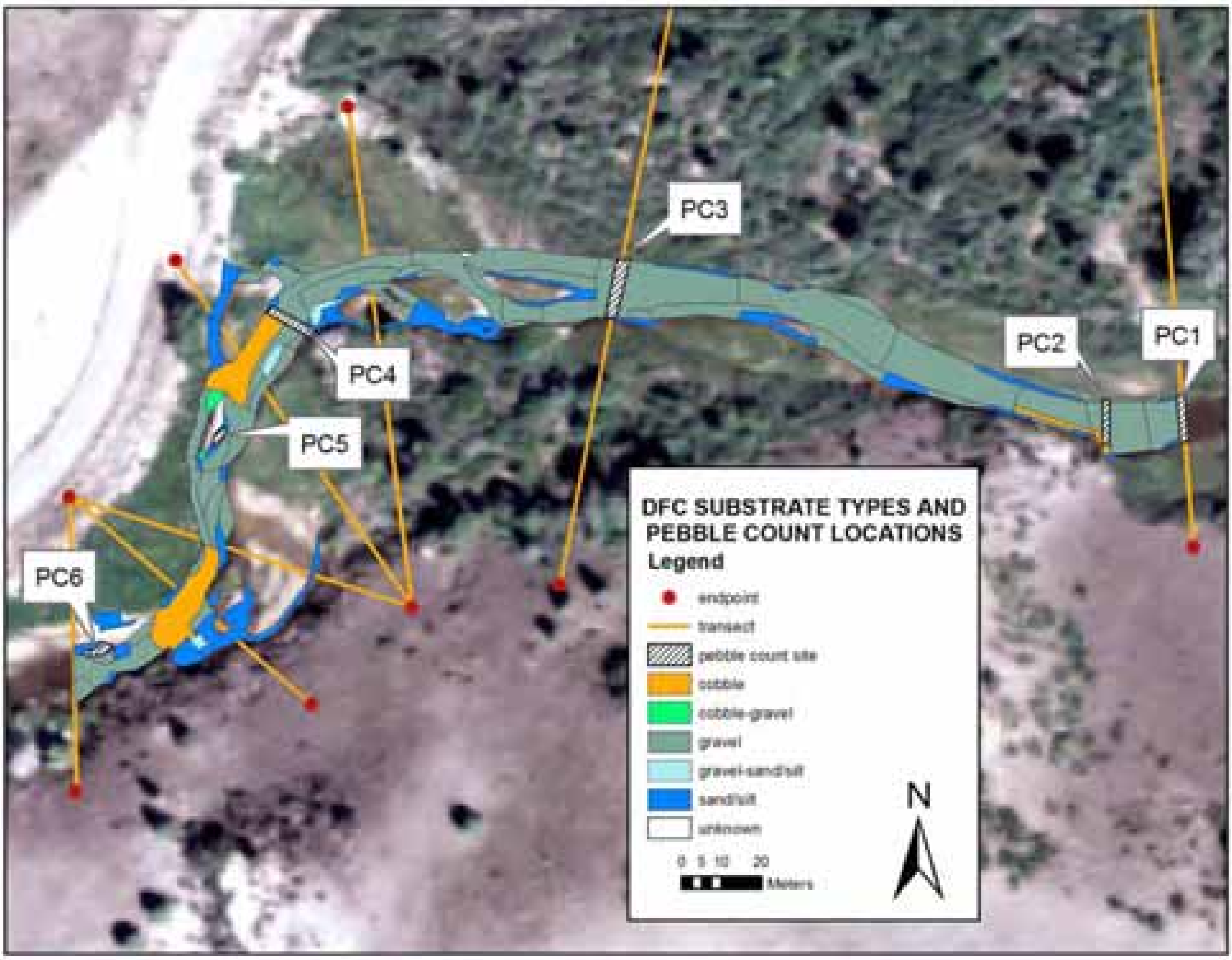


Figure 3.1b. Major substrate types and pebble count patch locations at the Diamond Fork Campground (DFC) monitoring site. Aerial photo from 2006.

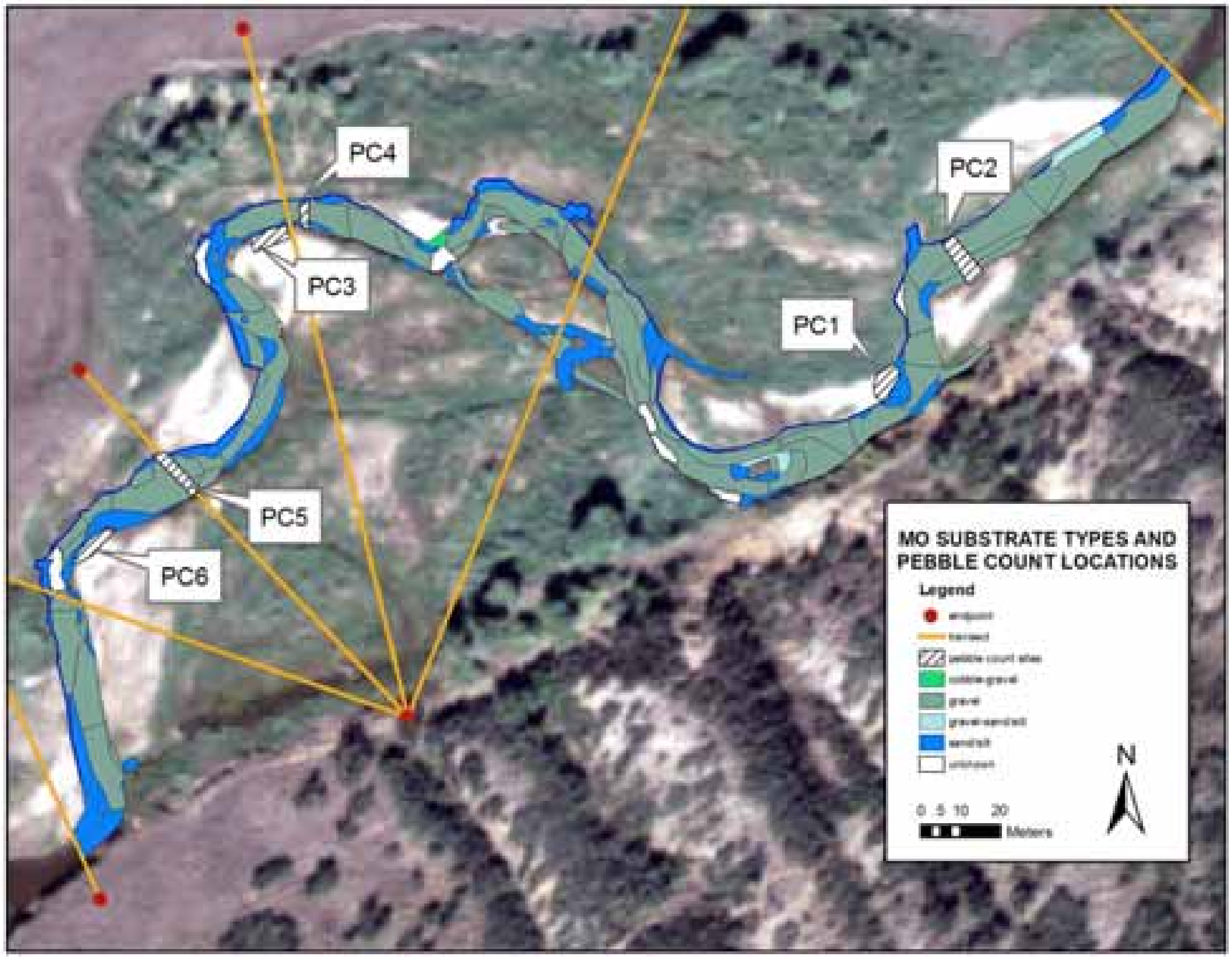


Figure 3.1c. Major substrate types and pebble count patch locations at the Mother (MO) monitoring site. Aerial photo from 2006.

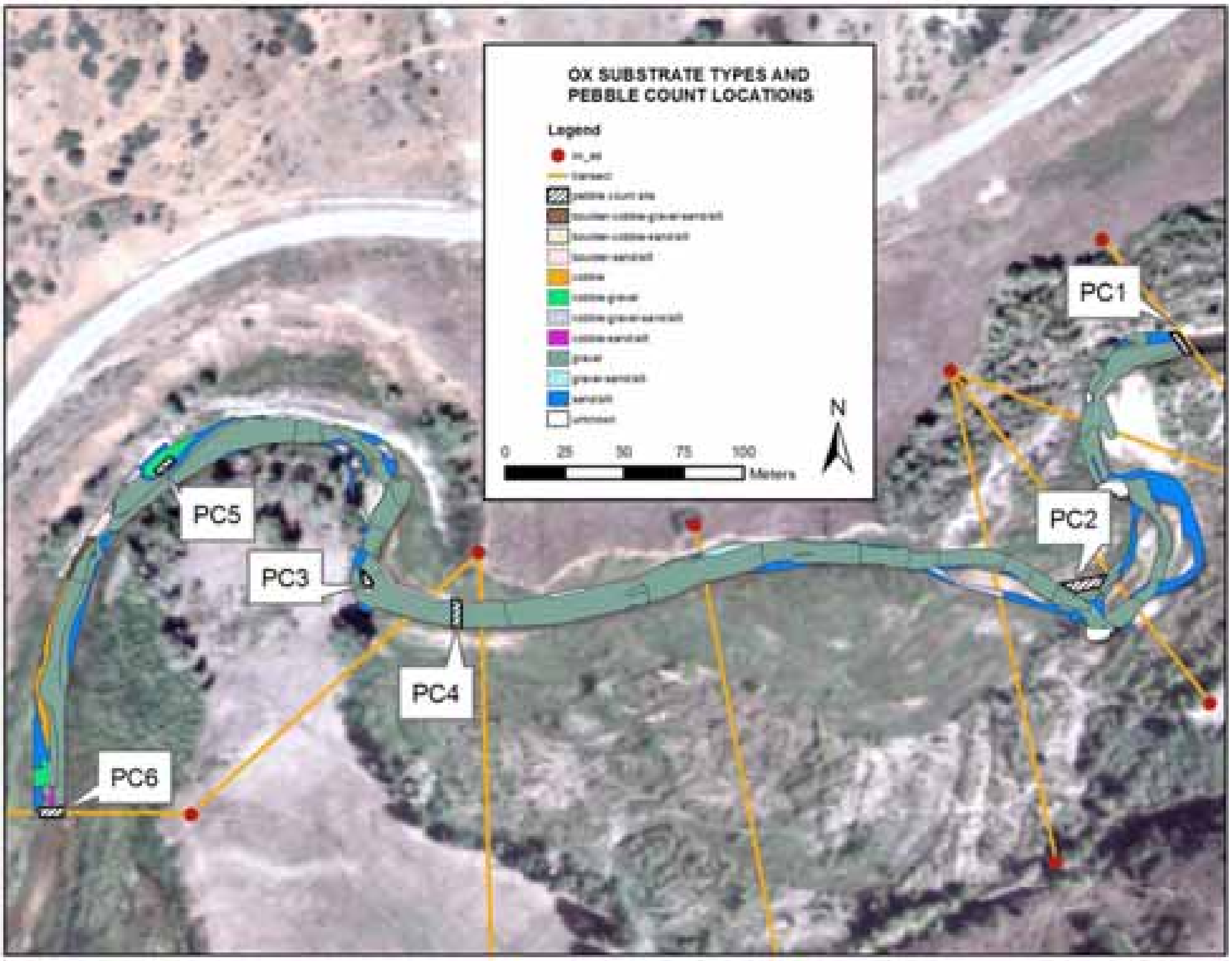


Figure 3.1d. Major substrate types and pebble count patch locations at the Oxbow (OX) monitoring site. Aerial photo from 2006.

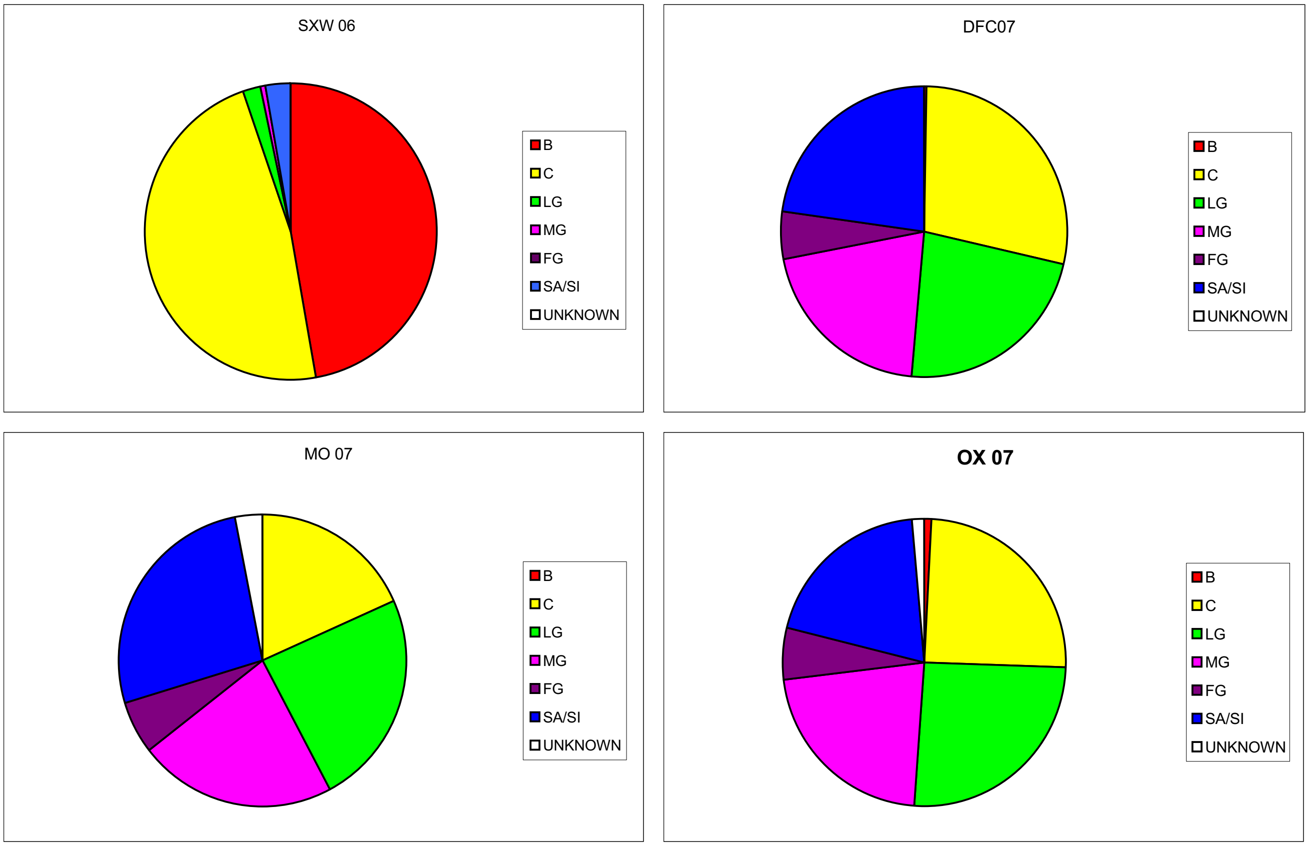


Figure 3.2. Individual plots of proportion of monitoring sites occupied by different substrate sizes, including detailed gravel sizes.

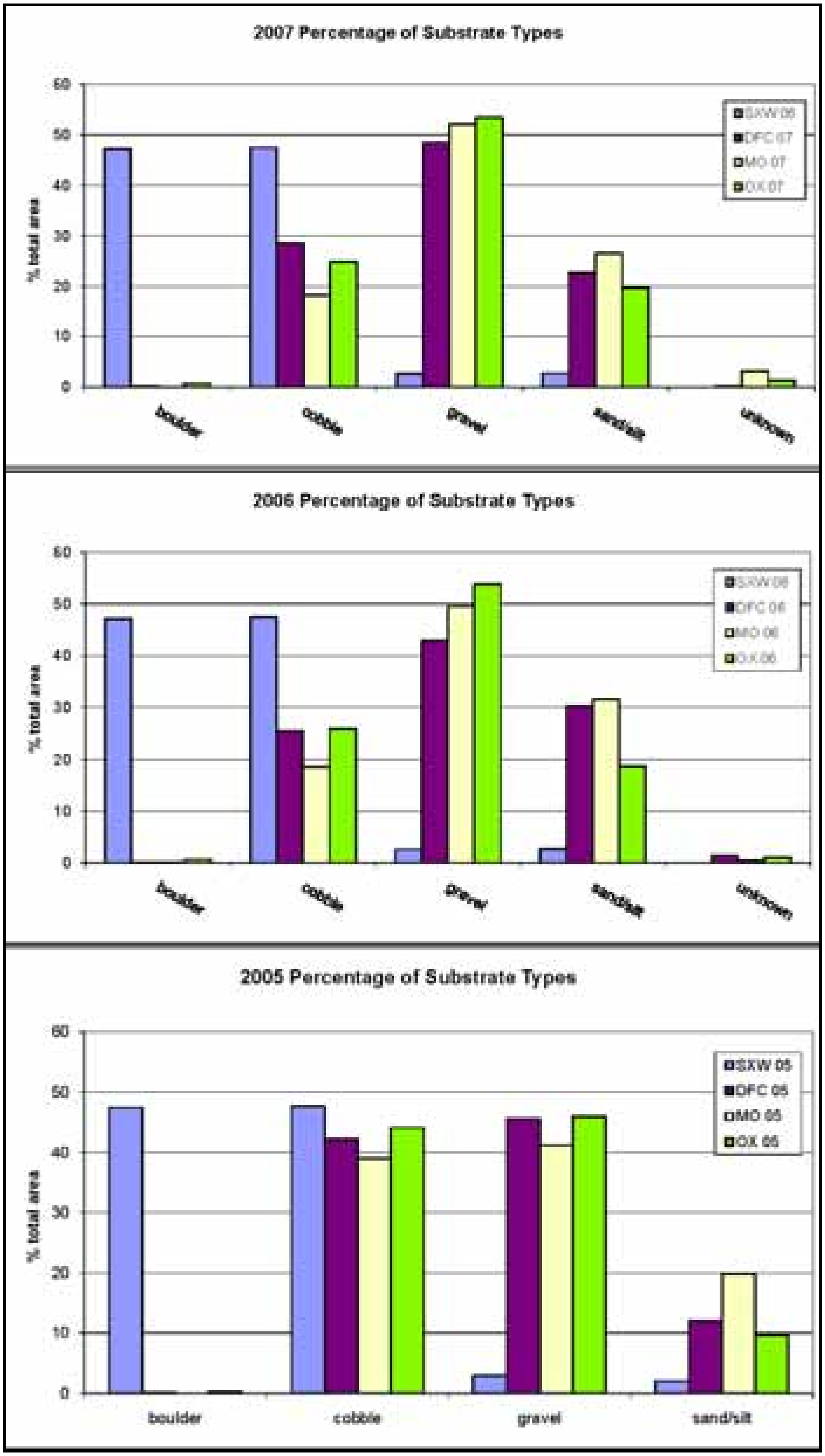


Figure 3.3. Proportion of monitoring site area occupied by various substrate size classes in 2005, 2006, and 2007.

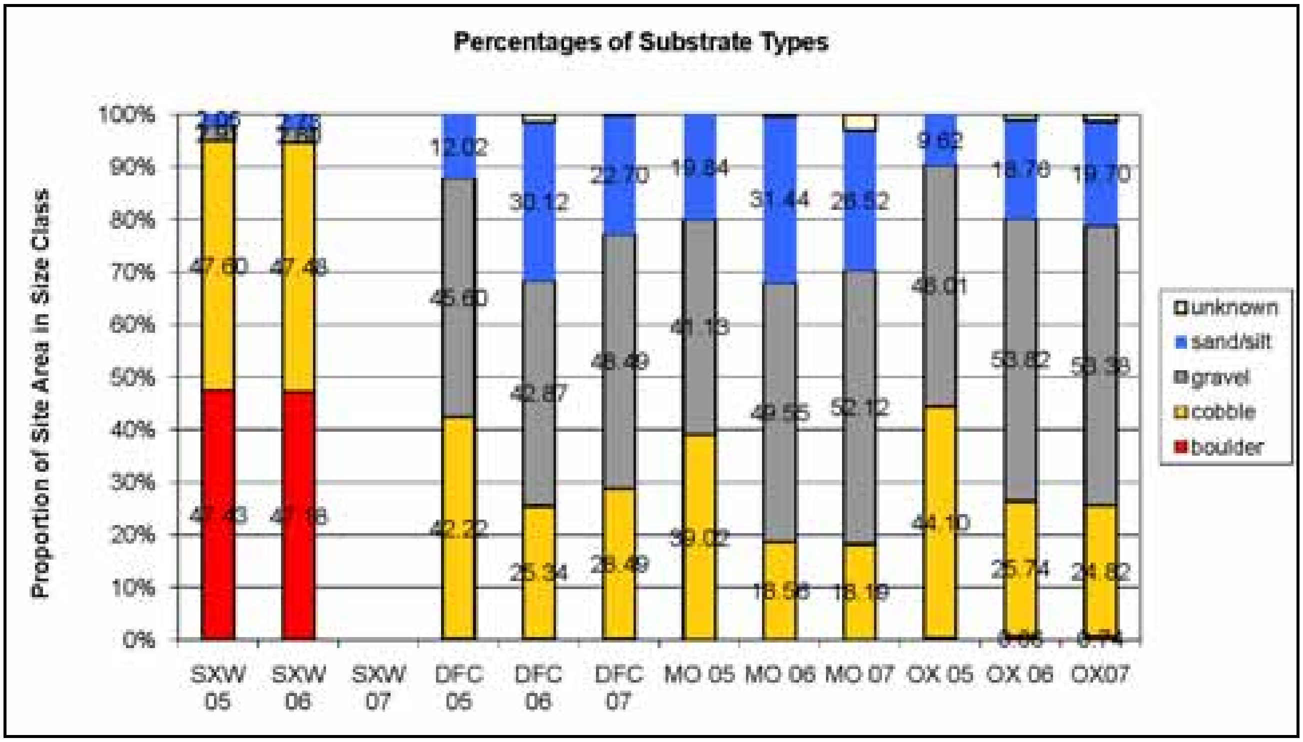


Figure 3.4. Summary plot of 2005–2007 substrate type percentages for all four monitoring sites.

The substrate maps at DFC, MO, and OX were also evaluated to determine where change in substrate size class has occurred (Figure 3.5a–c), specifically focusing on areas with increasing or decreasing percentages of sand/silt in the substrate. There were few discernable spatial trends observed with this analysis. More change seems to be occurring in the meanders than the straight sections with the most change at any one site occurring at MO, probably because MO has the greatest sinuosity. Some areas (shown in white), were mapped as vegetated in 2007, whereas the same areas were mapped in a "bare" substrate category during previous years. This conversion is further discussed in the following section (3.3.2). There were very few areas that converted from the riparian to bare substrate category.

In 2006 two main channel substrate polygons within the MO site and two polygons within the OX site were observed to have "cemented" characteristics during the substrate mapping effort. In these areas, gravel and cobble-sized particles are embedded in a matrix of fine-grained sand and silt that forms a semi-cohesive "brick." Photographs of this phenomenon are included in Chapter 4 of this report. In 2007 nine polygons at the MO site, seven polygons at the OX site, and one polygon at the DFC site have a similar cement feeling.

3.3.2 Island and Riparian Vegetation Mapping

Maps of riparian and island vegetation polygons for the DFC, MO, and OX monitoring sites are shown in Figure 3.6a–c. Maps of changes in the riparian and island vegetation polygons are shown in Figure 3.7a–c. In 2006 a trend toward increased area of streamside willows and reduced grass dominance was observed at these sites relative to 2005. In 2007 this trend continued. Many polygons that began in 2005 as bare bars have now become vegetated. There have been very few areas where a vegetated polygon in 2005 or 2006 changed to a substrate polygon, except for one meander bend on the easternmost side of DFC, where one particular polygon converted from vegetation to substrate and a relatively large area shows more gravel and cobble. In general, areas with more grass seem to be on low-elevation surfaces on the inside of bends or on islands, whereas the areas with more willow tend to be on higher surfaces and occur more often away from the banks and on the outside of bends.

At the DFC site, willows continued to encroach and increase in density along low-lying channel margin areas that were originally mapped as grass (Figure 3.8). In addition, many of the areas where silt deposited during the 2006 spring floods have now become dominated by grass. In the vicinity of DFC5, some individual bar and island deposits have started to merge together and become attached to the bank.

Similar trends are evident at the MO site (Figure 3.9, Figure 3.10), as well as at the OX site. This trend toward increased area of streamside willows with reduced grass dominance was expected, given the change in hydrology associated with pipeline completion. Now that floodplain-inundating flows are less frequent, willows are able to colonize areas that were only suitable for herbaceous vegetation. The trend of bar areas becoming silted in, vegetated with grass, and merging into floodplain areas is also expected now that flood magnitudes and durations have been reduced. Essentially, the active portion of the channel appears to be becoming smaller with time. However, additional years of monitoring will be needed to determine whether this is a long-term trend or a shorter-term response to the sequence of flood events observed during the 2005–2007 monitoring period.

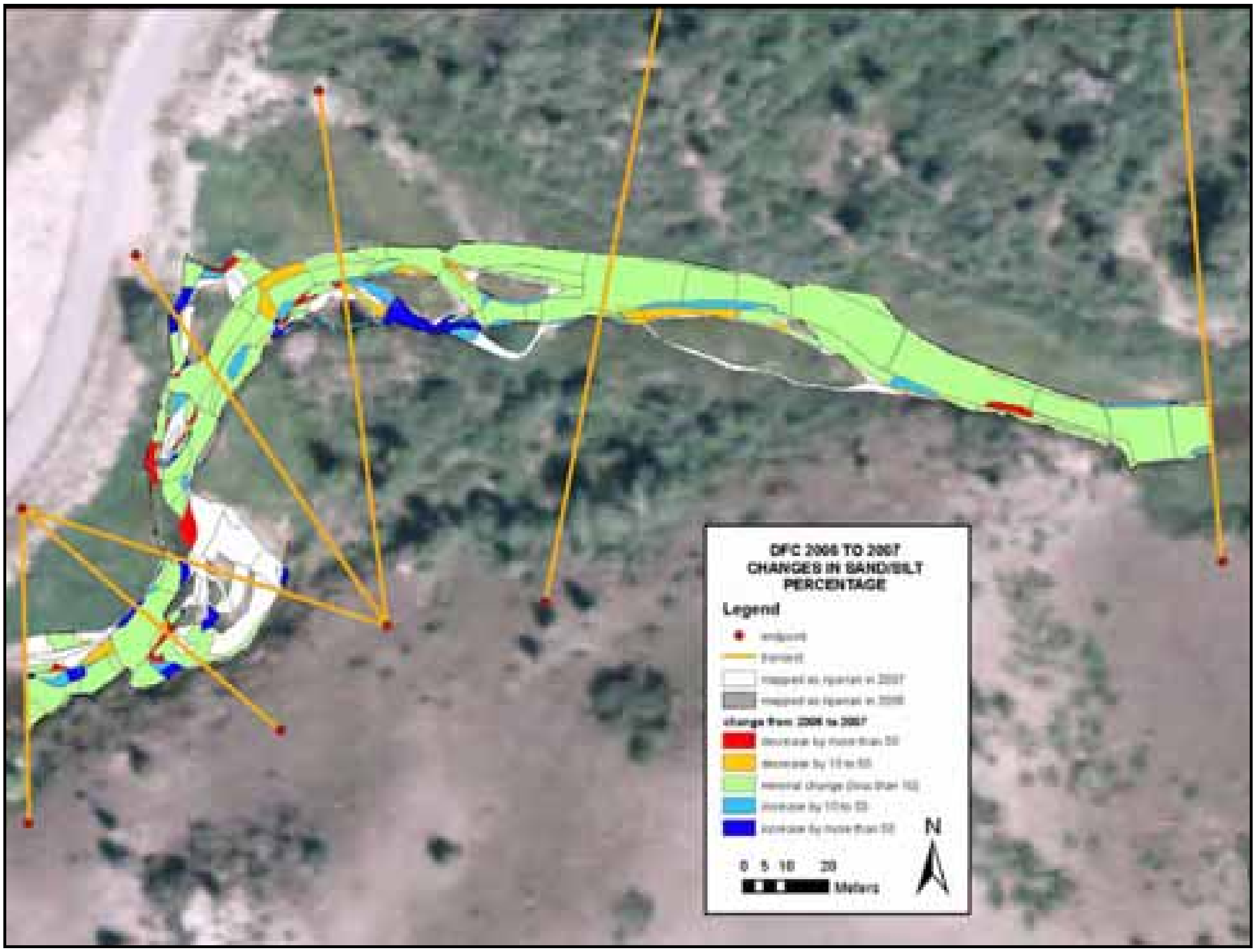


Figure 3.5a. Changes in sand/silt percentage from 2006 to 2007 at the DFC monitoring site.

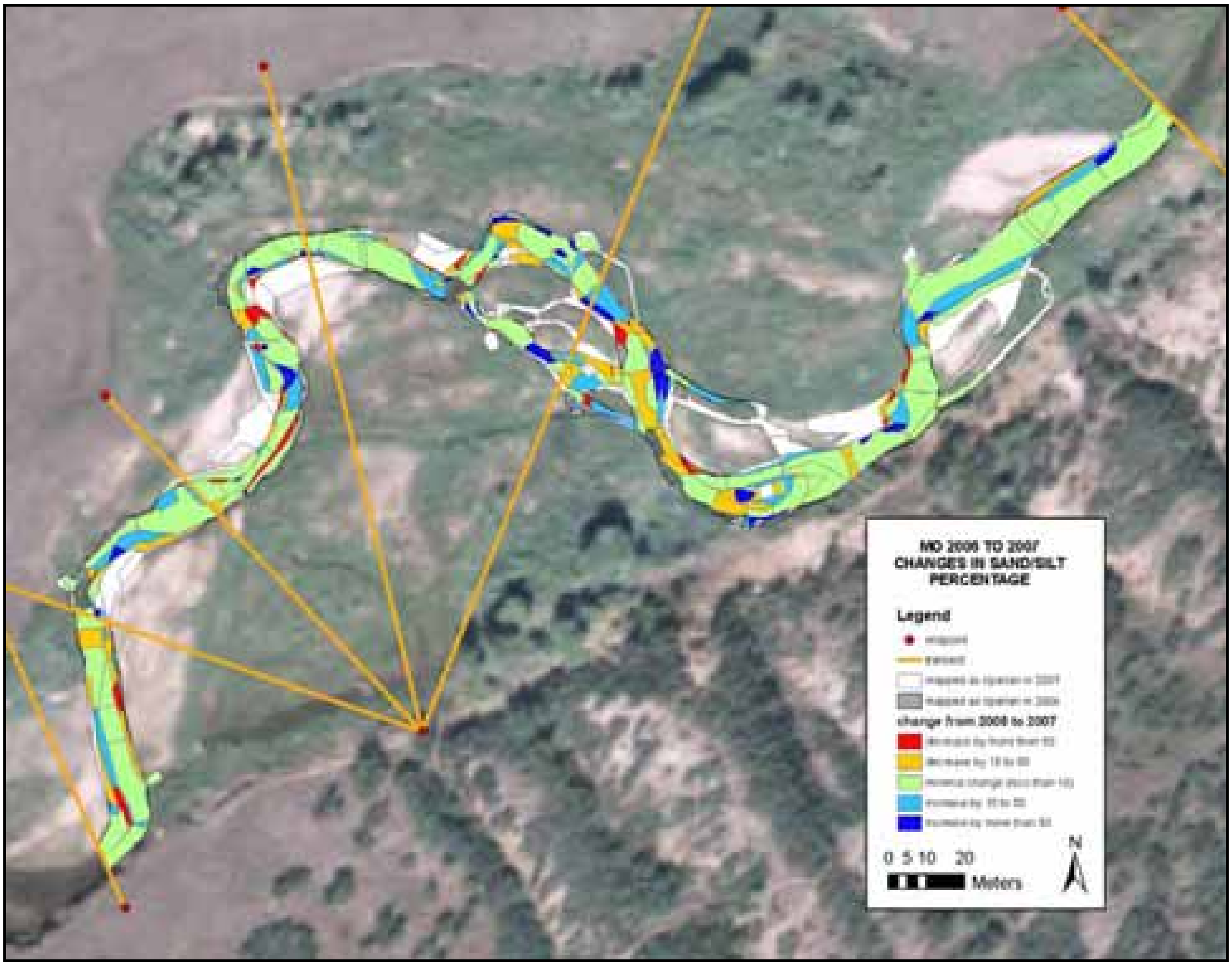


Figure 3.5b. Changes in sand/silt percentage from 2006 to 2007 at the MO monitoring site.

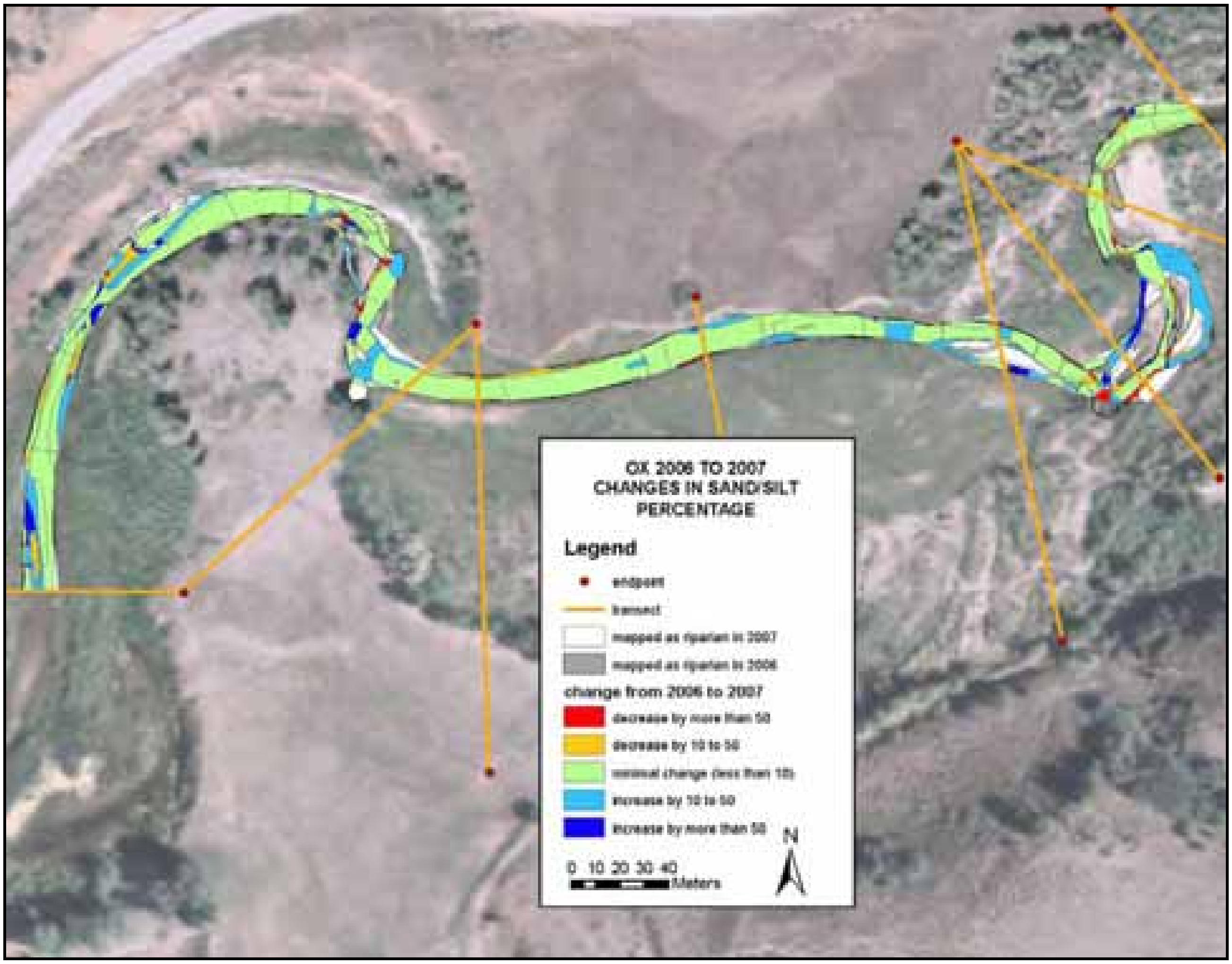


Figure 3.5c. Changes in sand/silt percentage from 2006 to 2007 at the OX monitoring site.

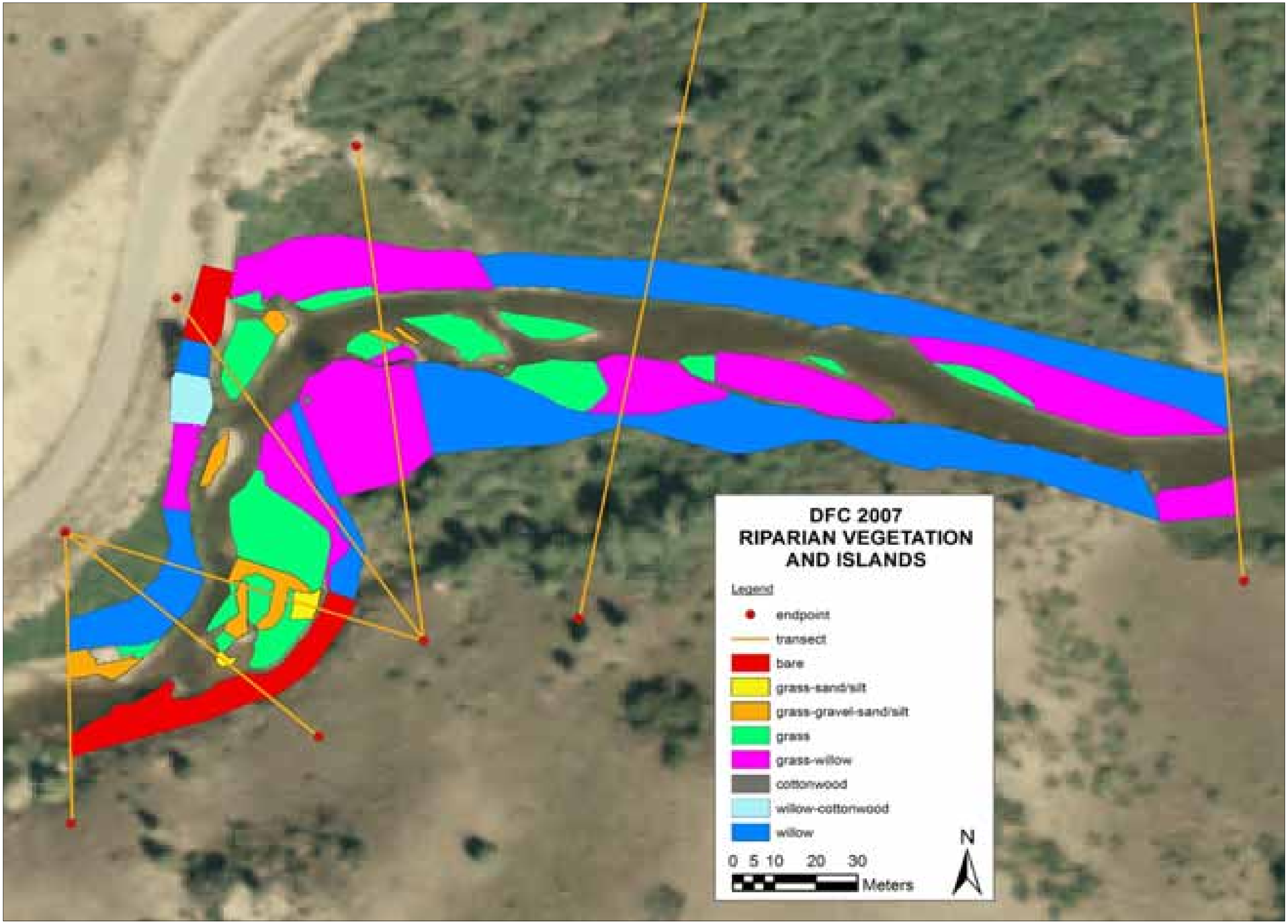


Figure 3.6a. Riparian and island vegetation polygons for the Diamond Fork Campground (DFC) monitoring site.

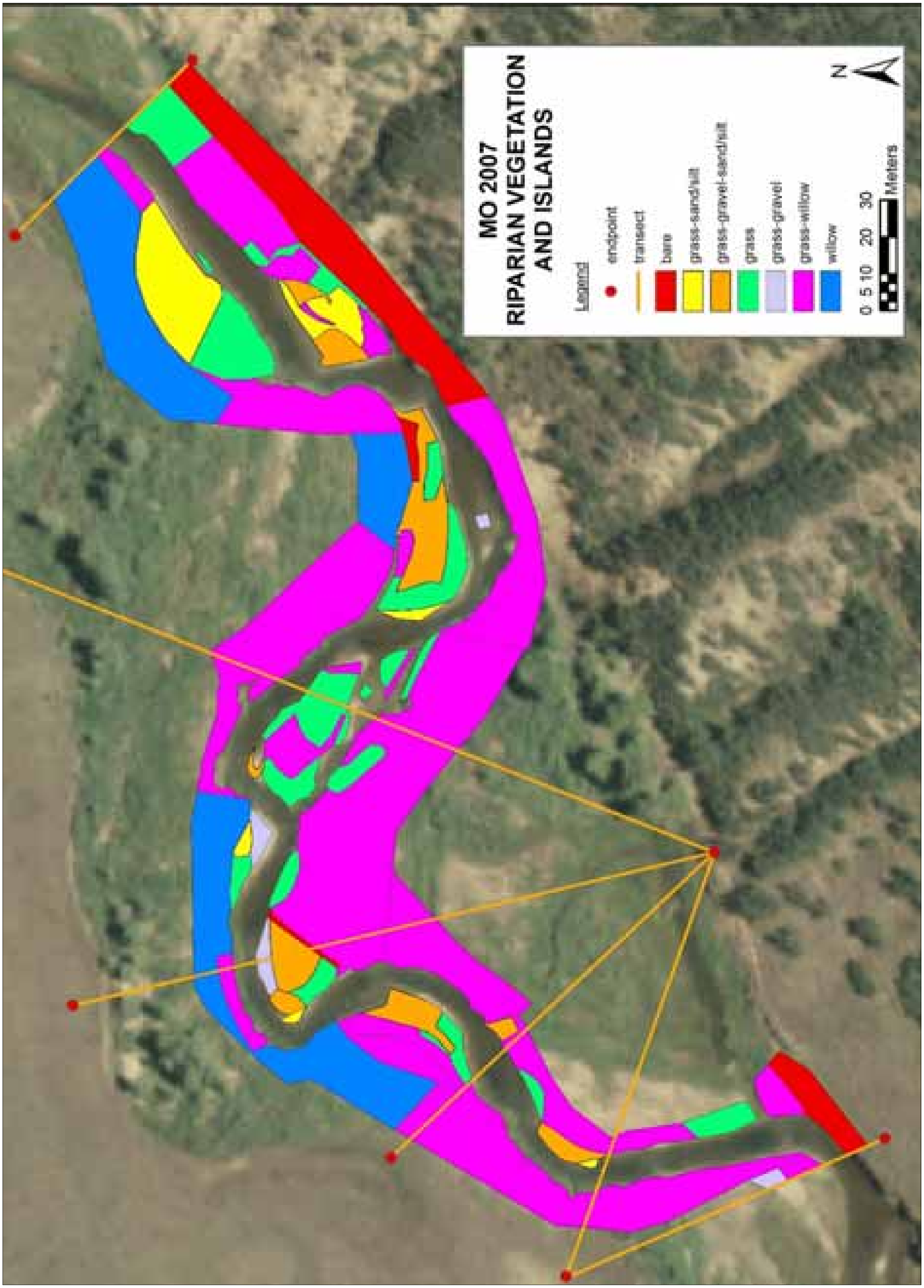


Figure 3.6b. Riparian and island vegetation polygons for the Mother (MO) monitoring site.

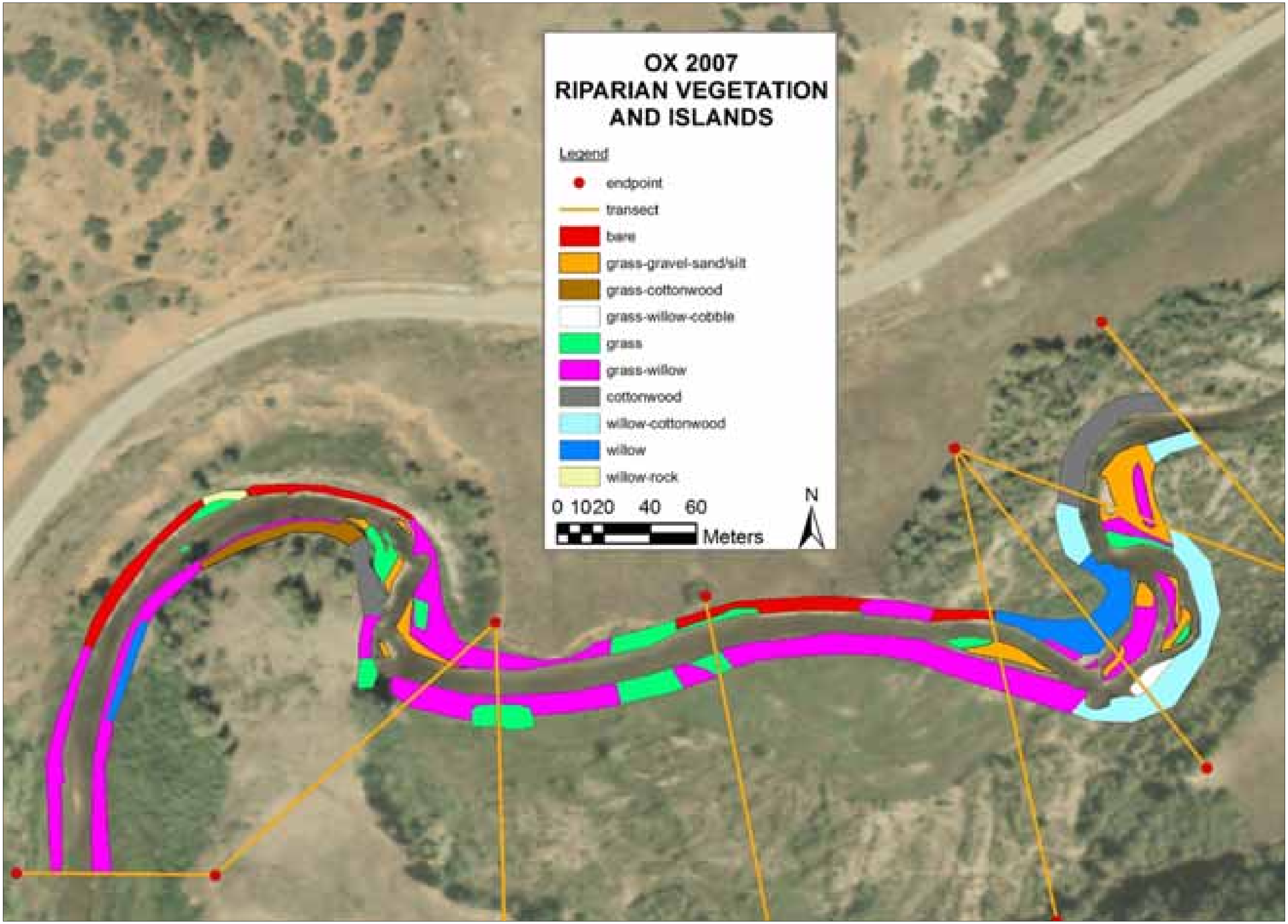


Figure 3.6c. Riparian and island vegetation polygons for the Oxbow (OX) monitoring site.

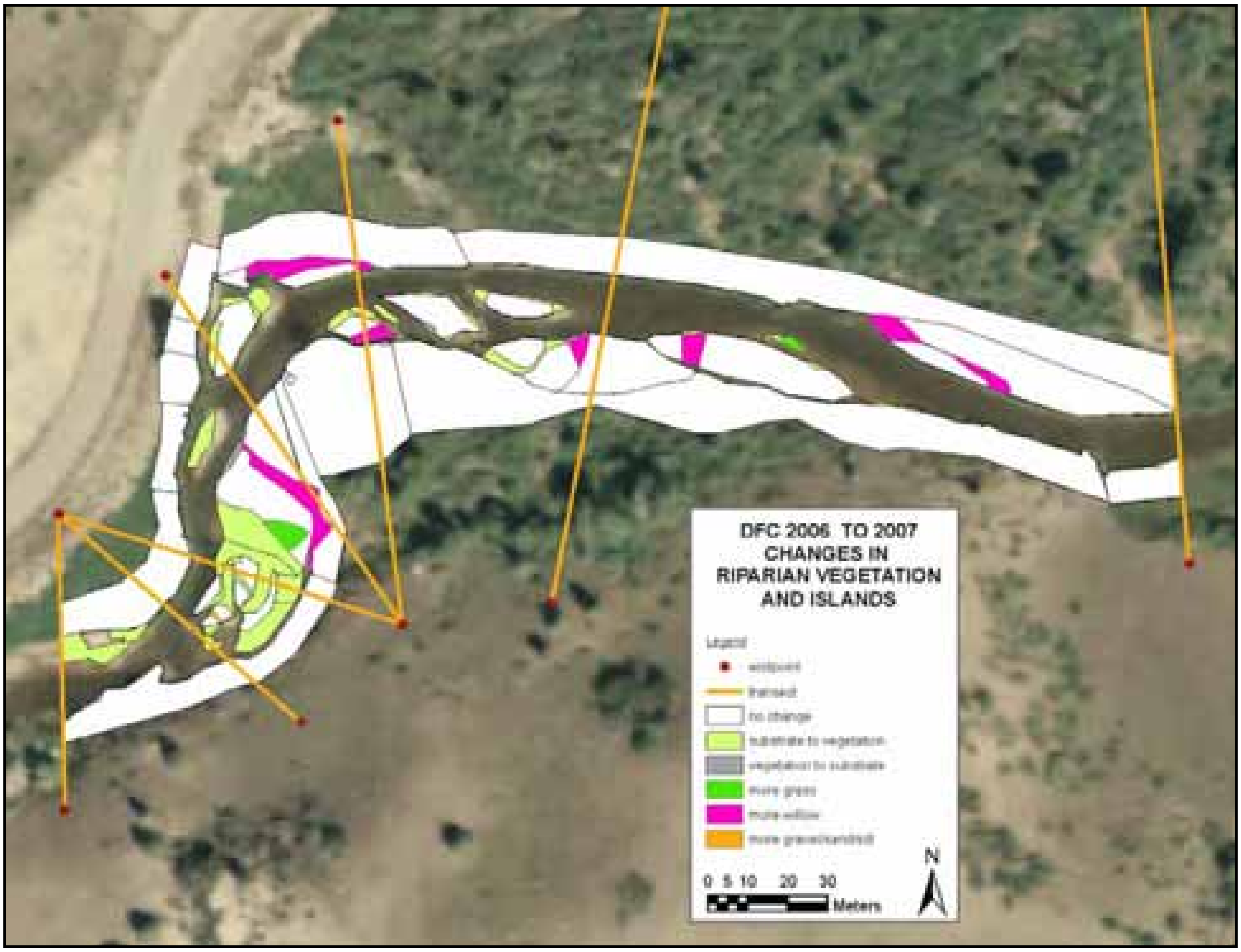


Figure 3.7a. Changes in vegetation type from 2006 to 2007 at the DFC monitoring site.

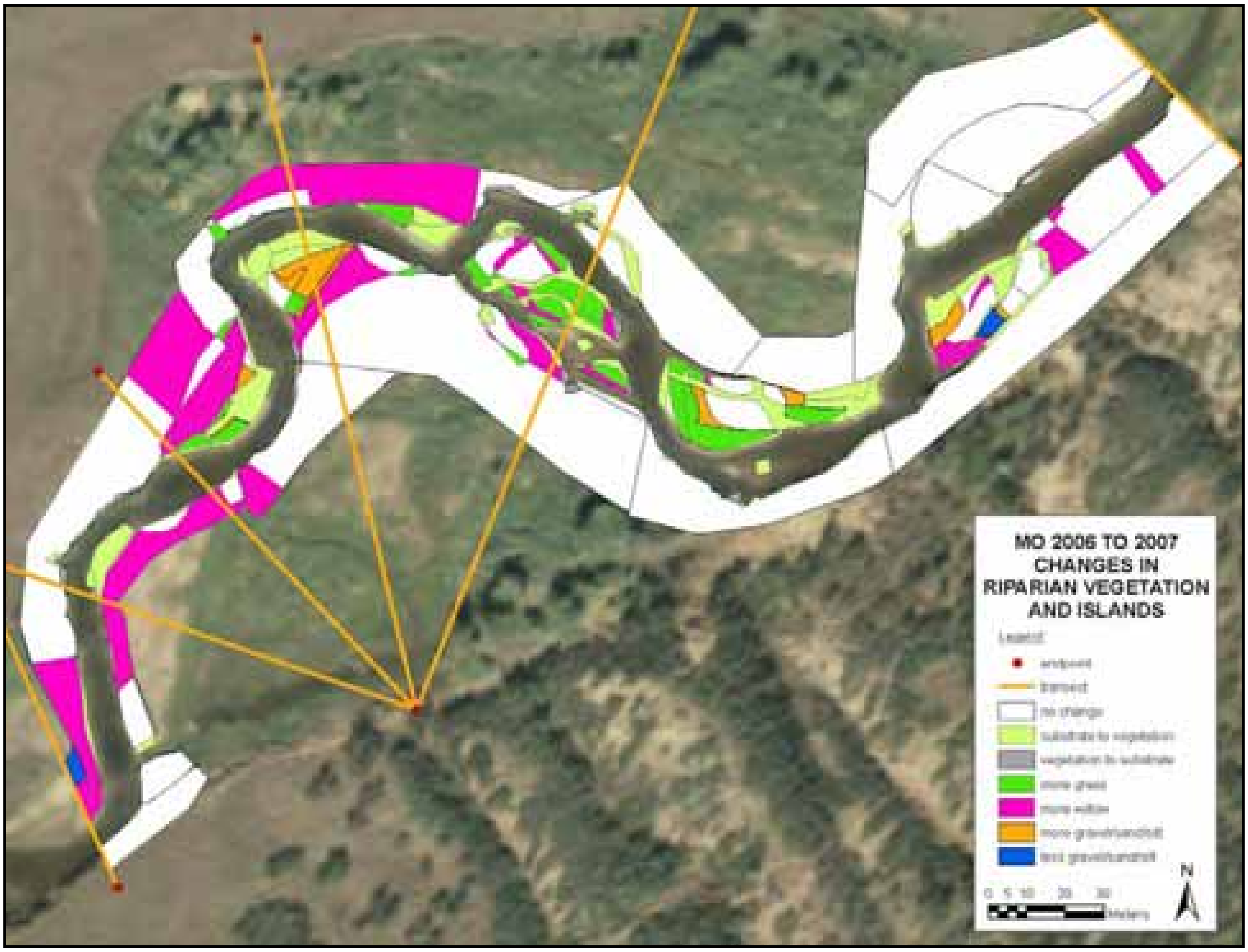


Figure 3.7b. Changes in vegetation type from 2006 to 2007 at the MO monitoring site.

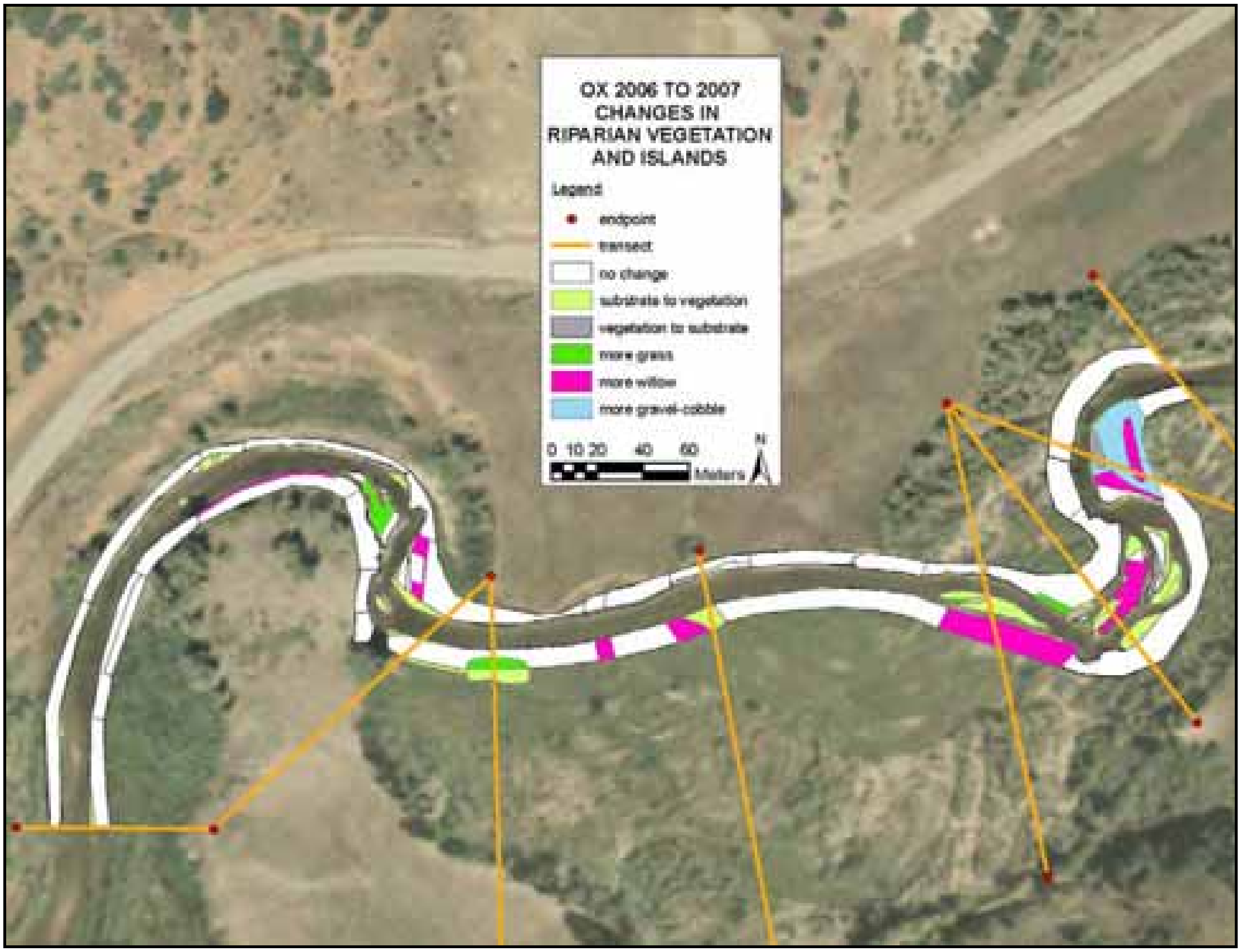


Figure 3.7c. Changes in vegetation type from 2006 to 2007 at the OX monitoring site.

Figure 3.8. Diamond Fork Campground (DFC) riparian vegetation in 2005 and 2007. View is looking east from endpoint DFC-REP-4 (Figure 2.7).

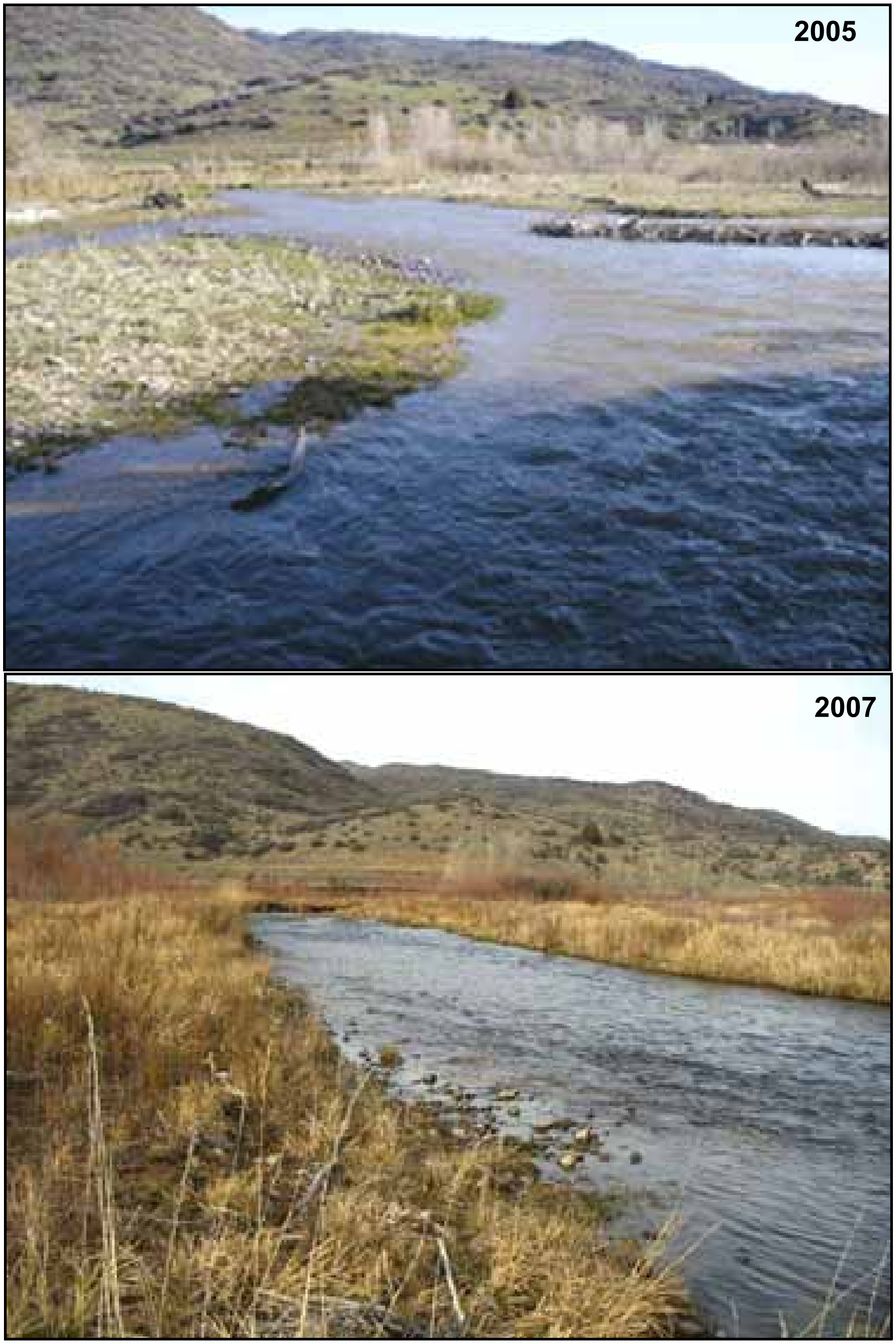


Figure 3.9. Photos illustrating vegetation encroachment at the MO site between 2005 and 2007. Areas that were gravel bars in 2005 have become grass-willow floodplain features. View is to the north from transect MO6.

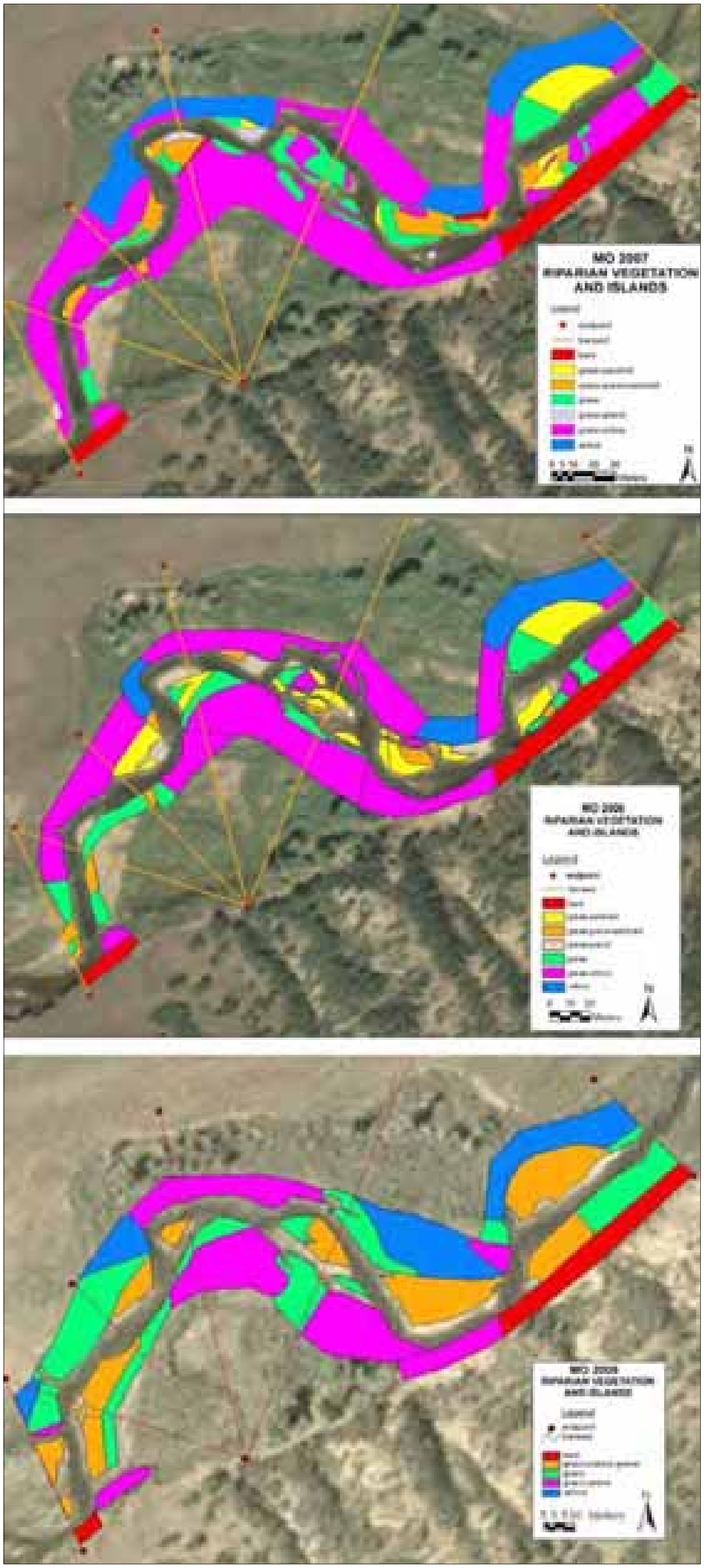


Figure 3.10. Vegetation trend comparison at the Mother (MO) site from 2005–2007.

3.3.3 Pebble Counts

The D16, D25, D50, D75, and D84 values for 2005, 2006, and 2007 are listed for each pebble count at the study sites in Table 3.3. Annual pebble count plots and plot data are shown in Appendix 3.2. Table 3.4 summarizes all of the annual pebble counts conducted at each site during 2007.

The average D16, D25, D50, D75, and D84, as well as the maximum D84 and minimum D16, for the riffle pebble counts and bar/patch pebble counts are shown in Tables 3.5 and 3.6, respectively.

Table 3.3. Pebble count results for channel monitoring sites.

SIXTH WATER (SXW)	SXW1			SXW2			SXW3			SXW4			SXW5			SXW6		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
D_{16}	21	17	10	23	6	2	26	10	<2	13	<2	<2	11	64	<2	60	41	16
D_{25}	47	27	26	32	12	8	40	18	<2	32	13	7	64	110	32	71	61	50
D_{50}	101	73	76	70	42	43	81	79	30	93	88	66	145	188	130	97	97	85
D_{75}	173	136	131	123	99	116	126	154	97	149	164	128	223	283	201	133	147	128
D_{84}	256	180	166	159	134	143	158	180	152	180	204	155	268	341	256	158	169	165
Class of D_{50} [a]	C	C	C	C	LG	LG	C	C	MG	C	C	C	C	C	C	C	C	C
DIAMOND FORK CAMPGROUND (DFC)	DFC1			DFC2			DFC3			DFC4			DFC5			DFC6		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
D_{16}	27	15	<2	32	22	15	36	14	6	19	17	18	37	<2	28	14	<2	11
D_{25}	35	27	10	42	28	28	40	22	17	32	26	30	43	15	38	19	6	16
D_{50}	65	62	45	70	53	50	60	49	45	78	56	48	61	51	59	33	23	30
D_{75}	96	116	76	106	82	78	97	82	73	121	89	77	82	78	83	52	42	50
D_{84}	110	139	90	122	98	95	116	101	85	142	112	90	92	87	97	62	54	59
Class of D_{50} [a]	C	LG	LG	C	LG	LG	LG	LG	LG	C	LG	LG	LG	LG	LG	LG	MG	MG
MOTHER (MO)	MO1			MO2			MO3			MO4			MO5			MO6		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
D_{16}	10	<2	17	25	18	<2	13	<2	<2	23	14	4	20	22	7	<2	6	<2
D_{25}	13	13	22	29	24	14	17	<2	4	31	19	16	28	26	14	<2	11	<2
D_{50}	22	35	38	47	40	38	28	23	20	41	31	34	47	39	37	30	32	16
D_{75}	30	52	55	72	66	64	39	35	38	56	53	58	72	55	59	48	58	48
D_{84}	35	60	62	86	75	78	43	41	51	63	64	72	81	62	70	58	72	66
Class of D_{50} [a]	MG	LG	LG	LG	LG	LG	MG	MG	MG	LG	MG	LG	LG	LG	LG	MG	LG	MG
OXBOW (OX)	OX1			OX2			OX3			OX4			OX5			OX6		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
D_{16}	25	17	<2	11	9	12	<2	13	<2	15	8	10	49	48	32	20	15	3
D_{25}	30	23	7	13	12	13	14	23	<2	23	11	18	56	56	47	26	19	11
D_{50}	45	43	25	21	19	21	27	36	21	35	23	32	72	75	61	44	34	24
D_{75}	65	74	52	29	28	29	42	52	48	69	44	59	87	95	77	66	51	46
D_{84}	78	90	63	33	33	32	51	60	60	81	64	76	100	108	84	77	60	55
Class of D_{50} [a]	LG	LG	MG	MG	MG	MG	MG	LG	MG	LG	MG	LG	C	C	LG	LG	LG	MG

[a] C = cobble, MG = medium gravel, LG = large gravel.

Table 3.4. Descriptive summary of changes in pebble count locations and results.

PEBBLE COUNT SITE	TYPE	LOCATION	D50			SUMMARY
			2005	2006	2007	
SIXTH WATER						
SXW PC1	wet riffle	Riffle near cross section 1.	101	73	76	Increase in sand/silt and medium gravel 2005–2006; in 2007 increase in sand/silt and large gravel with decrease in medium gravel.
SXW PC2	wet side channel	Side channel on the left side of the island near cross section 2.	70	42	43	Increase in sand/silt and medium gravel with decrease in cobble from 2005–2006; little change in 2007.
SXW PC3	wet riffle	Macroinvertebrate sampling site located upstream of cross section 3 and just above the mid-channel island.	81	79	30	Increase in sand/silt, fine and medium gravel, and cobble with decrease in large gravel from 2005–2006; in 2007 increase in sand/silt and fine gravel with decrease in cobble.
SXW PC4	wet bar	Inundated area at the downstream tip of the mid-channel island near cross section 4.	93	88	66	Increase in sand/silt 2005 to 2006; in 2007 continued increase in sand silt with decrease in large cobble.
SXW PC5	wet riffle	Main channel riffle at cross section 5.	145	188	130	Increase in boulders with decrease in medium gravel 2005–2006; in 2007 increase in sand/silt with decrease in boulder and large cobble
SXW PC6	dry bar	Dry bar near cross section 6 near the left edge of water.	97	97	85	Little change 2005–2006; in 2007 increase in sand/silt.
DIAMOND FORK CAMPGROUND						
DFC PC1	wet riffle	Riffle near transect 1.	65	62	45	Little change 2005 to 2006; in 2007 increase in sand/silt.
DFC PC2	wet riffle	20 meters (m) downstream from pebble count DFC1.	70	53	50	Small increase in medium gravel between 2005–2006; in 2007 little change.
DFC PC3	wet riffle	Crosses the main channel at transect DFC3.	60	49	45	Increase in medium gravel/decrease in large gravel from 2005–2006; in 2007 increase in sand/silt.
DFC PC4	wet riffle	Macroinvertebrate sampling site located between river left and the upper tip of the island downstream from transect DFC3.	78	56	48	Increase in gravel/decrease in cobble from 2005–2006; in 2007 little change from 2006.
DFC PC5	dry bar	Bar sampled in 2006 is turning into an island; in 2007 sampled new mid-channel bar just east of previous PC5.	61	51	59	Large increase in sand/silt from 2005–2006; in 2007 decrease in sand/silt back to conditions similar to 2005.
DFC PC6	dry bar	Bar sampled in 2006 became vegetated; in 2007 sampled new gravel deposits downstream just upstream of transect DFC7.	33	23	30	Large increase in sand/silt from 2005–2006; in 2007 decrease in sand/silt back to conditions similar to 2005.
MOTHER						
MO PC1	dry bar	Area sampled in 2007 is in same location as 2006, but the patch is smaller.	22	35	38	Increase in sand/silt and large gravel with decrease in medium gravel from 2005–2006; in 2007 decrease in sand/silt, overall size distribution remains coarser than 2005.
MO PC2	wet riffle	Macroinvertebrate sampling site located between transects 1 and 2.	47	40	38	Little change 2005 to 2006; in 2007 increase in sand/silt and decrease in medium gravel.
MO PC3	dry bar	Bar/island just downstream of transect 3.	28	23	20	Increase in sand/silt and decrease in medium gravel from 2005–2006; in 2007 little change.
MO PC4	wet riffle	Main channel at transect 3.	41	31	34	Increase in medium and fine gravel from 2005–2006; in 2007 increase in sand/silt and decrease in medium gravel.
MO PC5	wet riffle	Riffle at cross section 4.	47	39	37	Little change 2005 to 2006; in 2007 increase in sand/silt and decrease in medium gravel.
MO PC6	dry bar	Area sampled in 2007 is in same location as 2006, but the patch is smaller.	30	32	16	Increase in large gravel and cobble from 2005–2006; in 2007 increase in sand/silt and slight decrease in medium gravel.

PEBBLE COUNT SITE	TYPE	LOCATION	D50			SUMMARY
			2005	2006	2007	
OXBOW						
OX PC1	wet riffle	Macroinvertebrate sampling site located near a riffle near transect 1.	45	43	25	Little change from 2005–2006; in 2007 increase in sand/silt.
OX PC2	dry bar	High bar deposit between transects 2 and 3; slightly smaller in 2007.	21	19	21	Little change.
OX PC3	dry bar	Mid-channel bar downstream of transect 7.	27	36	21	Increase in large gravel and cobble from 2005–2006; in 2007 increase in sand/silt and decrease in medium gravel.
OX PC4	wet riffle	Riffle between transects 6 and 7.	35	23	32	Increase in fine/medium gravel and decrease in cobble 2005 to 2006; in 2007 slight increase in sand/silt and decrease in fine gravel.
OX PC5	wet bar	Shallow mid channel bar between cross sections 7 and 8.	72	75	61	Little change from 2005 to 2006; in 2007 increase in sand/silt and large gravel with decrease in cobble.
OX PC6	wet riffle	Riffle at transect 8.	44	34	24	Increase in sand/silt and decrease in cobble 2005 to 2006; in 2007 increase in sand/silt and decrease in medium gravel.

Table 3.5. Average, minimum, and maximum diameters of particles counted in riffles at the four study sites.

STUDY SITE [a]	DIAMETER CLASSES																							
	NUMBER OF RIFFLES			MEAN D16 (mm [b])			MEAN D25 (mm [b])			MEAN D50 (mm [b])			MEAN D75 (mm [b])			MEAN D84 (mm [b])			MINIMUM D16 (mm [b])			MAXIMUM D84 (mm [b])		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
SXW	3	3	3	19	29	4	46	53	20	112	115	79	176	191	143	226	231	191	10	10	<2	265	312	256
DFC	3	4	4	33	17	10	40	26	21	67	56	47	105	94	76	118	117	90	28	15	<2	125	142	95
MO	2	3	3	22	19	4	30	25	15	47	38	36	72	59	60	86	67	73	19	15	<2	90	74	78
OX	3	3	3	21	15	5	27	18	12	42	34	27	67	59	52	81	73	65	16	9	<2	85	92	76

[a] SXW = Sixth Water, DFC = Diamond Fork Campground, MO = Mother, OX = Oxbow.

[b] millimeter

Table 3.6. Average, minimum, and maximum diameters of particles counted in depositional bar/patch counts at the four study sites.

STUDY SITE [a]	DIAMETER CLASSES																							
	NUMBER OF PATCHES			MEAN D16 (mm [b])			MEAN D25 (mm [b])			MEAN D50 (mm [b])			MEAN D75 (mm [b])			MEAN D84 (mm [b])			MINIMUM D16 (mm [b])			MAXIMUM D84 (mm [b])		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
SXW	3	3	3	33	16	6	45	28	22	85	79	65	135	134	124	166	167	154	12	3	<2	185	200	165
DFC	3	2	2	25	4	20	33	9	27	56	40	45	85	62	67	99	69	78	15	3	11	140	86	97
MO	4	3	3	13	3	6	18	10	9	31	31	25	44	50	47	51	59	60	5	2	<2	64	74	66
OX	3	3	3	12	25	15	30	32	20	40	44	34	55	58	51	61	65	59	7	10	<2	100	102	84

[a] Site abbreviations: SXW = Sixth Water, DFC = Diamond Fork Campground, MO = Mother, OX = Oxbow.

[b] millimeter

As in 2005 the SXW site had the coarsest main channel substrate material in 2007 (average riffle D50 of 79 mm), the DFC site had the next coarsest material (average riffle D50 of 47 mm), and the MO and OX sites had the finest main channel material (average riffle D50s of 36 and 27 mm, respectively) (Figure 3.5). The same differences between sites are shown in the depositional bar/patch results (Table 3.6). These findings are expected, given the fact that SXW is the steepest monitoring site (3% slope), DFC is the second steepest site (0.9% slope), and the MO and OX sites are the flattest gradient sites (0.6% slope).

At the SXW site little change is evident between 2005 and 2006 in the pebble count results for in-channel riffle locations; in 2007 a trend toward fining is apparent, especially for the smaller diameter classes (Table 3.5). For the patch counts, the slight trend toward fining observed between 2005 and 2006 is pronounced in 2007 (Table 3.6) This trend is largely the result of an increase in the amount of sand- and silt-sized particles (2 mm and smaller) at all sites (Appendix 3.2), showing more of a bimodal distribution over time.

The pebble count results at the DFC site showed an increase in fines within depositional areas between 2005 and 2006; in 2007 depositional areas coarsened relative to 2006 and returned to a size distribution similar to, but slightly finer than, that measured in 2005 (Table 3.4, Table 3.6, Appendix 3.2). This trend matches the substrate mapping results, which document a dramatic increase in sand- and silt-dominated deposits in 2006 followed by a slight decrease in 2007 (Figure 3.1b, BIO-WEST 2007). The 2007 in-channel riffle pebble counts at DFC continued to show the fining trend observed between 2005 and 2006, largely due to an increase in sand/silt material at PC1 and PC3 (Table 3.4, Table 3.5, Appendix 3.2).

A similar fining trend is evident in the results for the MO in-channel riffle pebble counts. In 2007 these sites showed an increase in sand/silt material and decrease in medium gravel (Tables 3.4, 3.5; Appendix 3.2). The pebble count results for depositional bar areas at the MO site are mixed (Table 3.4). An increase in sand/silt material was observed at the PC 6 bar, little change was observed at PC3, and a decrease in sand/silt material was observed at PC1 (Appendix 3.2).

As with the other Diamond Fork Creek sites, the OX in-channel riffle results show a trend towards fining, driven by increases in the amount of sand and silt measured at the pebble count sites (Table 3.4, Table 3.5). Pebble count results for depositional bar areas also show a fining trend at OX (Table 3.6). These changes are due to increased amounts of sand and silt at PC 3 and PC5. The high bar deposit sampled as PC2 has shown no change over the 2005–2007 sampling period, as flows have not been high enough to inundate or alter the deposit (Table 3.3, Table 3.4).

Data from all sites were combined and analyzed using a two-way ANOVA to determine statistical differences between sites and between years. Particle sizes at SXW are significantly different from all the other sites due to site coarseness (size of the largest particles are significantly greater than the other sites). The D16 and D50 size fractions are becoming significantly finer over the past 3 years, whereas there are no significant differences in the D84 size fraction (Figure 3.11). The "fine fractions" are getting significantly finer across the board at all sites. Median size fractions are getting smaller but not as dramatically as the finer fractions, and the coarse fractions aren't changing with any strong pattern. These results would indicate that the distributions are becoming more bimodal since monitoring began in 2005.

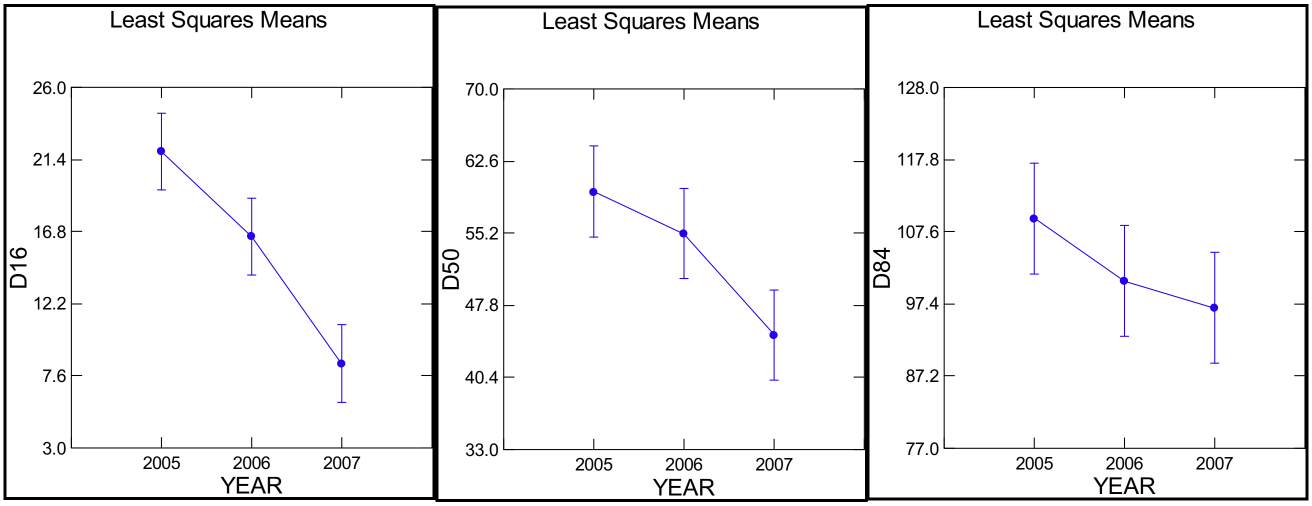


Figure 3.11. Statistical analysis of the pebble count data (all sites combined) showing a significant decrease in the D16 and D50 size fractions but no significant change in the larger D84 size fraction.

3.4 DISCUSSION AND SUMMARY

Several overall trends in Diamond Fork channel substrate characteristics are apparent based on the results of monitoring work between 2005 and 2007. Substrate mapping results indicate some of the bare areas became vegetated in 2006 and 2007. This change is largely due to the conversion of several large, depositional areas from sand- and silt-dominated substrate polygons in 2006 to grass-covered riparian polygons in 2007. Other than this change, there was also a general trend of fining throughout all lower Diamond Fork monitoring sites. Significant localized changes occurred in the distribution of individual susbstrate patch types, especially within meandering, multi-threaded active portions of the channel. The 2007 mapping results also suggest that the presence of cemented areas (hardened portions of silt-embedded bed material) is becoming more prevalent at the lower Diamond Fork Creek sites. This process alters the mobility of the bed sediments and changes the lateral and longitudinal geometry of the streambed by creating vertical underwater banks. This phenomenon could have significant effects on macroinvertebrate populations and long-term sediment transport dynamics in the creek, and it should continue to be monitored.

Riparian mapping results demonstrate an increase in the amount and dominance of willows as a riparian type. They also document a trend of bar areas becoming silted in, vegetated with grass, and merging into floodplain areas. These results suggest that the overall size and width of the active stream channel and bar areas may be decreasing on Diamond Fork Creek (Chapter 2). Additional monitoring to document channel response to future flooding events will be needed to determine whether the trends observed from the riparian mapping work are true long-term trends, or whether they are just shorter-term responses to the flow and flood conditions experienced between 2005–2007.

In addition to the substrate mapping results, the 2007 pebble count results also show an increase in the amount of sand and silt. At Sixth Water Creek, the increase in fines may be associated with the fact that in 2006 pebble counts at SXW were conducted in August, while in 2007 the counts were completed in November. Therefore, the observed increase in fines could be associated with seasonal differences rather than an indication of a year-to-year trend. However, the seasonal pebble count work completed during 2007 did not show a strong seasonal trend at SXW compared to the other sites (see Chapter 4 of this report). However, the seasonal SXW pebble counts were all conducted within main channel riffle or run areas, whereas some of the annual counts were located in slower-velocity areas that may be more susceptible to seasonal change and fines accumulation.

The size distribution of riffle areas shows a significant increase in the amount of fines at the three Diamond Fork Creek sites in 2007. The increase in fines is substantial and widespread. A trend toward increased embeddedness could be cause for concern because fine sediments degrade the quality of spawning gravels. Embeddedness is examined in Chapter 4.

4.0 SEASONAL SEDIMENTATION MONITORING

4.0 SEASONAL SEDIMENTATION MONITORING

4.1 INTRODUCTION

Bedload and suspended sediment monitoring results in 2005 and 2006 indicate that instream flows in both Sixth Water Creek (25-32 cubic feet per second [cfs]) and Diamond Fork Creek (60-80 cfs) cause elevated transport rates (>10 times) during the summer, fall, and winter months (BIO-WEST 2006 and 2007). The instream flows in Sixth Water Creek generally produce over 1 ton per day of suspended sediment transport and 0.5 ton per day of bedload sediments from upper Sixth Water Creek (at Ray's Crossing) during base flows (BIO-WEST 2007); compared to 0.1 ton per day of suspended sediment transport and no measurable bedload transport in Diamond Fork above Three Forks during the same time period. More than 90 percent of the sediment evacuated from Sixth Water remains temporarily stored in the channel either in lower Sixth Water Creek or lower Diamond Fork Creek during the summer, fall, and winter months, presumably infiltrating the coarser sediments or becoming deposited on the streambed in the low-velocity margins of the channel. Over time, the interstitial spaces of streambed facies fill up annually, become cemented, and are covered by fine-grained material (fines), eventually impairing the quality of spawning gravels and reducing the effectiveness of any protruding particles on the bed for creating "hiding places" around them, as normally occurs in gravel- to cobble-bedded streams.

Downstream sedimentation and the effects fine sediments have on the biotic components of stream ecosystem health are concerning, especially given current trends and loss of sensitive benthic macroinvertebrate taxa observed over the past 3 years in the lower reaches of Diamond Fork Creek (see Chapter 5). This portion of the study quantifies seasonal changes in substrate conditions (particle-size distributions, embeddedness, and silt depths) in reaches affected and unaffected by imported water and reaches above and below the Sixth Water Creek landslide. The results will help determine whether seasonal sedimentation is a problem at the various study reaches in Sixth Water and Diamond Fork Creeks in comparison with another nearby stream not affected by such high instream flows. These data may be used for future flow recommendations and other adaptive maintenance activities for Diamond Fork and Sixth Water Creeks. Such recommendations and activities will assist the Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) and other agencies with restoring the aquatic ecosystem to a desirable condition.

4.2 METHODS

Seasonal changes in substrate particle-size distributions, embeddedness, and silt depths were monitored at the established Sixth Water Creek and Diamond Fork Creek monitoring sites during summer and fall 2007. Sedimentation measurements were also made over the same time period using an adjacent watershed (the canyon portion of Hobble Creek) as a reference site to determine seasonal changes in a similar stream not affected by instream flows (i.e., paired watershed). A reference site in Diamond Fork Creek above Three Forks was originally considered, but a representative site could not be located due to basic geomorphic differences in the size, shape, and slope of upper Diamond Fork Creek compared with the established monitoring sites in lower Diamond Fork Creek. The purpose of these measurements was to quantify seasonal changes in substrate conditions in certain reaches affected and unaffected by imported water and reaches above and below the Sixth Water Creek landslide.

Monthly “repeat” sedimentation measurements were taken in July immediately following peak flows, then again at the end of July, end of August, end of September, and beginning of November at the following monitoring sites:

- Upper Sixth Water (SXW) (Figure 4.1)
- Ray’s Crossing (RC) (Figure 4.2)
- Diamond Fork Campground (DFC) (Figure 4.3)
- Mother (MO) (Figure 4.4)
- Oxbow (OX) (Figure 4.5)
- Hobble Creek (HC) (0.7 mile upstream of the reservoir [Figure 4.6])

Supplemental cross sections were located between many of the previously established cross sections (as described in Chapter 2) at the three lower monitoring sites (DFC, MO, and OX) on Diamond Fork Creek to specifically measure sedimentation within additional habitats in these relatively long study sites. The additional cross sections were placed to specifically cross riffle, run, or pool habitats within the channel (Table 4.1), where fine particle deposition had been observed in previous years or was predicted to occur in 2007 based on post-runoff geomorphic conditions.

Table 4.1. Cross section numbers, descriptions, and geomorphic features surveyed for the 2007 summer and fall repeat sedimentation measurements.

CROSS SECTION [a]	DESCRIPTION	GEOMORPHIC FEATURE
OX1	on geomorphic cross-section OX1	flat run
OX2	on geomorphic cross-section OX2	steep run
OX2.1	between Geomorphic X-sections OX2 and OX3	pool
OX3	on geomorphic cross-section OX3	riffle with side channel
OX4	on geomorphic cross-section OX4	riffle with side channel
OX5	on geomorphic cross-section OX5	flat run
OX6	on geomorphic cross-section OX6	flat run
OX7	on geomorphic cross-section OX7	riffle
OX7.1	downstream of geomorphic cross-section OX7	riffle
OX7.2	upstream of geomorphic cross-section OX8	pool with side channel
OX8	on geomorphic cross-section OX8	flat run
OX8.1	downstream of geomorphic cross-section OX8	pool
MO1	on geomorphic cross-section MO1	pool
MO1.1	downstream of geomorphic cross-section MO1.1	riffle
MO1.2	between MO1.1 and MO1.3	riffle
MO1.3	upstream of geomorphic cross-section MO2	pool
MO2	on geomorphic cross-section MO2	pool

CROSS SECTION [a]	DESCRIPTION	GEOMORPHIC FEATURE
MO2.1	downstream of geomorphic cross-section MO2	pool
MO3	on geomorphic cross-section MO3	pool
MO3.1	downstream of geomorphic cross-section MO3	riffle
MO4	on geomorphic cross-section MO4	riffle
MO5	on geomorphic cross-section MO5	steep run
MO6	on geomorphic cross-section MO6	pool
MO6.1	downstream of geomorphic cross-section MO6	pool with side channel
DFC1	on geomorphic cross-section DFC1	flat run
DFC2	on geomorphic cross-section DFC2	flat run
DFC2.1	downstream of geomorphic cross-section DFC2	flat run
DFC3	on geomorphic cross-section DFC3	steep run
DFC3.1	downstream of geomorphic cross-section DFC3	pool
DFC3.2	upstream of geomorphic cross-section DFC4	steep run
DFC4	on geomorphic cross-section DFC4	riffle
DFC5	on geomorphic cross-section DFC5	pool
DFC6	on geomorphic cross-section DFC6	steep run
DFC7	on geomorphic cross-section DFC7	pool
DFC7.1	downstream of geomorphic cross-section DFC7	riffle
RC1	on vegetation cross-section RC1	riffle
RC2	on vegetation cross-section RC2	riffle
RC3	on vegetation cross-section RC3	steep run
RC4	on vegetation cross-section RC4	steep run
RC5	on vegetation cross-section RC5	riffle
RC6	on vegetation cross-section RC6	riffle
SXW1	on geomorphic cross-section SXW1	riffle
SXW2	on geomorphic cross-section SXW2	riffle
SXW3	on geomorphic cross-section SXW3	riffle
SXW4	on geomorphic cross-section SXW4	riffle
SXW5	on geomorphic cross-section SXW5	riffle
SXW6	on geomorphic cross-section SXW6	riffle with large backwater
HC1	about 100 meters upstream of Eagle Scout parking lot	riffle
HC2	about 80 meters upstream of Eagle Scout parking lot	pool
HC3	about 60 meters upstream of Eagle Scout parking lot	riffle
HC4	about 30 meters upstream of Eagle Scout parking lot	flat run

[a] Upper Sixth Water (SXW), Ray's Crossing (RC), Diamond Fork Campground (DFC), Mother (MO), Oxbow (OX), Hobble Creek (HC).

Figure 4.1. Upper Sixth Water (SXW) monitoring site. Flow is from right to left.

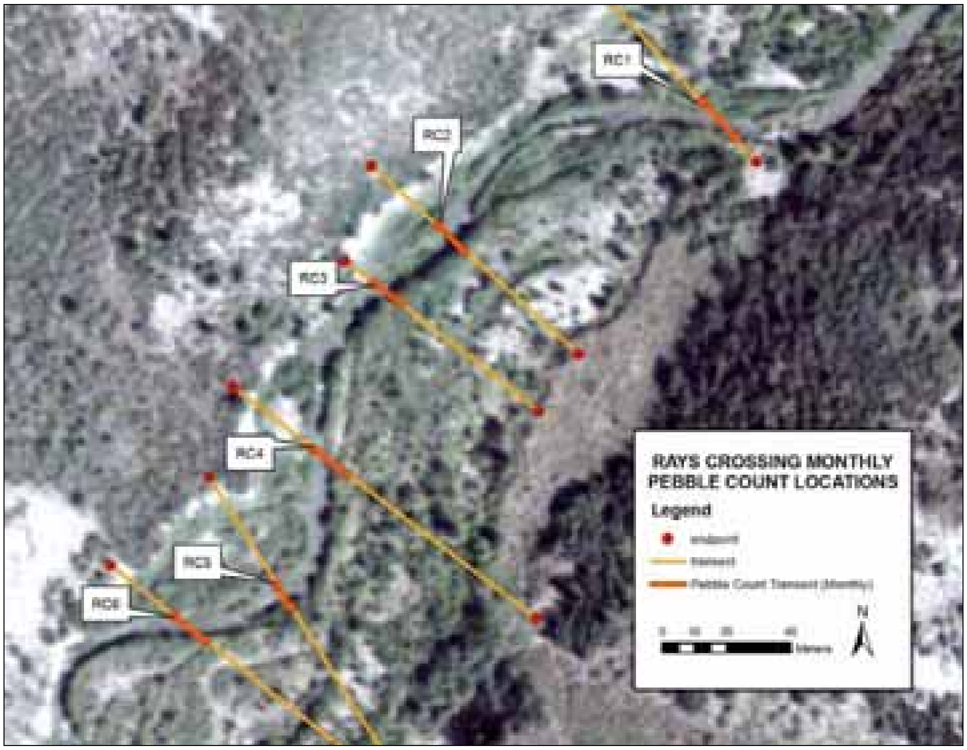


Figure 4.2. Ray's Crossing (RC) monitoring site in Sixth Water Creek. Flow is from right to left.

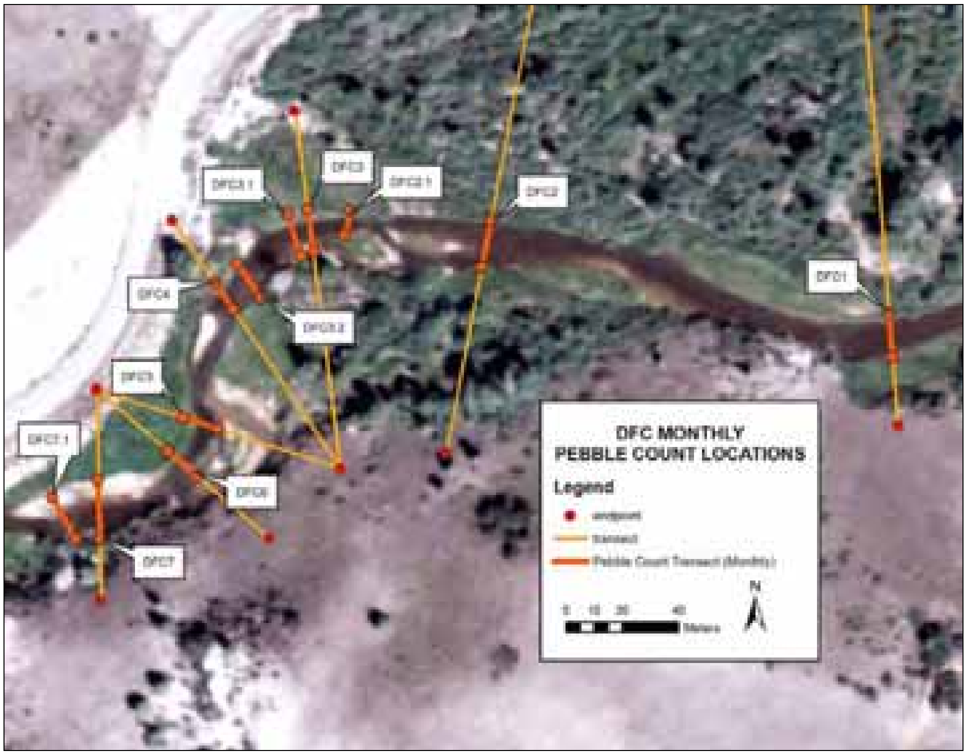


Figure 4.3. Diamond Fork Campground (DFC) monitoring site on lower Diamond Fork Creek. Flow is from right to left.

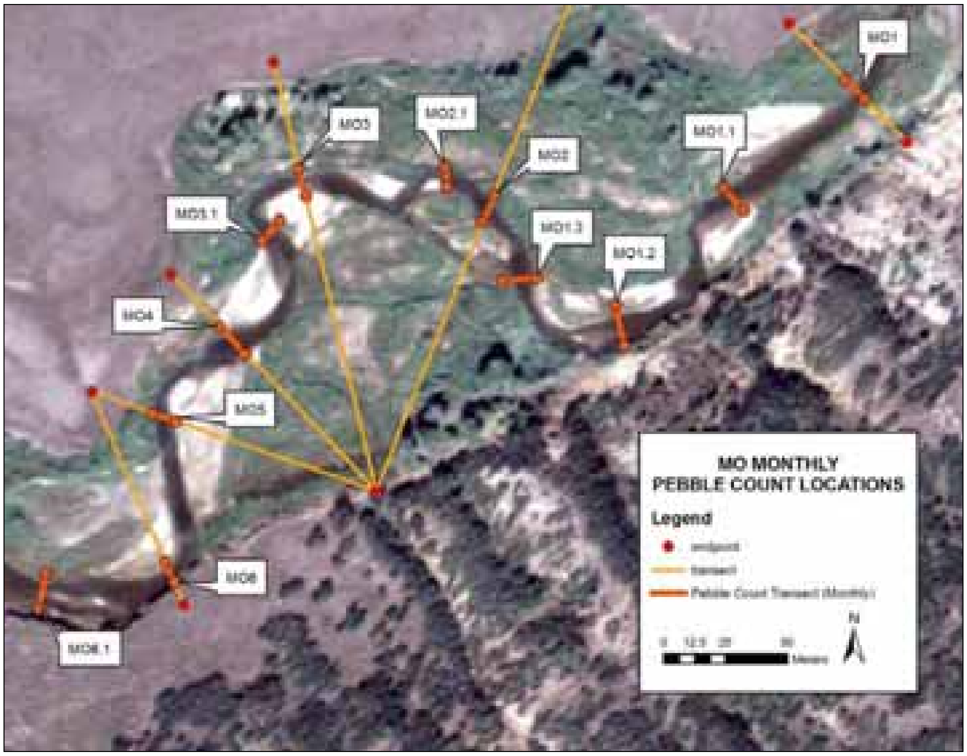


Figure 4.4. Mother (MO) monitoring site on lower Diamond Fork Creek. Flow is from right to left.

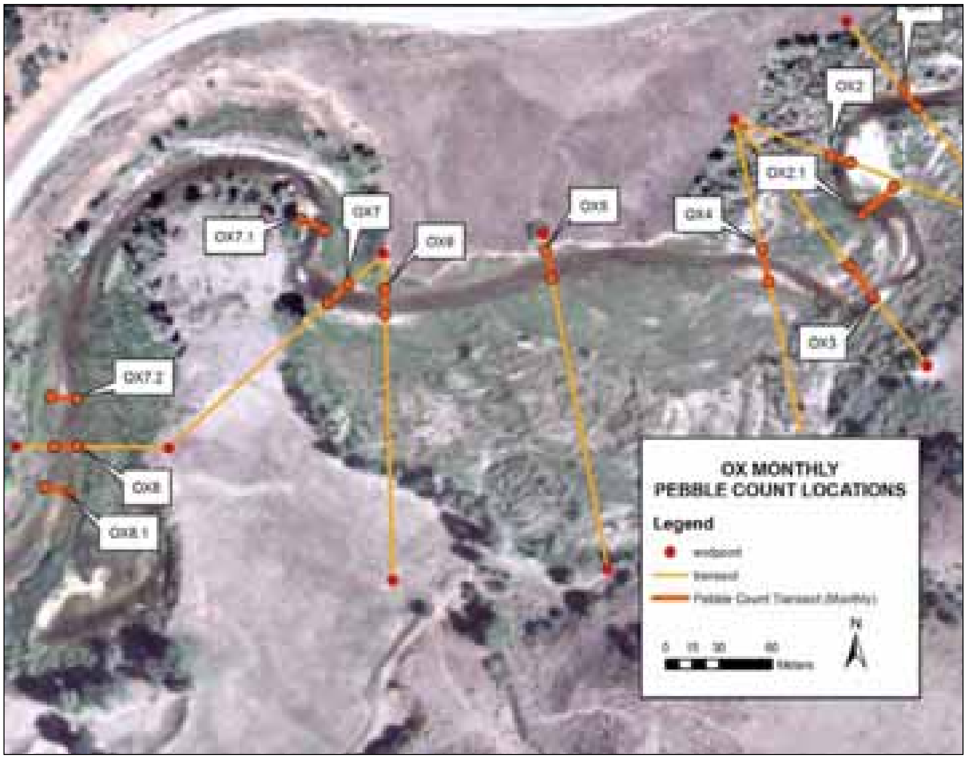


Figure 4.5. Oxbow (OX) monitoring site on lower Diamond Fork Creek. Flow is from right to left.

Figure 4.6. Hobble Creek (HC) “reference” monitoring site. Flow is from right to left.

To ensure precise repeat measurements, a 4-foot-long piece of rebar was pounded in the bank on both sides of the channel about 10 feet from the edge of water at each cross section. A measuring tape tag line was set up on each cross section for each monitoring period. The rebar end cap locations were surveyed with an Archer Field PC global positioning system (GPS) using TerraSync® version 2.61 software. End caps were surveyed to an accuracy within 5 meters (Appendix 4.1). These tape tag lines were used for every sample with the end of the measuring tape always tied at the same spot on the river left rebar. In an attempt to keep the channel as clear as possible, sampling started at each site at the most downstream cross section and moved in sequence upstream to the next cross section.

Fine sediment deposition was observed on the streambed in October 2006 during the annual geomorphic measurements (BIO-WEST 2007). Unfortunately, the "natural" spring runoff did not increase streamflow to the levels necessary to flush fine sediments from the streambed in 2007 (Figure 4.7). Therefore, it was necessary to flush the fine particles and clean the gravel bars before the repeat measurements began in 2007. Working closely with Central Utah Water Conservation District (CUWCD), the Mitigation Commission planned a meeting with interested agency personnel and a decision was made to enhance peak flows in 2007 with water delivered from Strawberry Reservoir via the Diamond Fork System and released at Monks Hollow flow control structure. A flushing flow of over 265 cfs ran for more than 2 days in the lower reaches of Diamond Fork Creek at the end of June and beginning of July (Figure 4.7). Bedload sampling performed during the artificial runoff verified that the flows had mobilized large gravel (particles larger than the D50 were in transport at each monitoring site) and produced large, clean gravel bars. Depth of scour was not determined. Most, but not all, of the silt along the banks was washed away.

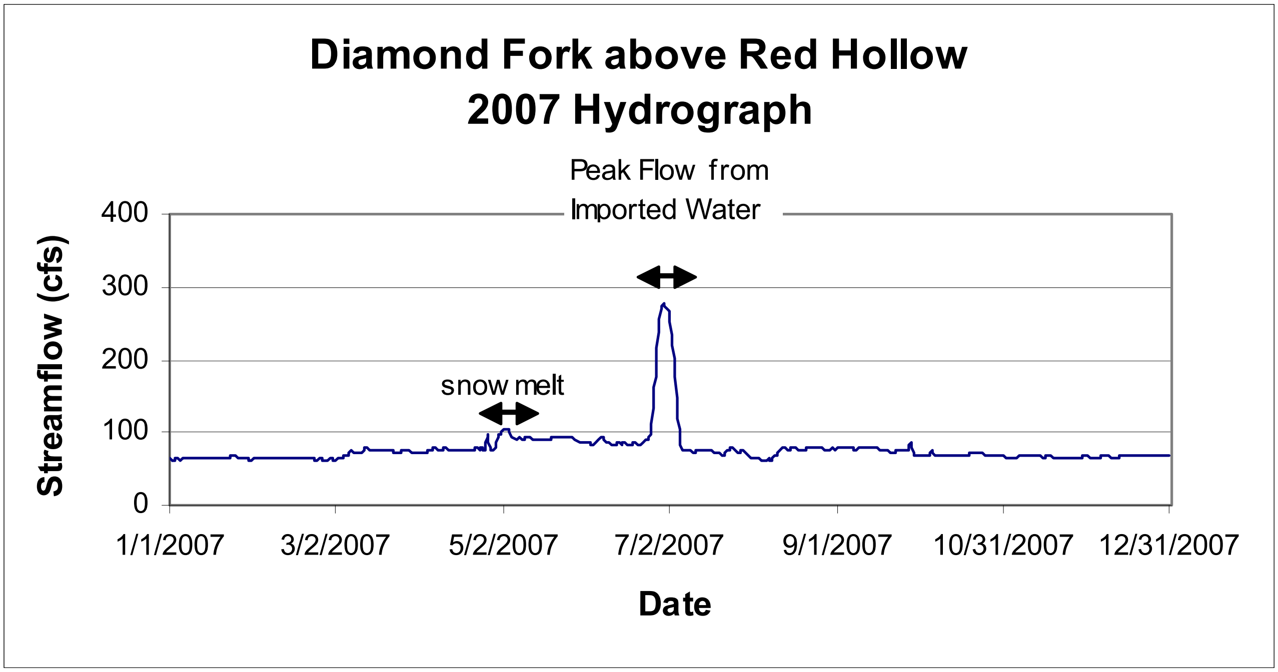


Figure 4.7. The 2007 hydrograph for lower Diamond Fork Creek (USGS 10149400 Diamond Fork above Red Hollow near Thistle, Utah).

The flushing flows only affected the DFC, MO, and OX monitoring sites, since these sites are below Monks Hollow flow control structure. The HC, SXW, and RC sites received no artificial runoff to enhance flushing. The five samples were collected July 7-9, July 30-August 1, August 28-30, September 25-27, and November 5-15. Because little-to-no seasonal change occurred at the SXW and RC sites, the August and September samples did not seem necessary, but the fifth and final sample in November was performed because significant changes were observed at the other sites.

Wolman pebble counts (Wolman 1954) were consistently performed in the zone between 1-2 meters downstream of the tag line, while the embeddedness estimates were consistently performed 1 meter above the tag line. This methodology was used to prevent the embeddedness estimates from being influenced by disturbance of the streambed when performing pebble counts. The depth of silt measurements were made exactly underneath the measuring tape tag line and could be consistently repeated at the same distances across the channel by using the same foot intervals on the tag line for each sample.

Pebble counts were repeated at the exact same locations on each of the sample dates, and 100 pebbles were counted at each transect for every sample. The pebble counts consisted of randomly selecting pebbles across the entire width of the channel, measuring the b-axis, and then placing the pebbles back in the channel. Great care was taken to randomly pick the pebble that was felt at the very center of the index finger, space the counts evenly across the channel, and place the pebble back in the same part of the channel to not bias the next monthly sample. The entire wetted channel was sampled.

Cold weather was anticipated for the last sample in November. Therefore, pebbles that were in deep pools, that required complete submersion to sample, were identified during the September sample, and used for the November sample. Detailed notes from the September sample recorded the block of channel that was not to be sampled again in November, and each pebble count measurement that was to be copied into the November sample. The pebbles that were not sampled in the cold weather were generally located in the thalweg, and no change in particle distribution had been observed in the first four samples in this portion of the channel.

Almost all of the pebble counts were performed without wearing gloves. The only cross sections that were performed with gloves were the DFC 3, 3.1, 3.2, 4, 5, 6, 7, and 7.1 lines on 11-7-07. It was observed that the gloves skewed the fine particle count because the sense of touch was likely lost (Appendix 4.2b). The July pebble count at HC was not included in the average results at this site because data errors with this sample were apparent.

At all sites the pebble count data were grouped into 16 half phi categories (2, 4, 5.7, 8, 11.3, 16, 22.6, 32, 45, 64, 90, 128, 180, 256, 362, and 512 millimeters [mm]) for both number of particles in size class and percent finer than size class (Appendix 4.2a) and plotted (Appendix 4.2b). All the cross sections from each monitoring site were compiled and averaged to give an average size distribution for each site. Each cross section was categorized by geomorphic feature into either riffle/steep runs or pool/flat runs. The riffle/steep run and pool/flat run cross sections were averaged for each monitoring site, which formed two more averaged graphs per site except for the SXW and RC sites (they had no pools or flat-run cross sections). The HC1 results were not used in any of the averaged graphs because of a large, stagnant backwater filled with fine sediment that misrepresented the average channel conditions observed at all other cross sections.

It has been observed in other research that pebble count data do not always reflect the degree of embeddedness (Sylte and Fischenich 2002); however, the two different measurements should be related. When pebble counts are performed in cobble and boulder substrate, the cobble or boulder could be 100 percent embedded but because the large rock covers more of the channel surface area the odds that the sand and silt particles will be randomly counted decreases as the embedded-particle size increases. The larger the size of the substrate being counted, the less of a chance that fine particles will be randomly selected. For this reason a visual embeddedness estimate was incorporated into the study.

Embeddedness is defined (Sylte and Fischenich 2002) by the percent of the gravel to boulder clasts that have more than half of their mass buried by particles that are less than 2 mm (sand and silt). Embeddedness estimates were categorized into a few basic classifications that could be documented and repeated by the same sampler (Table 4.2). The level of embeddedness was estimated at the same location for each repeat sample. The embeddedness estimate was made 1 meter upstream of the measurement tape tag line and along the length of the measurement tape tag line in 1- and, in some cases, 0.5- foot intervals. For example, the level of embeddedness (i.e., fully, mostly, some, or not embedded) was delineated across the channel and distance for each embeddedness class measured. To prevent judgement errors, embeddedness estimates were conducted by the same person, except for the first SXW estimate. The differences in judgement in estimating the first SXW sample made it clear that the same person needed to do all the embeddedness estimates in a consistent manner. The first SXW embeddedness estimate results are not shown in the results. Each cross section was photographed once for upstream, downstream, left bank, and right bank views (photos available electronically). Every embeddedness classification for each cross section and sample date was photographed with a digital underwater camera. To further prevent errors in evaluating embeddedness, the field notes from the previous sample date were used as a reference to ensure that classifications were consistent for each cross section throughout the five sample dates. The field notes are also available electronically.

Table 4.2. Embeddedness estimate classifications and descriptions.

EMBEDDEDNESS ESTIMATE CLASSIFICATIONS	
Classification	Description
Not	< 5% of clasts are embedded
Some	5-50% of clasts are embedded
Most	50-95% of clasts are embedded
Full	> 95% of clasts are embedded

The embeddedness estimates for each delineated area (measured in distance across the channel) were then compiled and converted to total percentages of the channel in each embeddedness class per cross section. The site average percentage of embeddedness for each sample date throughout the July to November 2007 sample period were graphed.

The depth of silt (i.e., sand, silt, and clay deposited on top of coarser gravel and cobble material) was determined by probing a 0.5-inch-diameter metal rod into the fine-grained material and measuring its depth at 1-foot intervals along each cross section. The scale on the sounding rod is 2 centimeters (cm) per mark. The depth and extent of fine-grained sediment at least one mark high (2 cm) was measured on all cross sections on every sample date. The rod was pushed into the fine sediment until it made the distinct sound of hitting gravel- or larger-sized clasts underneath the fine sediment. The depth of sediment was measured by the number of marks the rod sunk into the fine sediment until it hit the underlining gravel or cobble. If sod chunks or bank material was in the wetted channel it was not measured or was not included in the results since the study objective was to determine silt build-up across the channel during base flows and not to determine active bank erosion. Analysis of silt depth by station was difficult because some deposits are migratory; therefore, the silt depth data were summarize by average cross section width of deposition >2 cm deep throughout each reach for each sample date.

4.3 RESULTS

The reach average pebble-count results at the DFC, MO, and OX sites show an increase in fine-grained particles (< 2 mm) through out the sample dates, while the SXW, RC, and HC sites reveal little-to-no change (Figure 4.8). By the last sample date, the MO site had triple the number of fine particles than counted in the first sample, from 10 to 30 percent. The OX and DFC sites more than doubled their fine particle numbers throughout the sample dates, from 8 to 20 percent approximately for each site. The SXW, RC, and HC sites had no significant increase in fine particles throughout the sample period.

When the pebble count data were categorized into geomorphic feature types, the DFC, MO, and OX sites showed a correlation between feature types and change in the number of fine particles counted, whereas the HC site showed no correlation (Figure 4.9). The channel slopes and number of boulders at the SXW and RC sites are much greater than at the other sites, which limits the creation of distinct geomorphic features that span the entire cross section. Therefore, there are no pool/flat-run features at these steeper sites. The pool/flat-run graphs show that in the final sample in the late fall, the DFC, MO, and OX sites had three times more percent fine particles than on the first sample following spring runoff, and nearly 40 percent fines (particles <2 mm) at MO in November. The riffle/steep-run sample sites at MO had three times more percent fines by the last sample in November than the first sample in July, while the DFC and OX sites increased by 50 and 90 percent, respectively.

By the last sample date, the SXW, RC, DFC, MO, OX, and HC site average percent fines were 12, 17, 17, 30, 20, and 16, respectively. The site average percent fines in the pool/flat-run cross sections at the DFC, MO, OX, and HC sites were 23, 39, 24, and 17, respectively.

There were no observed differences in the coarser particles (gravel- and cobble-sized material) in the pebble count data, other than some medium-sized particles were getting covered or surrounded by fines throughout the summer and fall months. The shift in percent fines affected the entire particle size distribution in the lower reaches of Diamond Fork Creek. The D50 was reduced significantly at the DFC, OX, and MO study sites (Figures 4.8 and 4.9) in response to the change in percent fines, whereas the D50 remained relatively unchanged during the summer and fall months at the other sites. The increase in fines did not cover or change the counts of the largest particles (D84) as they remained exposed throughout the sample period. It is important to note that the largest particles in lower Diamond Fork Creek were primarily in the thalweg in the steeper/higher-velocity portions of the channel in areas where fine-sediment deposition usually does not occur.

The embeddedness results (proportion of the channel cross section with embedded particles) were similar to the pebble count results (Figure 4.10), where embeddedness estimates in the lower Diamond Fork Creek sites (DFC, MO, and OX) increased significantly over the summer and fall seasons, whereas SXW and HC remained the same. Embeddedness levels at RC (below the Sixth Water Creek landslide) also increased during this time period. The RC, DFC, MO, and OX sites generally increased in the percentage of the channel that is fully embedded. The DFC, MO, and OX sites decreased in the percentage of the channel that was classified as not embedded, while HC was the opposite and increased in the percentage of the channel that was not embedded.

From the first embeddedness estimate sample date to the final sample the RC, DFC, MO, and OX sites increased in embeddedness by about 20 percent, 60 percent, 90 percent, and 120 percent, respectively. The SXW site had no change in embeddedness, and HC actually decreased in embeddedness overall.

The RC site percent fines (< 2 mm) increased by only 4 percent in the pebble count data (Figure 4.8), whereas “fully” embedded portions of the cross sections increased by more than 16 percent. Portions of the channel that were “not” embedded decreased proportionally at 14 percent. These results show that embeddedness estimates were more sensitive to fine-sediment deposition in this steep, boulder-bedded channel than pebble counts.

One noticeable result is that OX increased more in embeddedness than MO, but the pebble count data showed MO increasing more in fine particles than OX. This result may be due to the difference in geomorphic features found at each site. The MO site has more pools than OX, and OX has more runs than MO. There were no flat runs sampled at MO, whereas there were seven pools sampled. There were four flat runs and three pools sampled at OX. These geomorphic differences could explain the discrepancy between the pebble-count and embeddedness results.

Silt-depth measurement results (the total number of sample points across the channel with measurable silt depths) correlated relatively well with the pebble-count and embeddedness results as the extent of silt deposition increased at the lower Diamond Fork Creek sites (DFC, MO, and OX) over the sampling period, but not at the Sixth Water Creek sites (SXW and RA) or reference paired watershed (HC) site (Figure 4.11). The distance across the channel where silt depths exceeded 2 cm (approximately 1 inch) ranged from 0.5-2 feet in Sixth Water Creek at the SXW and RC sites, 1-6 feet in lower Diamond Fork Creek at the DFC, MO, and OX sites, and 3-4 feet in Hobble Creek at HC. Seasonal trends are difficult to determine in Sixth Water Creek and Hobble Creek as there were relatively small changes between the first and last samples. However, seasonal changes are apparent in lower Diamond Fork Creek as the number of feet across the channel with measurable silt deposition doubled or tripled between July and November (Figure 4.11).

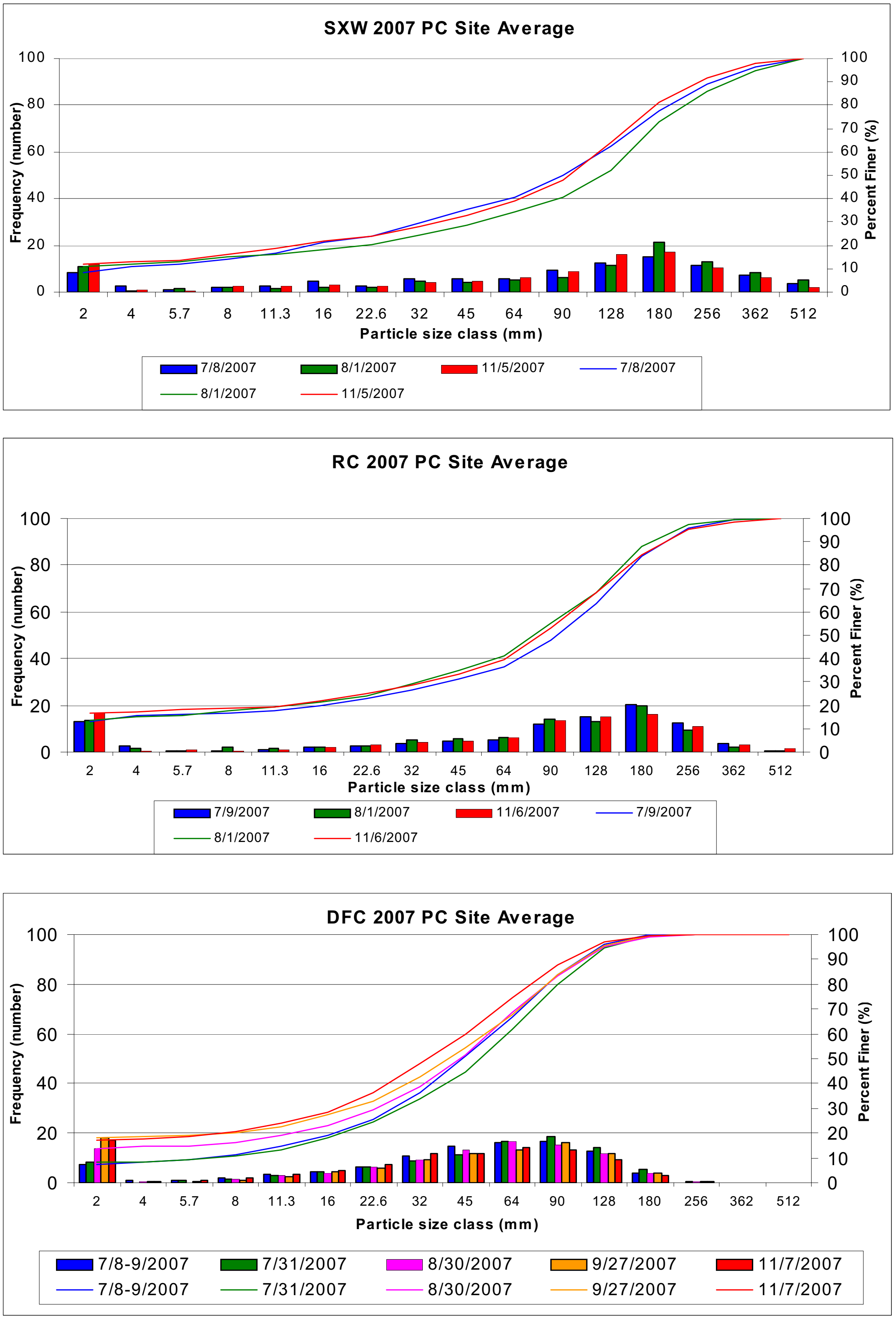


Figure 4.8a. Site-averaged results from 2007 cross-section pebble-count (PC) data. The primary axis (left) correlates with the bars and is a histogram of the number of particles within each size class, whereas the secondary axis (right) correlates with the lines and shows the cumulative number of particles starting with the smallest class size.

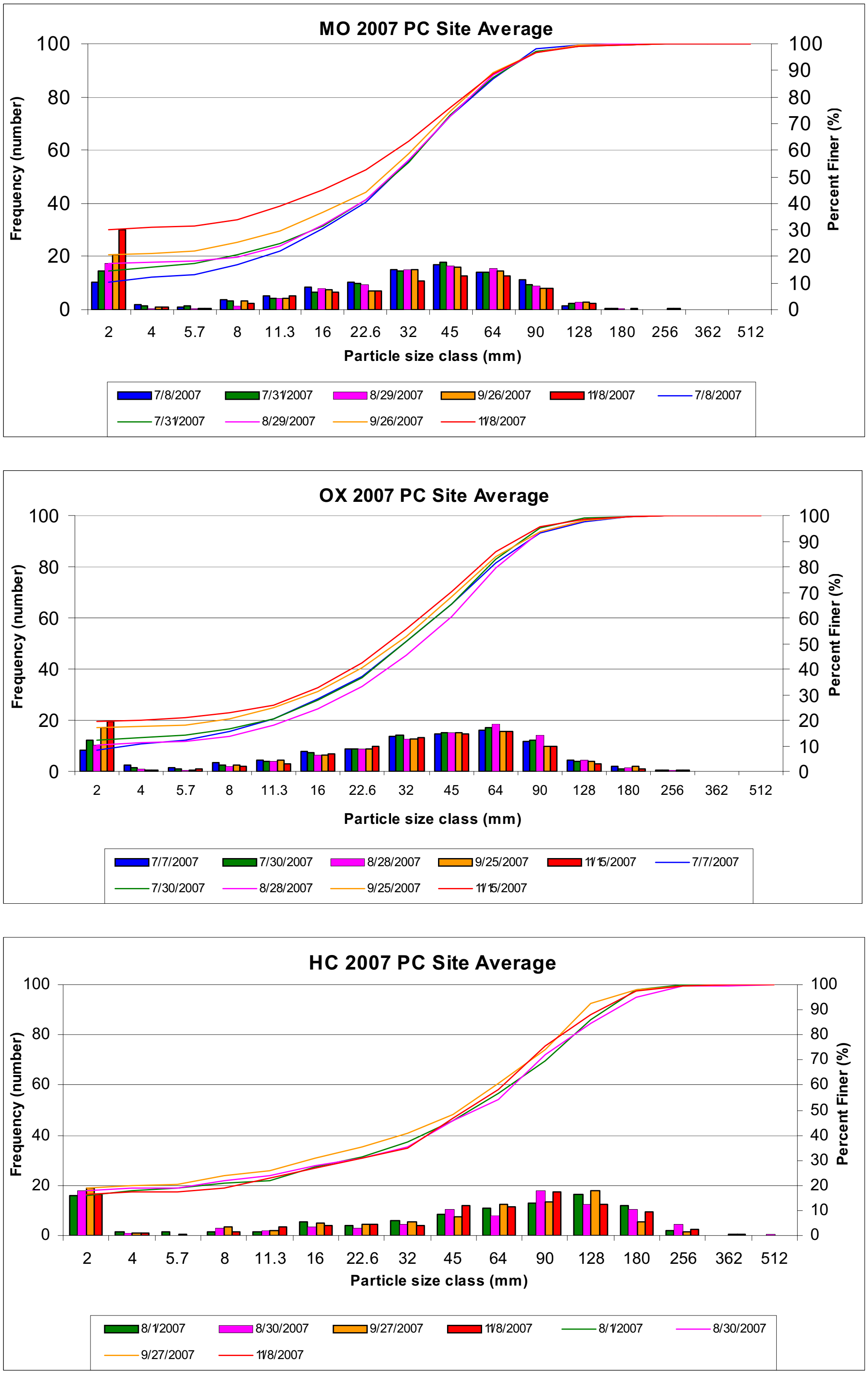
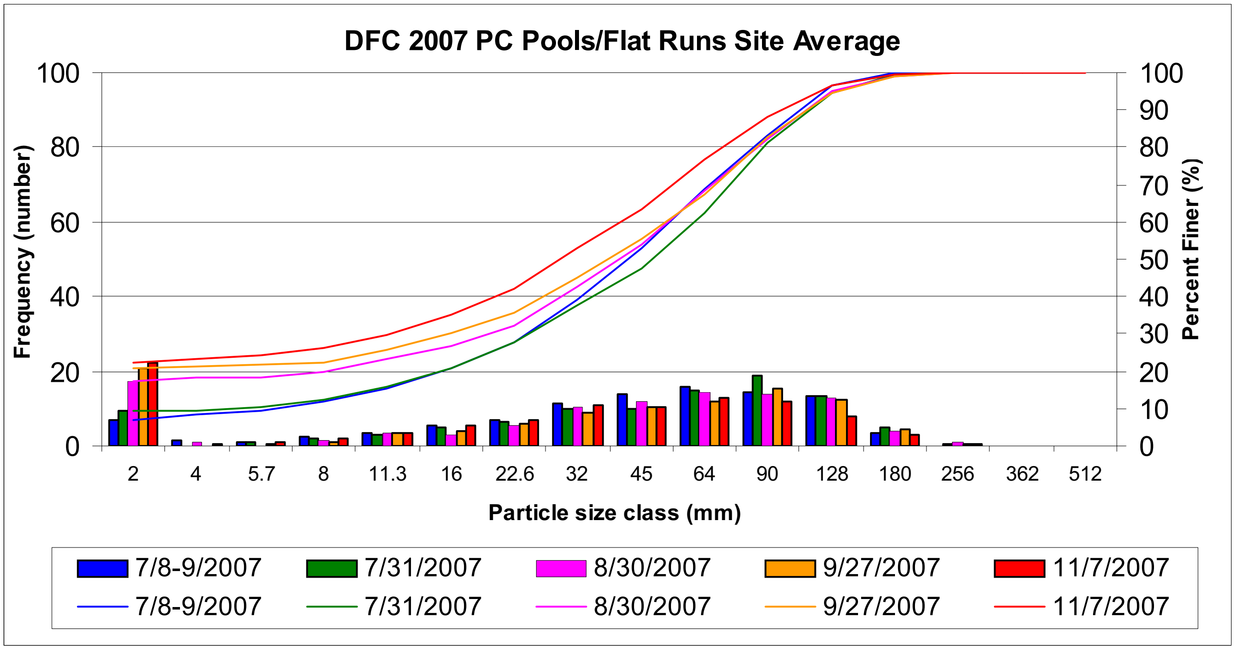


Figure 4.8b. Site-averaged results from 2007 cross-section pebble-count (PC) data. The primary axis (left) correlates with the bars and is a histogram of the number of particles within each size class, whereas the secondary axis (right) correlates with the lines and shows the cumulative number of particles starting with the smallest class size.



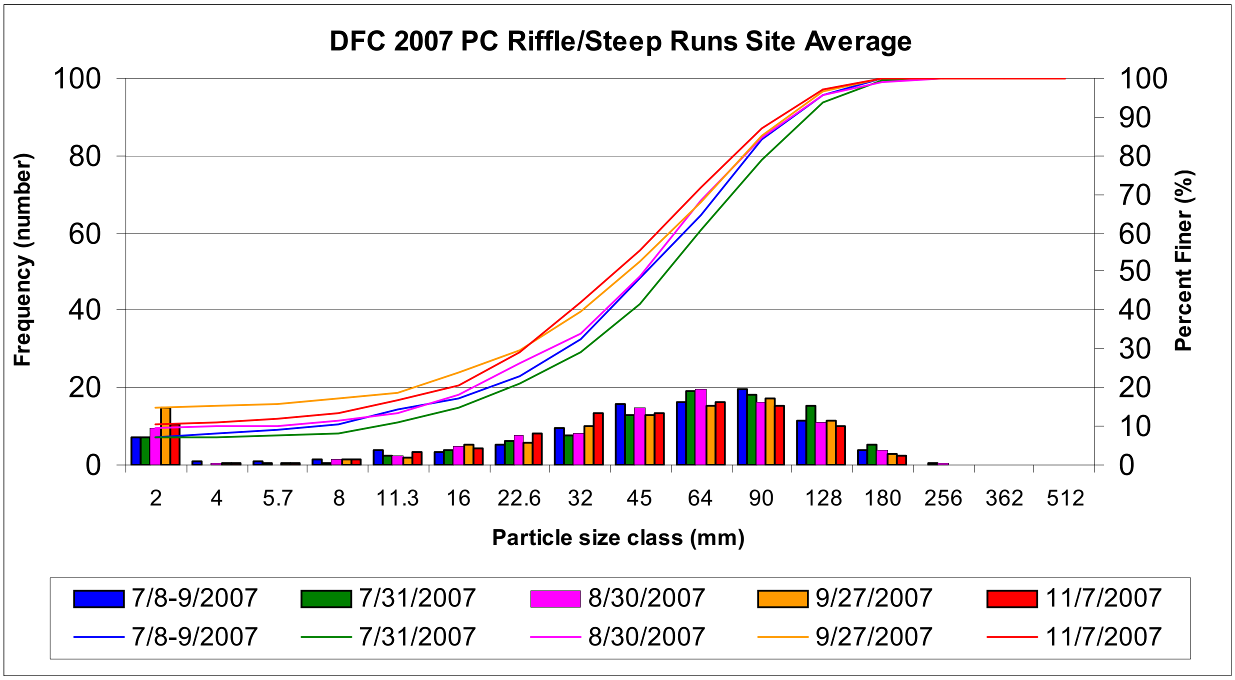
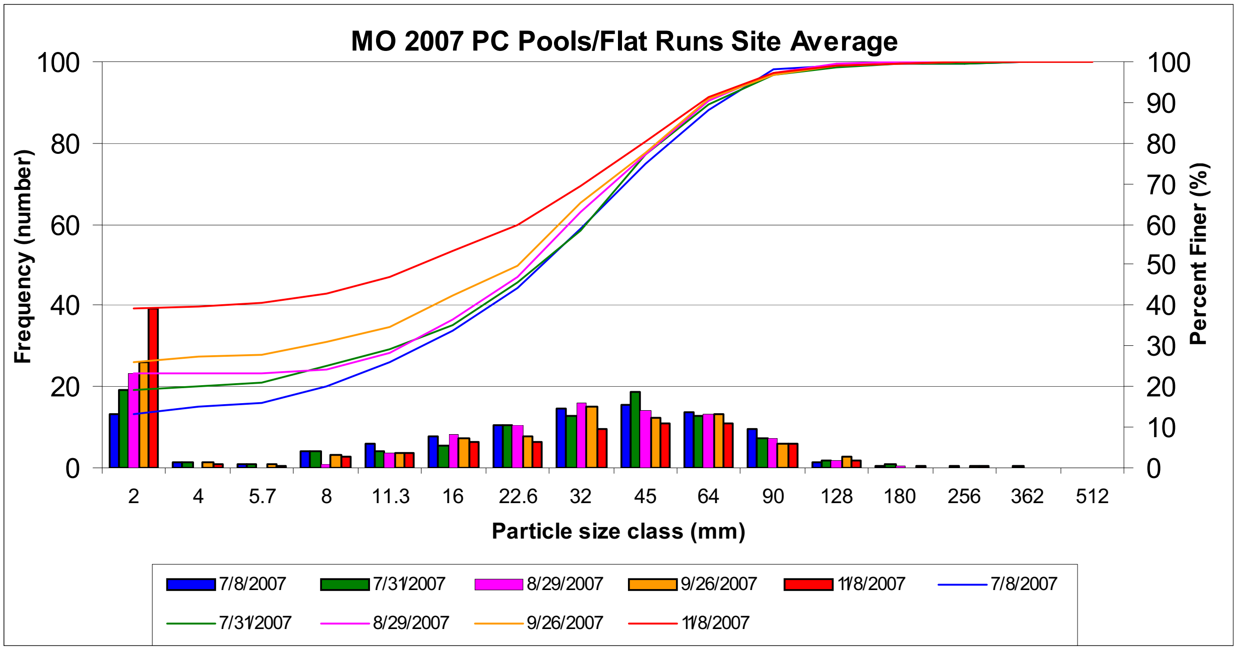


Figure 4.9a. Site-averaged pool/flat-run and riffle/steep-run results from 2007 cross-section pebble-count (PC) data.



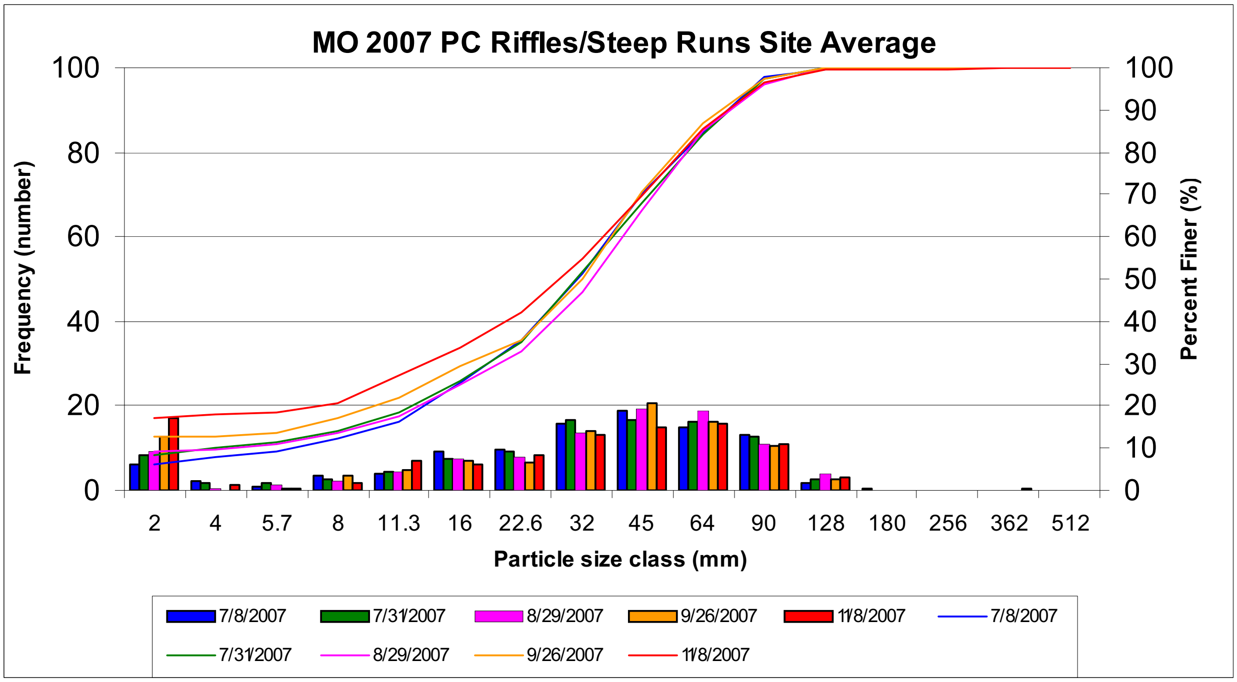
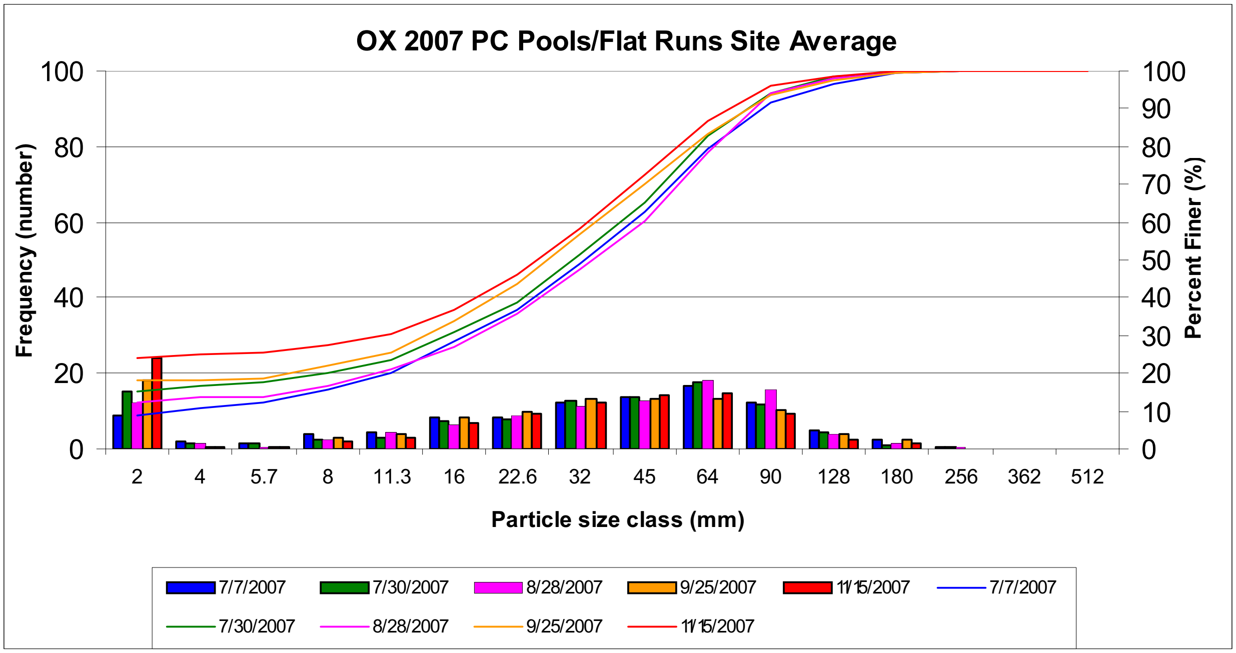


Figure 4.9b. Site-averaged pool/flat-run and riffle/steep-run results from 2007 cross-section pebble-count (PC) data.



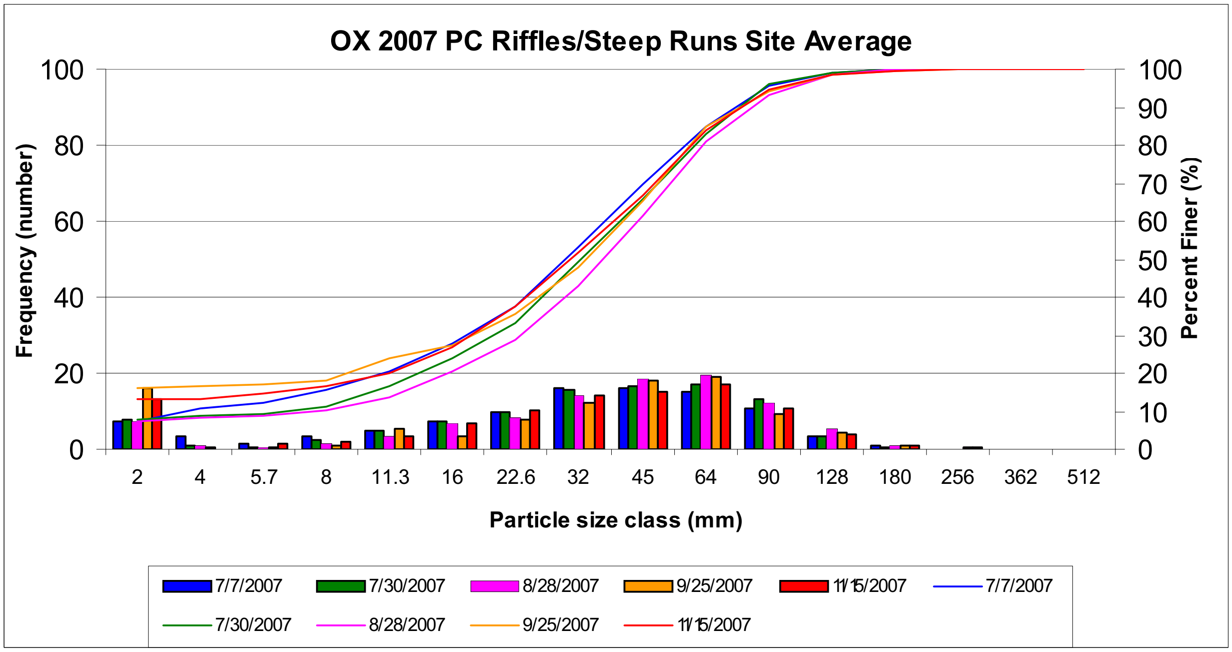
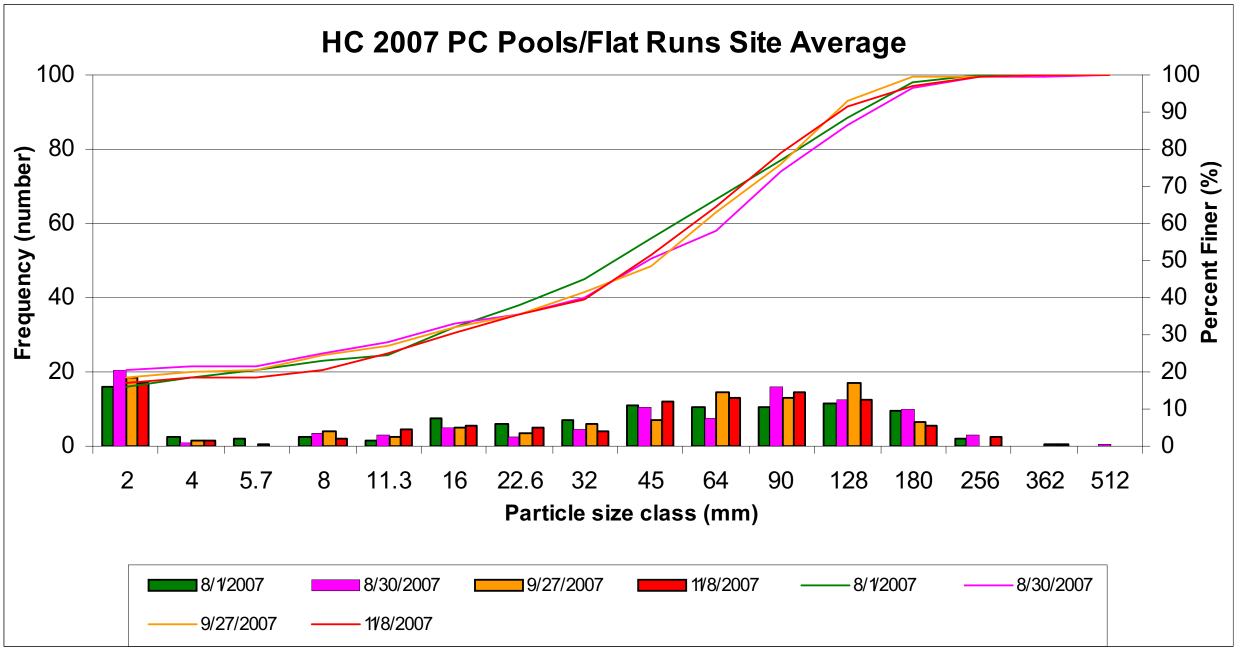


Figure 4.9c. Site-averaged pool/flat-run and riffle/steep-run results from 2007 cross-section pebble-count (PC) data.



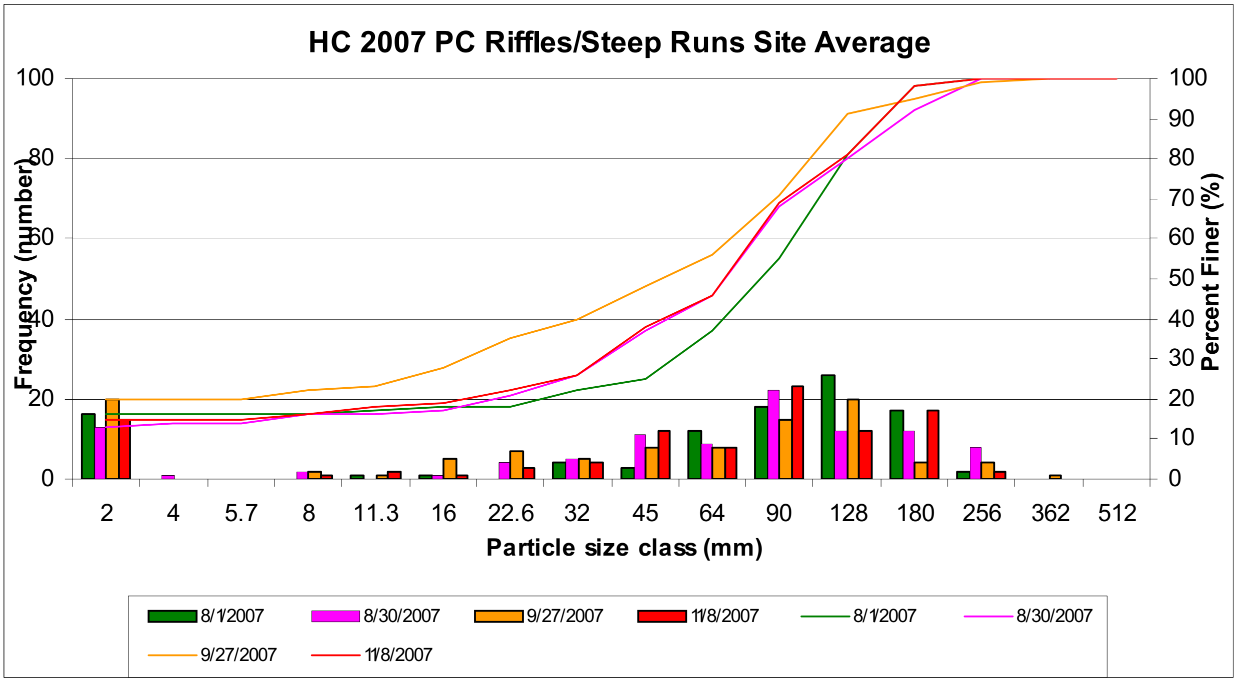


Figure 4.9d. Site-averaged pool/flat-run and riffle/steep-run results from 2007 cross-section pebble-count (PC) data.

the DFC, OX, and MO study sites (Figures 4.8 and 4.9) in response to the change in percent fines, whereas the D50 remained relatively unchanged during the summer and fall months at the other sites. The increase in fines did not cover or change the counts of the largest particles (D84) as they remained exposed throughout the sample period. It is important to note that the largest particles in lower Diamond Fork Creek were primarily in the thalweg in the steeper/higher-velocity portions of the channel in areas where fine-sediment deposition usually does not occur.

The embeddedness results (proportion of the channel cross section with embedded particles) were similar to the pebble count results (Figure 4.10), where embeddedness estimates in the lower Diamond Fork Creek sites (DFC, MO, and OX) increased significantly over the summer and fall seasons, whereas SXW and HC remained the same. Embeddedness levels at RC (below the Sixth Water Creek landslide) also increased during this time period. The RC, DFC, MO, and OX sites generally increased in the percentage of the channel that is fully embedded. The DFC, MO, and OX sites decreased in the percentage of the channel that was classified as not embedded, while HC was the opposite and increased in the percentage of the channel that was not embedded.

From the first embeddedness estimate sample date to the final sample the RC, DFC, MO, and OX sites increased in embeddedness by about 20 percent, 60 percent, 90 percent, and 120 percent, respectively. The SXW site had no change in embeddedness, and HC actually decreased in embeddedness overall.

The RC site percent fines (< 2 mm) increased by only 4 percent in the pebble count data (Figure 4.8), whereas “fully” embedded portions of the cross sections increased by more than 16 percent. Portions of the channel that were “not” embedded decreased proportionally at 14 percent. These results show that embeddedness estimates were more sensitive to fine-sediment deposition in this steep, boulder-bedded channel than pebble counts.

One noticeable result is that OX increased more in embeddedness than MO, but the pebble count data showed MO increasing more in fine particles than OX. This result may be due to the difference in geomorphic features found at each site. The MO site has more pools than OX, and OX has more runs than MO. There were no flat runs sampled at MO, whereas there were seven pools sampled. There were four flat runs and three pools sampled at OX. These geomorphic differences could explain the discrepancy between the pebble-count and embeddedness results.

Silt-depth measurement results (the total number of sample points across the channel with measurable silt depths) correlated relatively well with the pebble-count and embeddedness results as the extent of silt deposition increased at the lower Diamond Fork Creek sites (DFC, MO, and OX) over the sampling period, but not at the Sixth Water Creek sites (SXW and RA) or reference paired watershed (HC) site (Figure 4.11). The distance across the channel where silt depths exceeded 2 cm (approximately 1 inch) ranged from 0.5-2 feet in Sixth Water Creek at the SXW and RC sites, 1-6 feet in lower Diamond Fork Creek at the DFC, MO, and OX sites, and 3-4 feet in Hobble Creek at HC. Seasonal trends are difficult to determine in Sixth Water Creek and Hobble Creek as there were relatively small changes between the first and last samples. However, seasonal changes are apparent in lower Diamond Fork Creek as the number of feet across the channel with measurable silt deposition doubled or tripled between July and November (Figure 4.11).

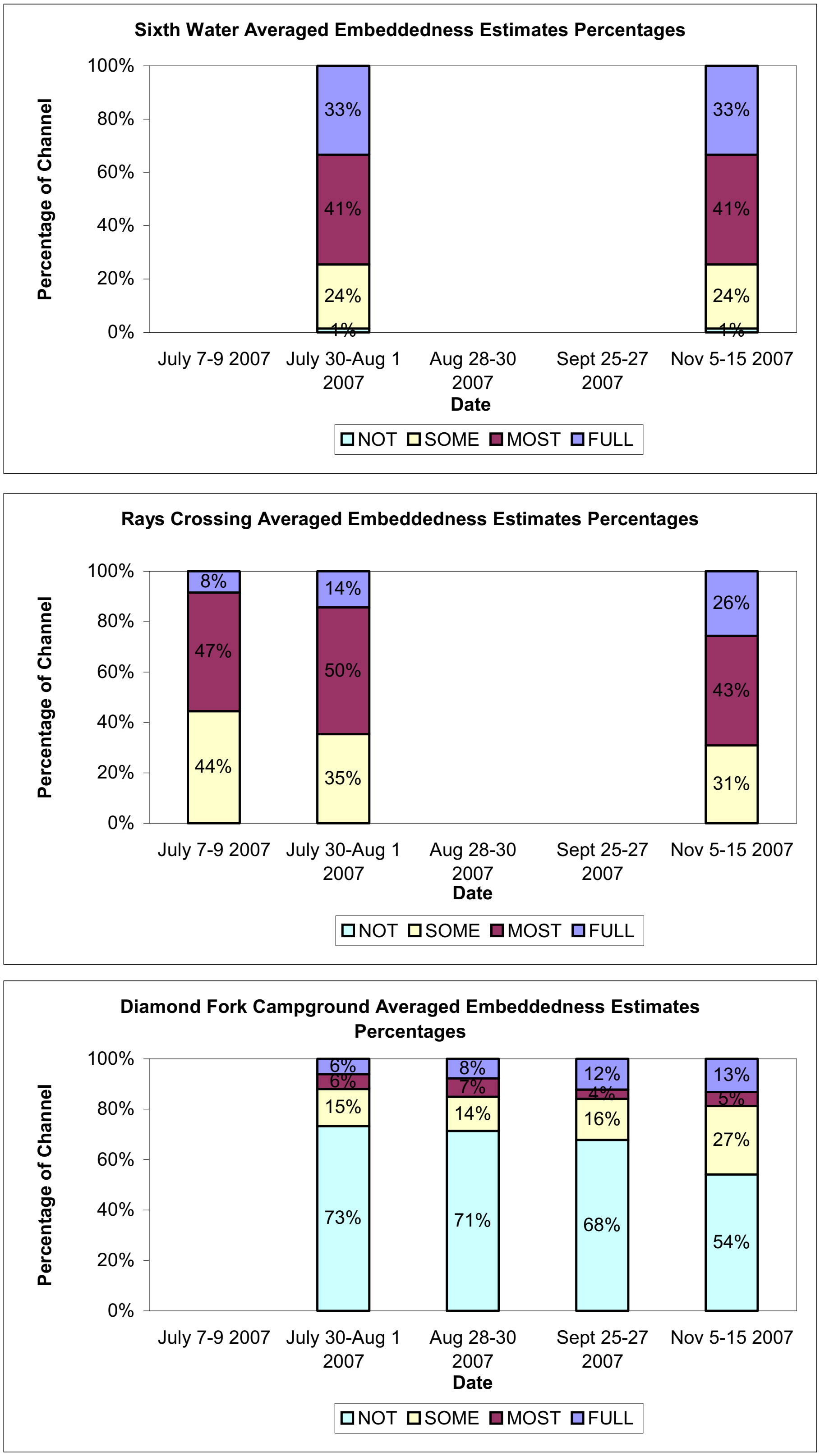


Figure 4.10a. Proportion of the channel with embedded particles.

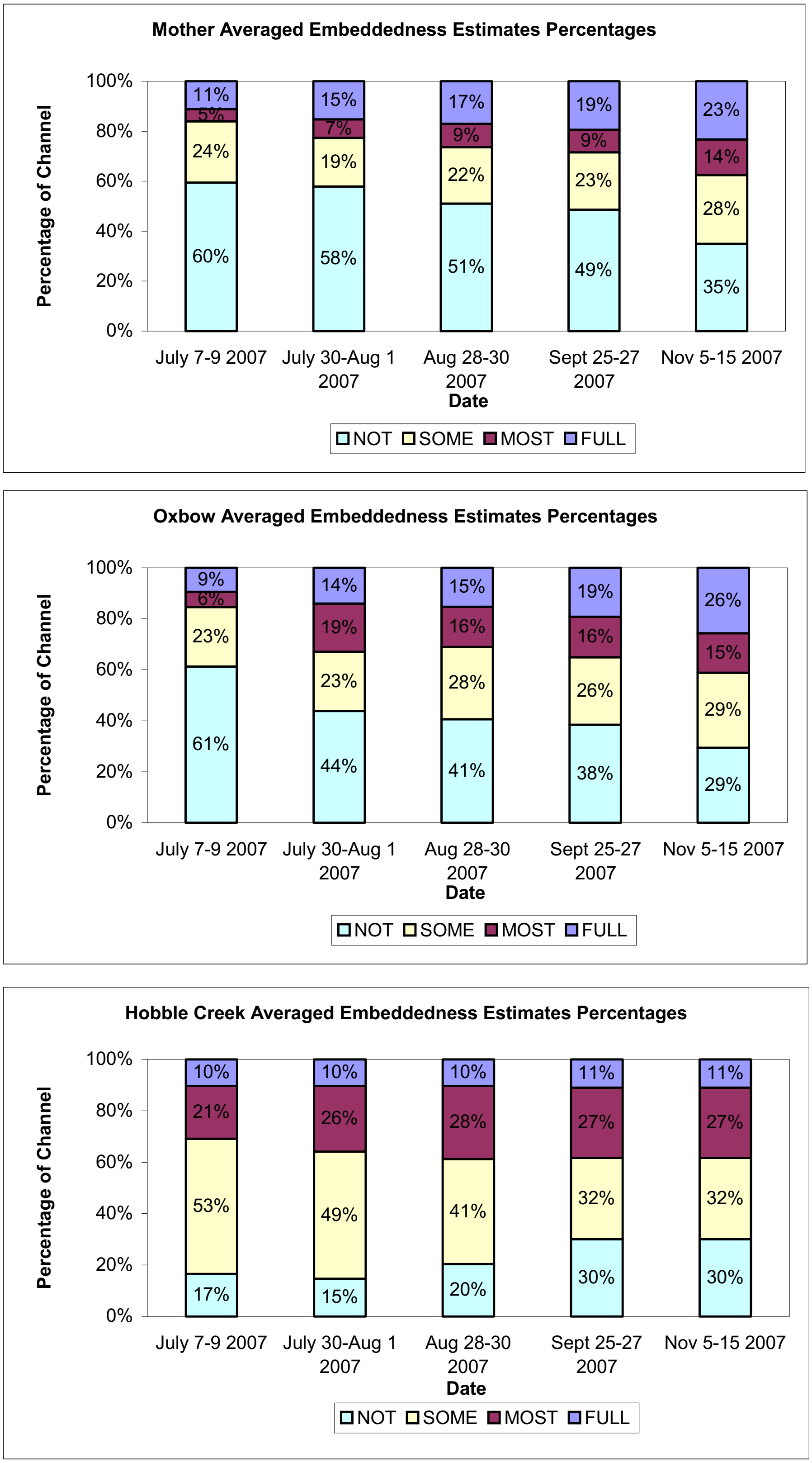
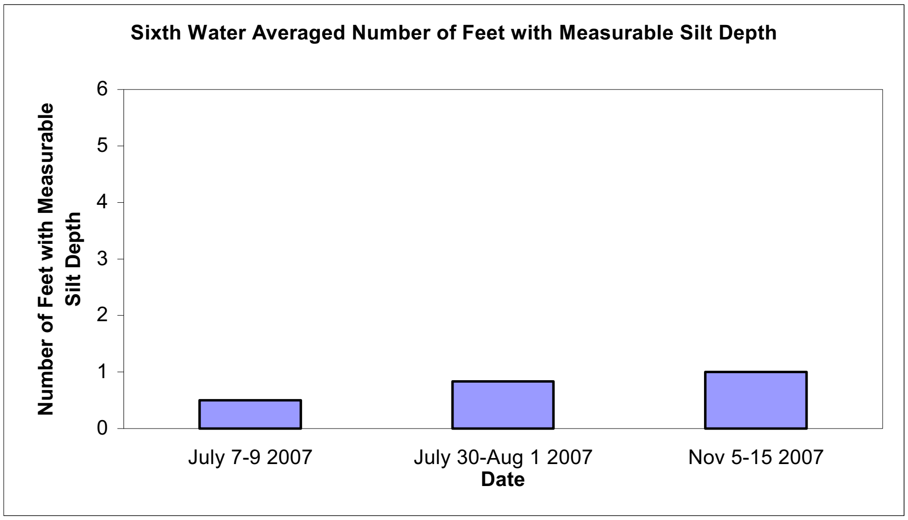
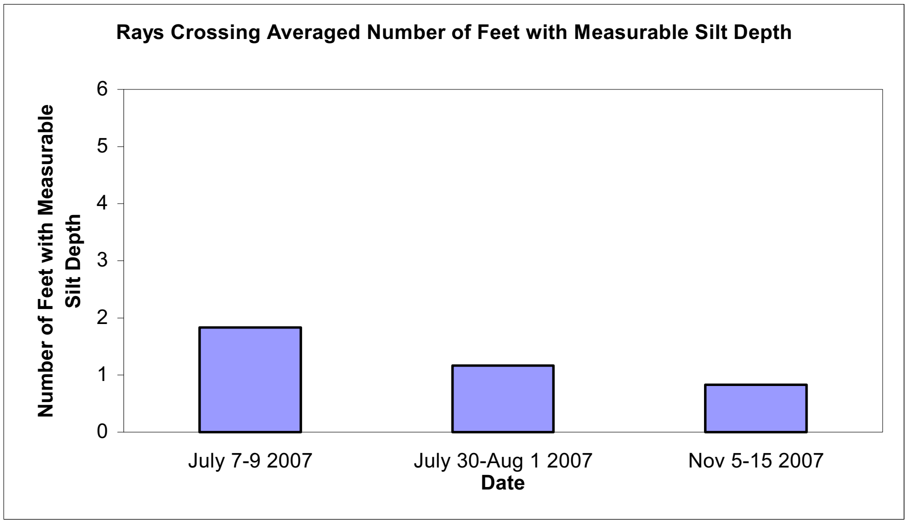


Figure 4.10b. Proportion of the channel with embedded particles.





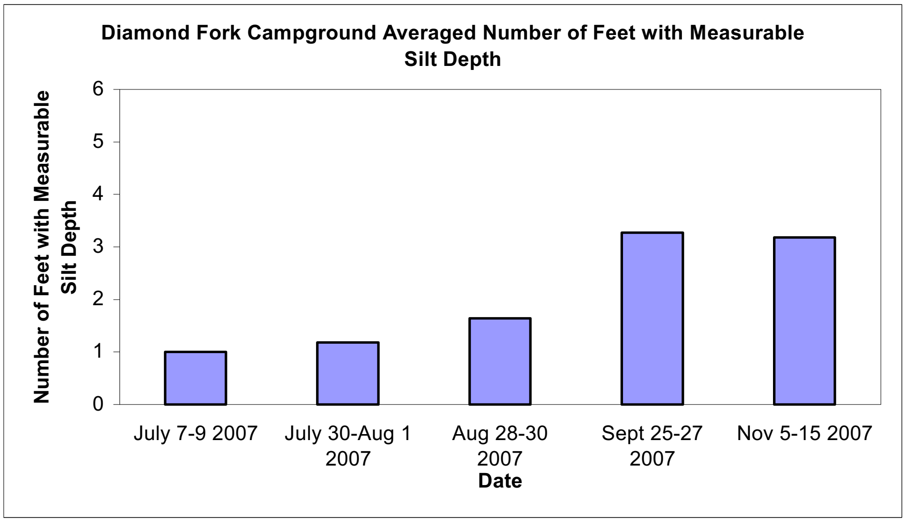
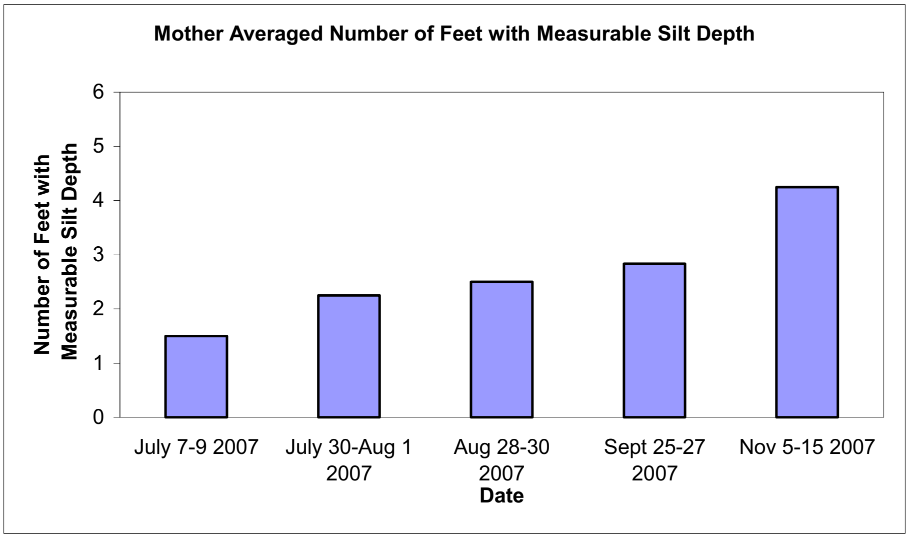
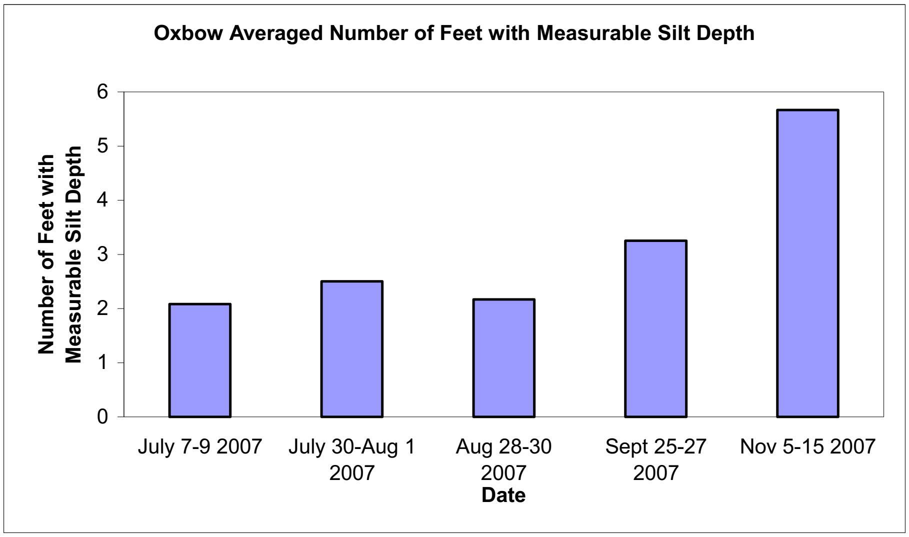


Figure 4.11a. Average number of sampling points (1 foot intervals across the channel cross sections) with measurable silt depth.





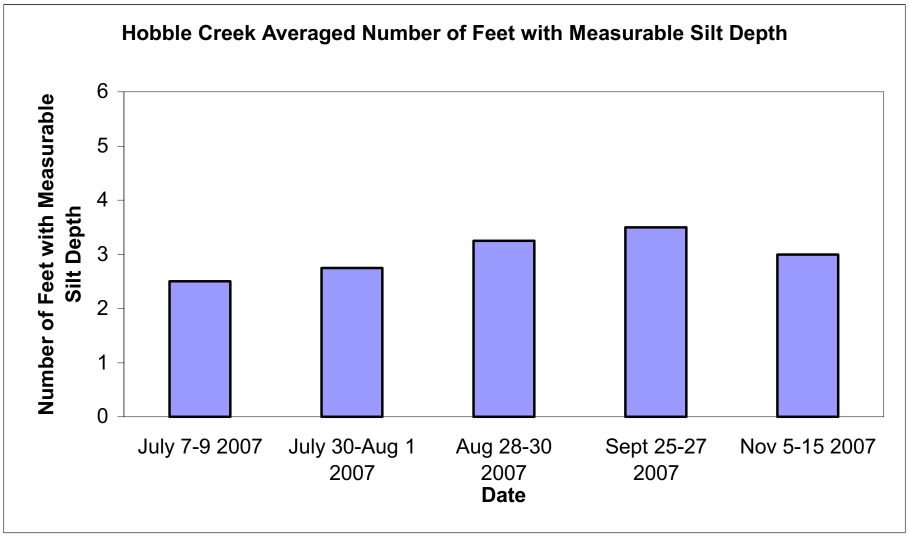


Figure 4.11b. Average number of sampling points (1 foot intervals across the channel cross sections) with measurable silt depth.

The actual silt depths ranged from 0-98 cm (over 3 feet), with the deepest silt build up occurring in the backwater portions of MO (the reach with the lowest channel slope as shown in Table 4.3). An interesting result is that most measurements in lower Diamond Fork Creek and Hobble Creek were between 2-8 cm, whereas the majority of silt deposits in Sixth Water Creek were somewhat deeper (between 4-10 cm), likely a result of average particle size and the large voids that occasionally fill with fine-grained sediment around boulders in Sixth Water Creek compared to the flatter “veneer” of fine-grained sediments that cover gravel in low-velocity margins of the channel in both lower Diamond Fork Creek and Hobble Creek.

Table 4.3. The 2005-2006 Diamond Fork monitoring sites channel slopes.

SITE	2005 CHANNEL SLOPE	2006 CHANNEL SLOPE
SXW	3.10%	3.30%
DFC	0.99%	0.93%
MO	0.59%	0.54%
OX	0.66%	0.59%

4.4 DISCUSSION

Summer and fall sedimentation is occurring in the lower reaches of Diamond Fork Creek. There seems to be a direct correlation between the average slope of the sites (Table 4.3), the degree of change in the number of fine particles counted in the pebble counts (Figure 4.9), and the extent of siltation on the streambed throughout the sample period (Figure 4.11). There is also a strong inverse correlation between the reach’s average slope and average particle size (Figure 4.8). The flatter the slope, the smaller the particles that make up the channel bed.

One of the driving factors in fine-particle deposition in lower Diamond Fork Creek during the summer and fall is the slope of the channel. According to Table 4.1 more pools were sampled at the MO site than the OX and DFC sites, but the MO riffle/steep-run data still increased by three times suggesting that feature type is not the only factor determining fine-sediment deposition and the degree of embeddedness; the reach’s average slope is also a component. The difference in channel slope between DFC (1.0%) and MO/OX (0.6%) affects fine-particle deposition significantly. Reaches with higher channel slopes are not depositing the fine-grained sediments but transporting them to lower, flatter reaches of Diamond Fork Creek. Since subsurface cementation has been observed at the MO and OX sites, both surface and subsurface deposition are suspected.

The flatter reaches of Diamond Fork Creek are becoming significantly embedded, and gravel patches are becoming covered with silt. The embeddedness of the channel is occurring at very high rates where ideal spawning gravels are located. During the November sampling period several spawning redds (probably German brown trout [*Salmo trutta*]) were observed in the MO and OX reaches. Since no fish were observed still on their redds, it was likely they were done spawning. Some of the redds were on or near the cross sections, and at the MO6 cross section fine-particle deposition was observed in the tailings of the redd on November 8 (Photo 4.1). Fine-particle

Photo 4.1. Fine sediment embedding a recent spawning redd in lower Diamond Fork Creek at the Mother (MO) monitoring site.

deposition occurred very quickly during this relatively sensitive spawning season. The rate of sedimentation seems to be greater in the fall than what was observed immediately following the peak-flow event in early July from relatively clean water released out of Monks Tunnel. These results are consistent with the measurable increase in bedload transport during fall samples in previous years (BIO-WEST 2006, 2007). The reason for this response and the dramatic fall increase in fine-particle fractions of the pebble-count data in the last sample at MO and OX is likely that the fine particles being transported start filling the void spaces on and under the surface of the channel following the "flush," or gravel-cleaning function of spring runoff. In other words the "gravel filter" becomes clogged every year. After spring runoff cleans the channel and deposits fresh gravel material, the continued bedload and suspended-sediment transport fills the voids in the substrate, sometimes causing a cementing effect in the surface and subsurface channel material. This fine-particle deposition eventually expresses itself in the fall on the surface because subsurface voids are filled up or cemented in. Void spaces under the bed of the channel are filling throughout the summer, and the increase in fine particle counts in the fall is likely a result of void spaces filling up annually.

Cementing of the subsurface was evident in the channel at the head of the pool just down stream of MO4. The head of this pool is controlled by a nick point in the cemented substrate of the channel (Photo 4.2). The force of the current at the head of this pool was very strong, but it was still unable to erode the cemented material that composed the channel bottom (Photo 4.3 shows a 2-foot vertical cut in the bed material in the thalweg).

Photo 4.2. The bed becomes cemented during late summer/early fall, forming “knick” points in the Mother (MO) and Oxbow (OX) monitoring sites.

Photo 4.3. A close-up of the “knick” point at the Mother (MO) monitoring site.

As described by Wilcock (1998):

> Physically, as stream substrates become more embedded, the interstitial space between particles is reduced, thus effectively reducing streambed roughness and altering channel bedform and hydraulics. Streambed and substrate mobility can be substantially affected by the quantity and characteristics of the fine material.

In addition, without periodic mobilization of fine sediments from the coarse bed material, deposited fines eventually clog interstitial voids (Kondolf and Wilcock 1996, Osmundson and Scheer 1998).

Biologically, permeability and interparticle dissolved oxygen can be negatively affected, which directly impacts egg survival for many fish species. Increases in embeddedness levels decrease the space between particles and limit the available area and cover for small fish, macroinvertebrates, and periphyton. Shifts to finer materials in particle-size distributions can alter biotic communities by reducing species diversity and density (Lenat et al. 1981). An increase in fine sediment reduces geometric mean-particle size and gravel permeability, and leads to lower dissolved oxygen levels in pore water (Chapman 1988). Thermal attenuation, decomposition, and nutrient transport also depend on percolation and the extent of sediment deposition in interstitial spaces among gravel particles (Young et al. 1990, Bjornn and Reiser 1991). Substrate permeability can be reduced by deposition of fine sediment in spawning gravels (Moring 1982, Platts et al. 1989, Rinne 1990). This in turn results in the reduction of embryo survival, fry emergence, and fry size (Tappel and Bjornn 1983, Young et al. 1990). It also impacts regeneration and living space for macroinvertebrates (Merrit and Cummins 1984).

Other research has shown that the hyporheic zone functions differently in areas where the channel is cemented. It is probable that the macroinvertebrate population differences observed between the spring and fall samples, and between 2005 and 2007 samples, have a direct correlation with sedimentation and cementation of Diamond Fork Creek (Chapter 5). Seasonal sedimentation might also explain the relatively low fish population found in the lower reaches of Diamond Fork Creek. Large fish size and low populations could be a product of poor recruitment. It is possible that fish numbers could continue to dwindle as a result of habitat degradation.

Based upon bedload sampling results in 2005 and 2006, it is assumed that small gravel- and sand-sized particles are transported year round and that the trend of increasing embeddedness continued past the last sample date in November. Visual observations made during the substrate mapping efforts (Chapter 3) indicate that run sections in MO and OX appear to be elongating upstream and downstream, and this, in turn, may be shortening the riffles and pools. It appears that channel cementation may be armoring the heads and tails of riffles and pools.

5.0 BENTHIC MACROINVERTEBRATE MONITORING

5.0 BENTHIC MACROINVERTEBRATE MONITORING

5.1 INTRODUCTION

This section describes the results of the third year of quantitative benthic macroinvertebrate monitoring on Diamond Fork and Sixth Water Creeks following the completion of water conveyances that allow deliveries from Strawberry Reservoir to completely bypass the system (with the exception of minimum instream flows). One goal for the restoration of Sixth Water and Diamond Fork Creeks is to benefit the fishery, which appeared to be negatively impacted during the historical water delivery regime by artificially high summer flows. Macroinvertebrates are a critical component of a healthy trout fishery, and adequate fish habitat and monitoring the macroinvertebrate community can provide information on changes in water quality and habitat, as well as an index for the quantity and quality of food available for the fishery. Such information can be used to determine whether and which types of adaptive maintenance activities are needed to assist in returning Diamond Fork Creek to a more desirable condition. Monitoring the health of the macroinvertebrate community will also help ensure that the restoration is achieving its commitments to maintaining and improving biological integrity and recreational opportunities.

5.2 METHODS

Quantitative and qualitative sampling for benthic macroinvertebrates was conducted in several locations in Diamond Fork Creek during April/May (spring sample) and again in September (autumn sample) from 2005 through 2007. An exception to this sample schedule occurred during the spring 2006 sample due to high flows (BIO-WEST 2007). Sample locations included each of the four long-term monitoring sites described in previous chapters, as well as three sites chosen specifically to evaluate water quality impacts of hydrogen sulfide inputs resulting from conveyance tunnel construction (only two of the latter were sampled in 2005). The three hydrogen sulfide evaluation sites included the original “control” site selected in 2005 near Sawmill Canyon (SC) (~ 7.25 kilometer [km] upstream from Three Forks), believed to be free of hydrogen sulfide impacts and the “impact” site in an area known to be heavily impacted by hydrogen sulfide inputs (~ 2.1 km upstream from Three Forks). Due to poor replication of results among samples at the original control site and poor physical conditions that were not conducive to effective sampling there, a second control site was added in 2006 and sampled again in 2007. The second control site was located further upstream near a U.S. Forest Service guard shack (GS).

In each sample location, one riffle was chosen at the site for collection of three replicate benthic macroinvertebrate samples. A pre-requisite of an appropriate site was sufficient size to permit collection of three samples and physical characteristics conducive to effective sampling with the gear. Each of the individual samples was taken with a Hess-type cylindrical square-foot bottom sampler with a 250-micron mesh net. The requirements for sampling with this device include substrate sizes ranging from gravel to cobble, water depth of less than two feet, and water velocity that was not too great to prevent holding the sampling gear in place. Hess samplers provide a quantitative estimate of both the density (number per area) and composition of the macroinvertebrate community in riffle-type habitats within each monitoring site. Since similar habitat types were sampled in each site using the Hess sampler, estimates of richness and abundance are directly comparable among sites.

In addition to the three samples collected with the Hess-type sampler, one multi-habitat, composite, kick-net sample was collected at each site. This sample was comprised of 20 individual samples collected in various habitat types, in proportion to their abundance within the site, using a D-frame kick net (Barbour et al. 1999). At the SI and SC sites, a multi-habitat sample was collected within a 200-m reach including the quantitative Hess sample sites. In each of the 20 sample sites, a 0.5-m area of substrate was disturbed in front of the D-frame kick net by kicking at the substrate. In areas with moderate-to-high velocities, the current carried the invertebrates and periphyton from the disturbed area into the D-frame kick net below. Areas with low velocity or large amounts of aquatic vegetation were disturbed, and the D-frame net was passed through the water column throughout the disturbed area.

Sample processing and preservation in the field included rinsing large debris over a 250 micron mesh sieve, and removing it from the sample. Samples were then rinsed, placed into a series of 1,000-milliliter (ml) and 500-ml wide-mouth Nalgene containers, preserved in 70 percent ethanol, and shipped to EcoAnalysts, Inc. (EcoAnalysts), in Moscow, Idaho, for further processing and identification.

EcoAnalysts processed and identified organisms in the benthic macroinvertebrate samples. Samples were spread over a gridded pan and sub-sampled by randomly selecting a grid and picking all organisms out of that grid. Grids were randomly selected and sorted until either 500 organisms had been picked or the entire sample had been sorted. When only a portion of the entire sample was used, macroinvertebrate counts from the sorted grids were extrapolated to the remaining grids to estimate the total number (abundance) of each taxa collected in each sample. All organisms were identified to the genus/species level, except for midges, which were identified to family, and worms, which were identified to class. Quality-assurance and -control procedures included a separate sorting effort on all samples to ensure 90 percent sorting efficiency. Also, a synoptic reference collection was created, which was checked by a second taxonomist to ensure taxonomic accuracy. The number of each taxa collected was then entered into a spreadsheet, which was used to generate a list of approximately 50 metrics that can be used as an index of the quality and health of the macroinvertebrate community. EcoAnalysts provided the raw data and metrics to BIO-WEST, along with the synoptic reference collections.

5.2.1 Data Analysis

Several commonly used metrics were selected to examine differences between sites and seasons sampled during the 3 years of monitoring. Total abundance of organisms in all Hess samples was converted into density estimates for the sample site using the 0.086-square-meter (m^2)area for the open bottom of the Hess sampler (WILDCO, Inc. 2006) and calculating the number of organisms per square meter. A variety of data transformations was used to fit the selected metrics to the normal distribution, and an analysis of variance (ANOVA) was used to test for differences among sites. Where appropriate, Tukey's multiple comparison test was used to compare all differences between means. Differences in the selected metrics within sites were compared between seasons using multiple paired t-tests and Bonferroni-adjusted probabilities.

5.3 RESULTS

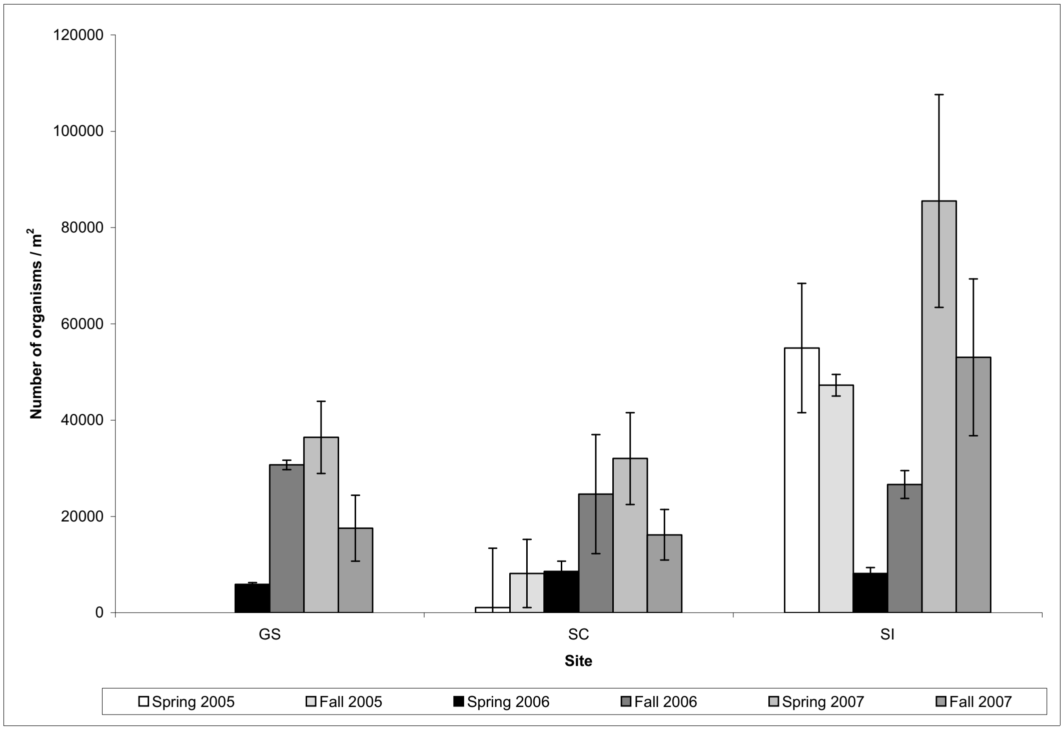
5.3.1 Metrics Used

A complete list of taxa found and metrics generated for each sample collected in 2007 can be found in Appendix 5.1 (data from 2005 and 2006 are found in the respective annual reports [BIO-WEST 2006, 2007]). The metrics used for comparing macroinvertebrate communities among sites (within each season) and within a site (among seasons) were total density of all macroinvertebrates (total abundance for kick-net samples), density/abundance of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (collectively referred to as EPT), total taxa richness, EPT taxa richness, the Hilsenhoff Biotic Index (HBI), and the proportion of the community that is comprised of the three most dominant taxa. The relevance of and calculated values for each of these metrics from all monitoring efforts during 2005-2007 are described below.

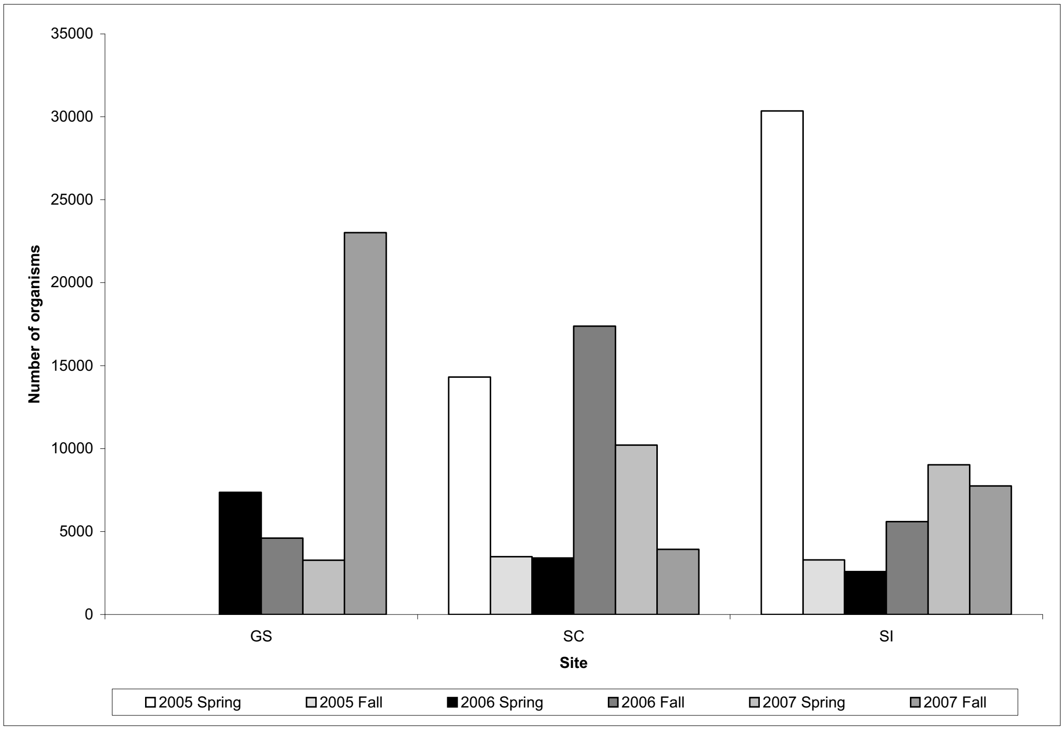
5.3.2 Total Density/Abundance

An estimate of the total density of macroinvertebrates provides one means of comparing biological conditions across sites. However, a high overall density may not indicate good habitat conditions and a healthy macroinvertebrate community if it results from an abundance of tolerant species. Very low total density indicates oligotrophic or toxic conditions, while very high total densities of macroinvertebrates are often associated with nutrient enrichment and a degraded condition. Among the three hydrogen sulfide evaluation sites (GS, SC, and SI), the total density of macroinvertebrates was significantly lower in the control (SC) than the impact site (SI) in autumn of 2005 ($F=15.6$, $p=0.017$). Total density was also higher at the SI site in spring 2005 and both spring and autumn 2007, but these were not significant using an alpha threshold value of 0.05 (Figure 5.1a). There was also a significantly higher density in the GS site in the spring 2007 sample compared with spring 2006, but there was no other significant differences over time in any site and little evidence to suggest a temporal trend in any site during the 3 years of monitoring. Among the four long-term monitoring sites (Sixth Water [SXW], Diamond Fork Campground [DFC], Mother [MO], and Oxbow [OX]), total density of all macroinvertebrates was significantly higher in the two upstream sites (SXW and DFC) than the two lower sites (MO and OX) in the autumn 2005 sample ($F=10.0$, $p=0.004$) and significantly higher in the SXW site than all other sites in the spring 2007 sample; no other significant differences were observed (Figure 5.2a). In each of these sites, the highest mean density value was observed in the final sample and in the DFC and OX sites, this value was significantly higher than previous samples in the same site (for DFC, $F=4.1$, $p=0.033$; for OX, $F=10.1$, $p=0.002$).

In qualitative kick-net samples, total abundance of macroinvertebrates displayed no distinct trends among sites or years in the three hydrogen sulfide evaluation sites (Figure 5.1b). Among the four long-term monitoring sites, total abundance was often similar among sites within a season; however, when there was a difference (autumn 2005 and autumn 2007) the abundance was highest in the SXW site (Figure 5.2b). This latter observation is similar to that observed in Hess sampling, except that both the SXW and DFC sites had higher densities during autumn 2005 and autumn 2007 with Hess sampling.

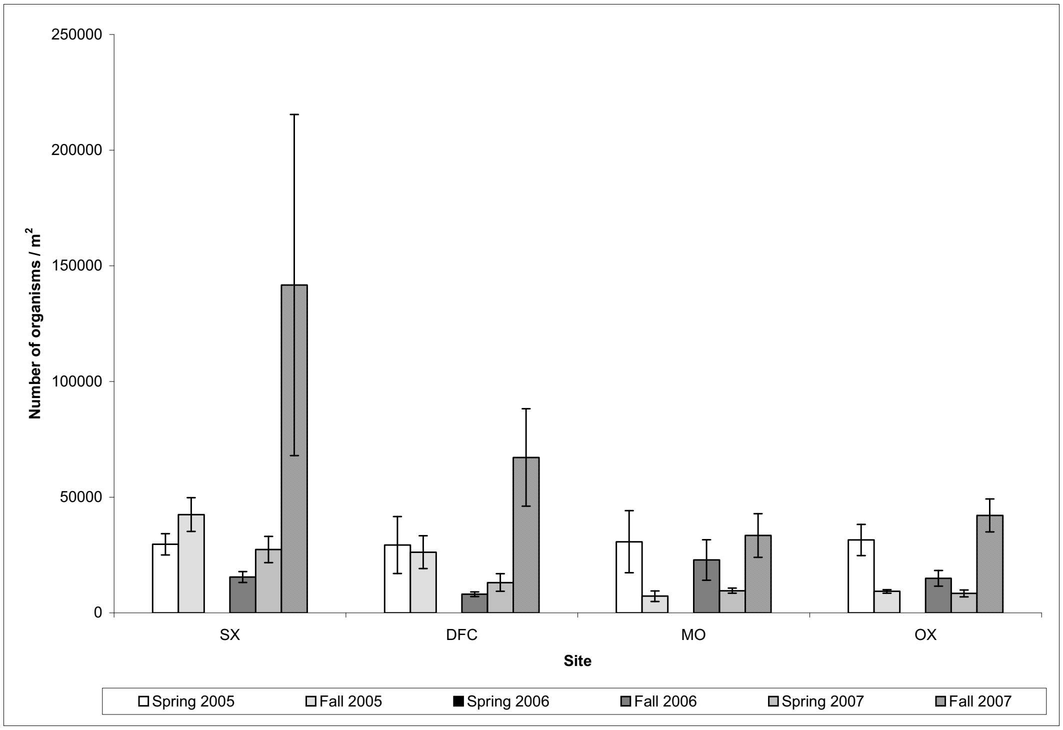


(a) Hess samples.

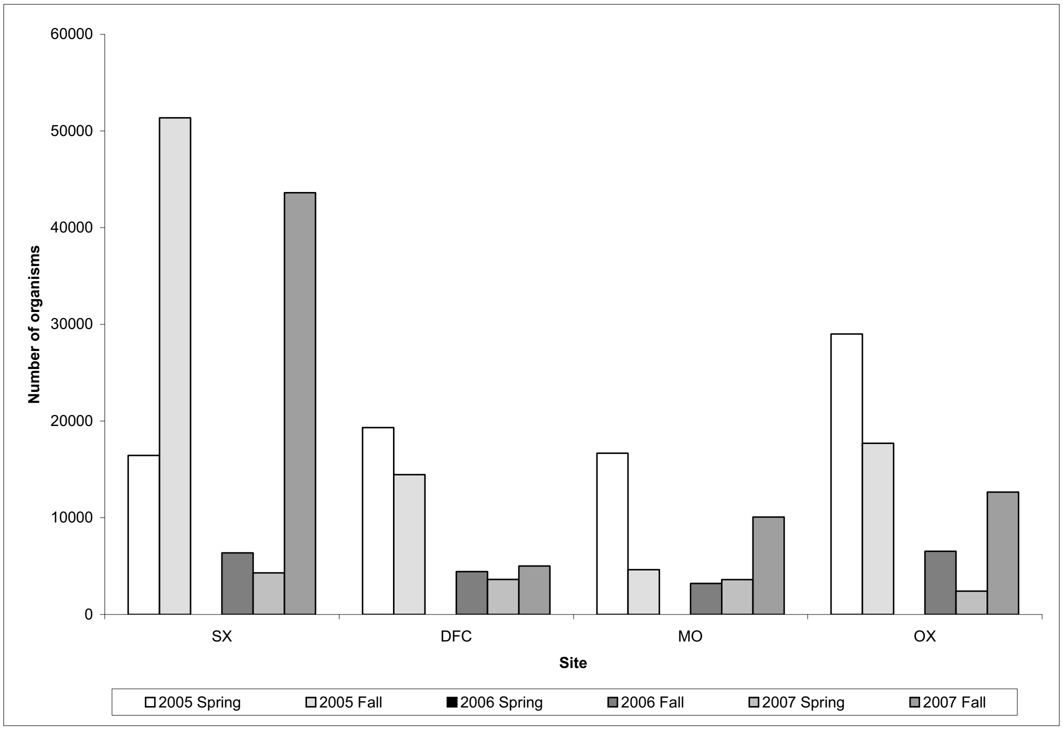


(b) Kick-net samples.

Figure 5.1. Total density of all macroinvertebrates averaged among three replicate Hess samples collected in each of the three hydrogen sulfide evaluation sites (a) and total abundance of all macroinvertebrates from qualitative kick-net samples (b) in spring and autumn 2005-2007. Error bars represent +/- one standard error.



(a) Hess samples.



(b) Kick-net samples.

Figure 5.2. Total density of all macroinvertebrates averaged among three replicate Hess samples collected in each of the four long-term monitoring sites (a) and total abundance of all macroinvertebrates from qualitative kick-net samples (b) in spring and autumn 2005-2007. Error bars represent +/- one standard error.

5.3.3 Ephemeroptera, Plecoptera, and Trichoptera (EPT) Density/Abundance

The EPT taxa are generally thought of as sensitive to anthropogenic disturbance and provide a means of comparing macroinvertebrate community dynamics among sites at a finer scale than comparing total density of all organisms. EPT taxa density determined from Hess samples was similar among all hydrogen sulfide evaluation sites during each sample effort. The EPT density tended to be lowest in the SI site in 2006 and 2007 samples, but there were no significant differences (Figure 5.3a). In both control sites, there appeared to be a trend toward increasing EPT density during the three years of sampling (Figure 5.4), however, these were not significant (for GS, $F=1.01$ and $p>0.33$; for SC, $F=2.59$ and $p>0.12$).

Among the four long-term monitoring sites (Figure 5.5a), EPT density was significantly higher in the upstream two sites (SXW and DFC) in the autumn 2005 sample ($F=10.46$, $p=0.004$). EPT density was also higher in the SXW and OX sites than MO and DFC in autumn 2006 and higher in the SXW site than MO or OX in spring 2007. There were no significant differences among sites in spring 2005 or autumn 2007. Only one of the four monitoring sites, MO, had a significant trend over time (Figure 5.6) with EPT density increasing during the monitoring period ($F=6.96$, $p=0.02$).

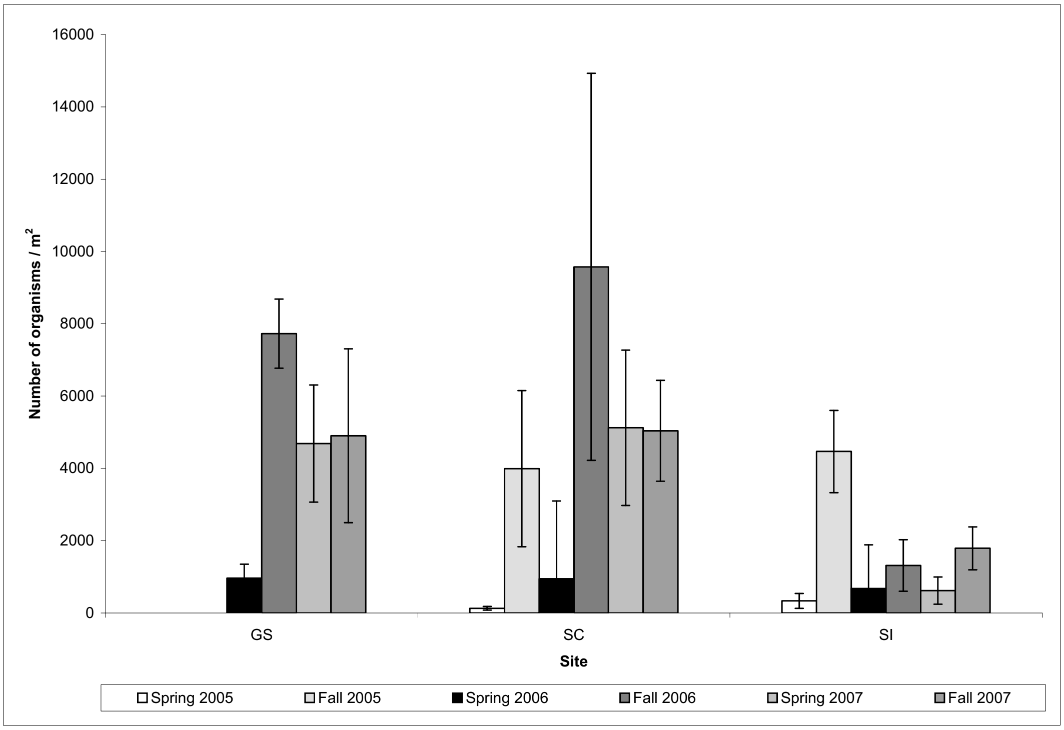
The qualitative kick-net collections in the three hydrogen sulfide evaluation sites did not have the same trend of increasing EPT taxa abundance in the control sites (Figure 5.3b) as observed in the Hess samples. The highest value among all samples occurred in autumn 2007 in the GS site, but this was preceded by much lower values in the spring 2007 and autumn 2006 samples. All kick-net samples collected in the SI site had very low EPT abundance.

Among the four long-term monitoring sites, the SXW site had the highest EPT abundance in both samples in 2005, but in all subsequent samples, there were similar values among all sites (Figure 5.5b). In all four sites, there appeared to be a trend of decreasing EPT abundance in the kick-net samples between the autumn 2005 samples and those collected in spring 2007, but in all cases there was an increase in autumn 2007.

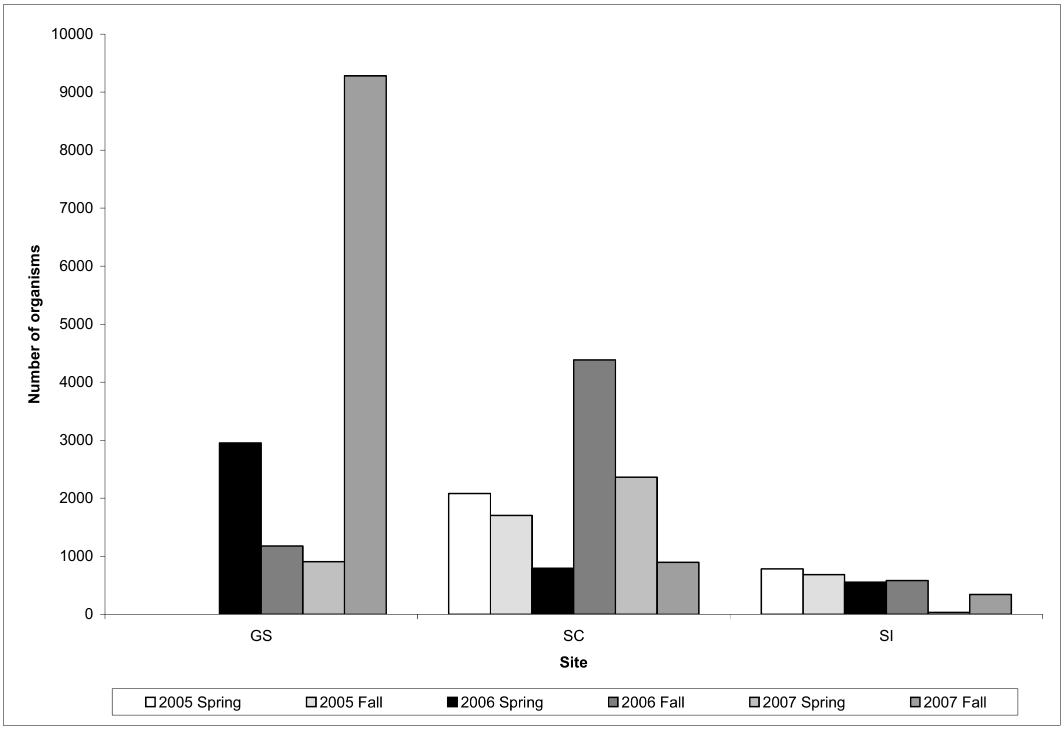
5.3.4 Taxa Richness

Taxa richness is the number of taxa observed in each sample (Hess or kick-net) and provides an index for evaluating community diversity, but as with total density, it does not discriminate taxa by tolerance to altered conditions. Because degraded conditions often lead to a high abundance of just a few tolerant species, higher taxa richness usually indicates greater habitat diversity and/or more suitable water quality, and therefore suitable to a wider range of macroinvertebrates.

Taxa richness was significantly higher (in all cases, $p<0.03$) in the two control sites than in the hydrogen sulfide impact site (SI) during each sample in 2005-2007 (Figure 5.7a). Within sites, there was a trend of decreasing total taxa richness over time in SI, but there was an increasing trend in the GS site between spring 2006 and autumn 2007 (no samples were collected there in 2005), and a similar trend during 2006-2007 in the SC site. However, due to a high taxa richness value in the autumn 2005 sample at SC, there was no trend over the three years of data collection. Also in the SC site, samples collected in autumn 2005 and autumn 2007 were significantly higher than the



(a) Hess samples.



(b) Kick-net samples.

Figure 5.3. Density of EPT taxa averaged among three replicate Hess samples collected in each of the three hydrogen sulfide evaluation sites (a), and total EPT abundance of all macroinvertebrates from qualitative kick-net samples (b) in spring and autumn 2005-2007. Error bars represent +/- one standard error.

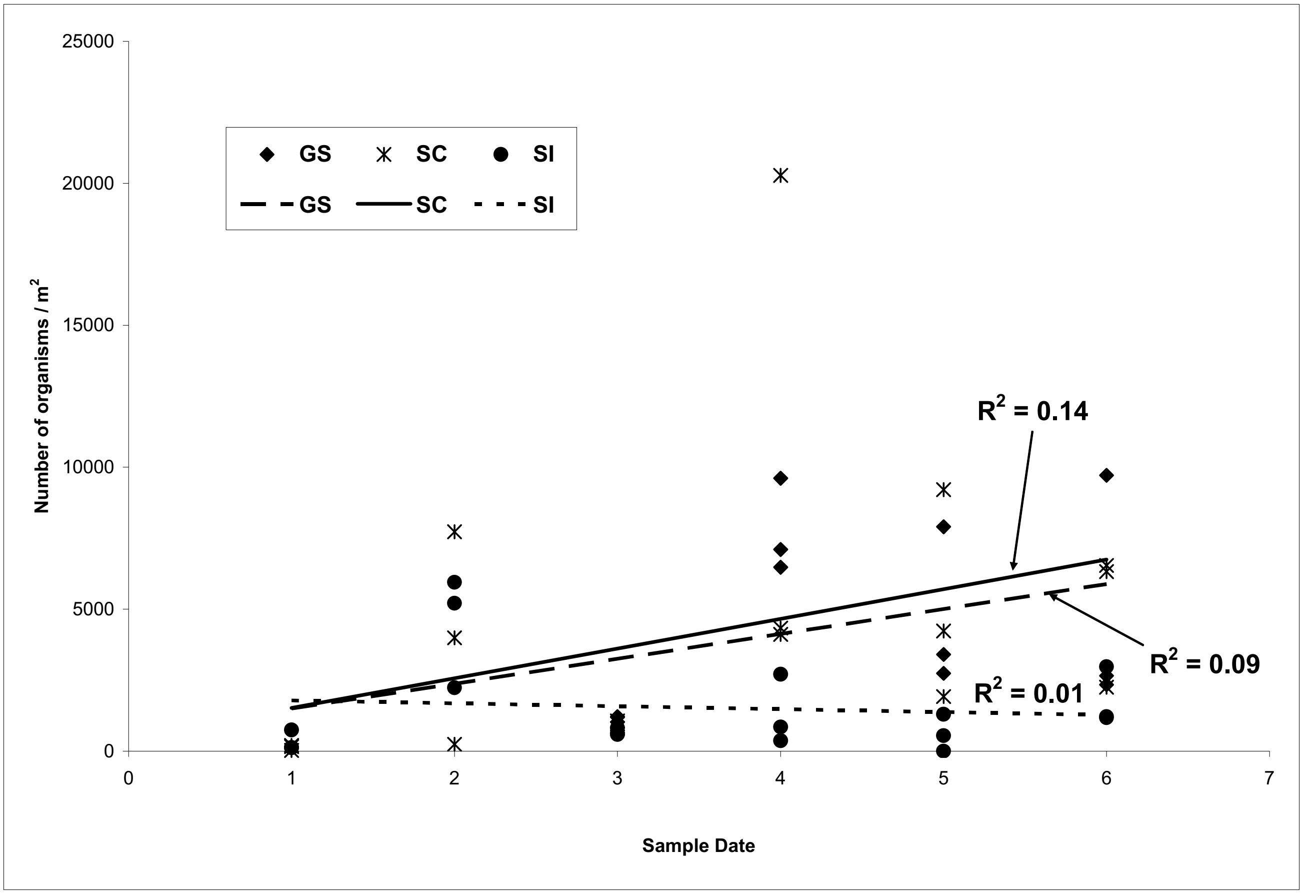
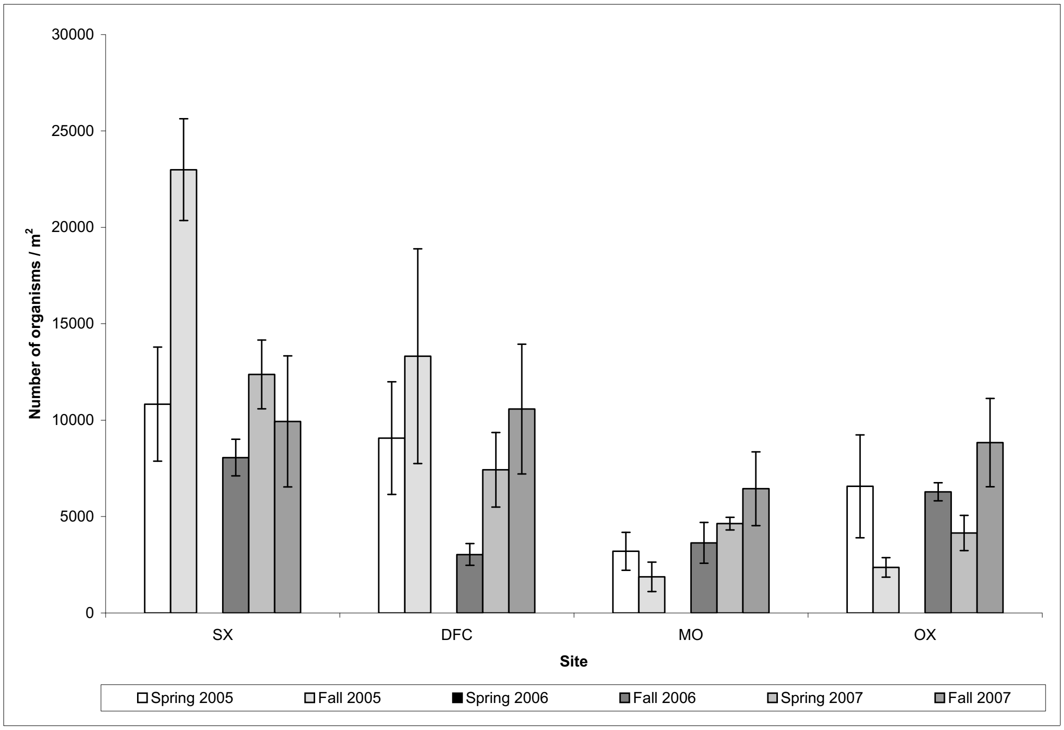
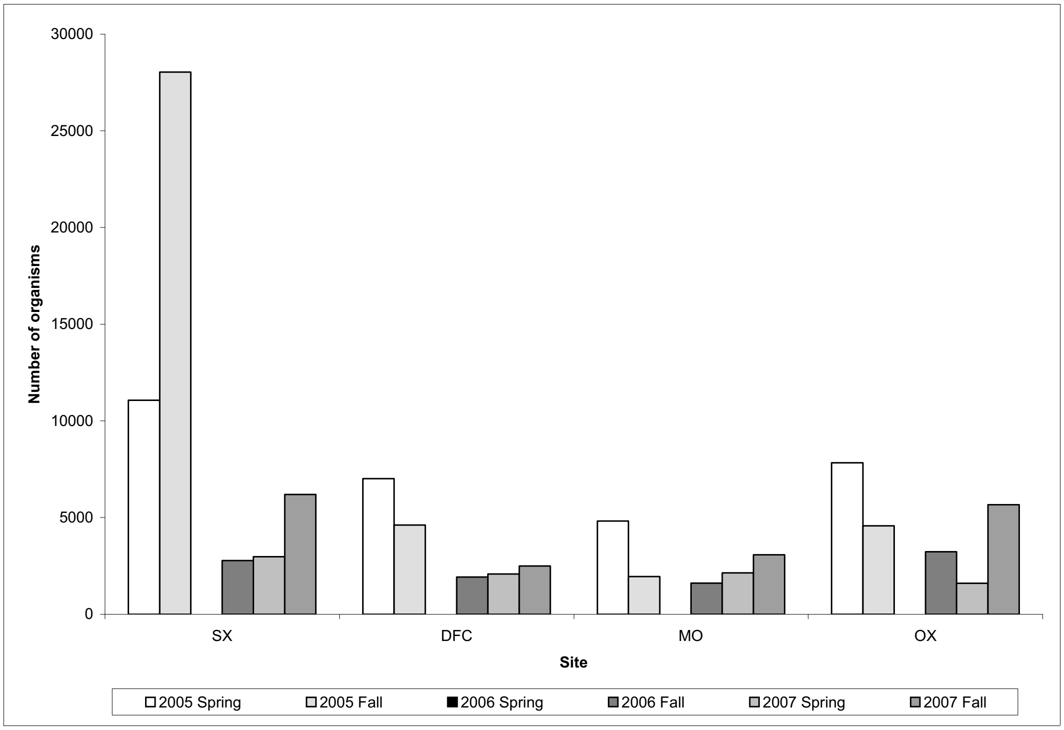


Figure 5.4. Scatterplot and trend lines of EPT taxa density collected in Hess samples in the three hydrogen sulfide evaluation sites from 2005-2007. Sample dates progress from spring 2005 (1) to autumn 2007 (6).



(a) Hess samples.



(b) Kick-net samples.

Figure 5.5. Density of EPT taxa averaged among three replicate Hess samples collected in each of the four long-term monitoring sites (a), and total EPT abundance of all macroinvertebrates from qualitative kick-net samples (b) in spring and autumn 2005-2007. Error bars represent +/- one standard error.

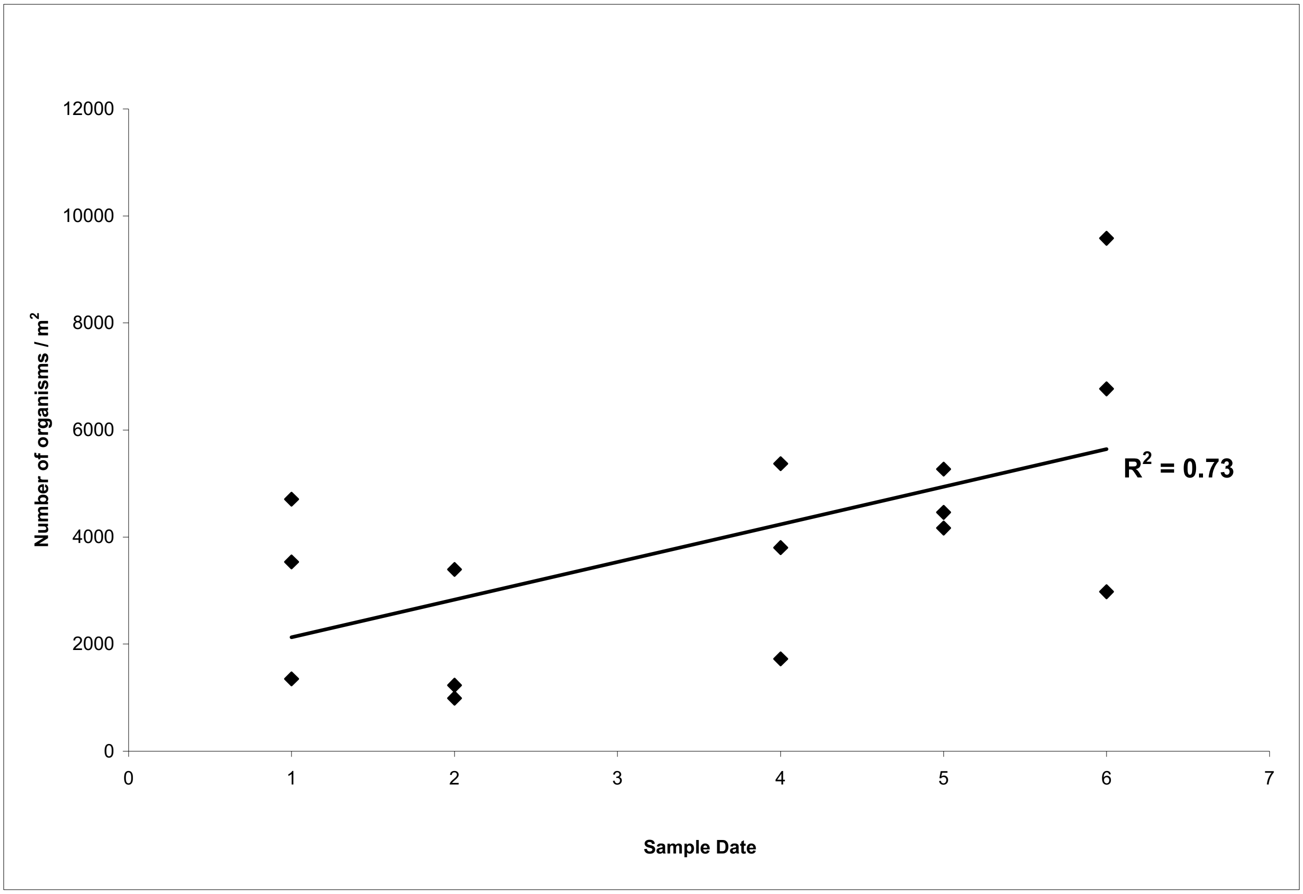
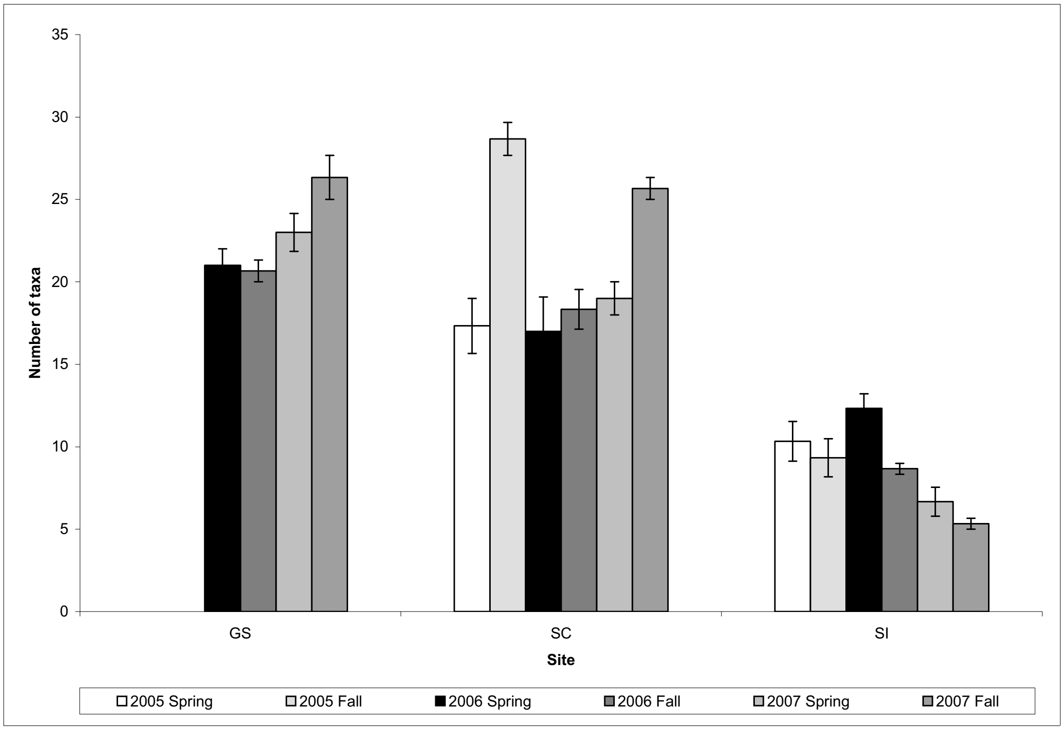
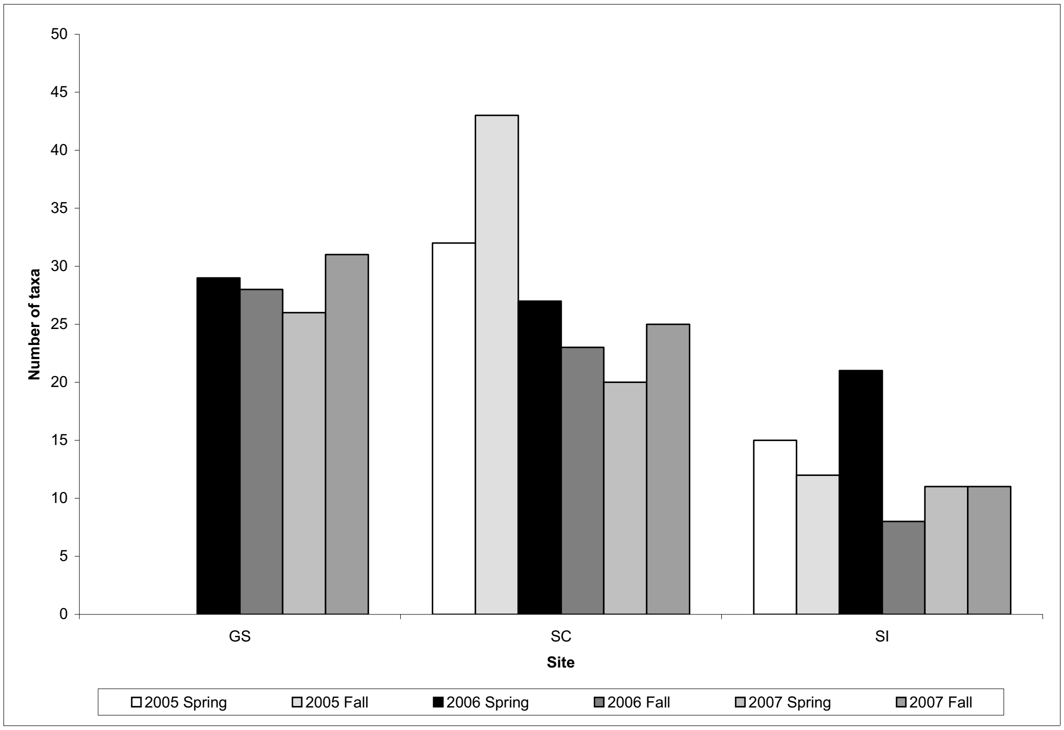


Figure 5.6. Scatterplot and trendline of EPT taxa density collected in Hess samples in the MO site from 2005-2007. Sample dates progress from spring 2005 (1) to autumn 2007 (6).



(a) Hess samples.



(b) Kick-net samples.

Figure 5.7. Taxa richness averaged among three replicate Hess samples (a) and qualitative kick-net samples (b) collected in each of the three hydrogen sulfide evaluation sites in spring and autumn 2005-2007. Error bars represent +/- one standard error.

preceding spring sample (F=5.0, p=0.011) and in the GS site the taxa richness was higher in autumn 2007 than earlier samples (F=5.9, p =0.020).

Taxa richness in the four long-term monitoring sites was similar among sites during each sample in 2005-2007 (Figure 5.8a) the only statistically significant result was a higher taxa richness in the SXW site compared with the MO site in spring 2005 (F=5.2, p=0.028). Within each site, there appeared to be a trend toward decreasing taxa richness over time, but this was only a significant relationship in the SXW site (F=11.85; p<0.005) (Figure 5.9). However, when evaluated separately by season, there was a significant trend of decreasing taxa richness in all four sites in the autumn (Figure 5.10; p<0.02 for all sites), but in the spring there was either no trend of change over time (SXW, DFC, and OX) or a significant trend of increasing taxa richness over time (MO; F=15.6, p=0.017) (Figure 5.11).

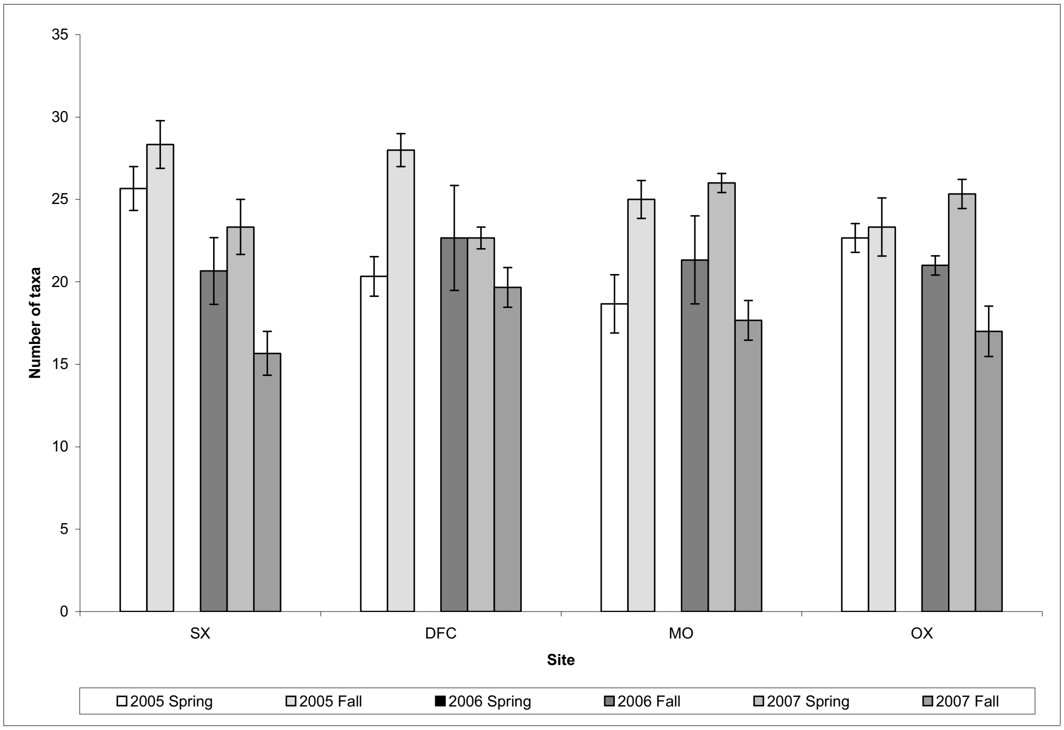
The results of the quantitative kick-net collections in the three hydrogen sulfide evaluation sites were similar to the Hess sampling in that during each sample effort, taxa richness was higher in SC and GS than in SI (Figure 5.7b). Also similar to the Hess data, there was little evidence of change over time in the SI site, but in contrast to an apparent increase in taxa richness observed in Hess sampling (at least during 2006-2007) there appeared to be a decreasing trend in the SC site.

Among the four long-term monitoring sites, taxa richness was similar during each sample efforts (Figure 5.8b), but among samples within each site there appeared to be a decreasing trend over time. The mean difference in taxa richness between kick-net samples and Hess samples was approximately 4.9 more taxa in the kick-net samples.

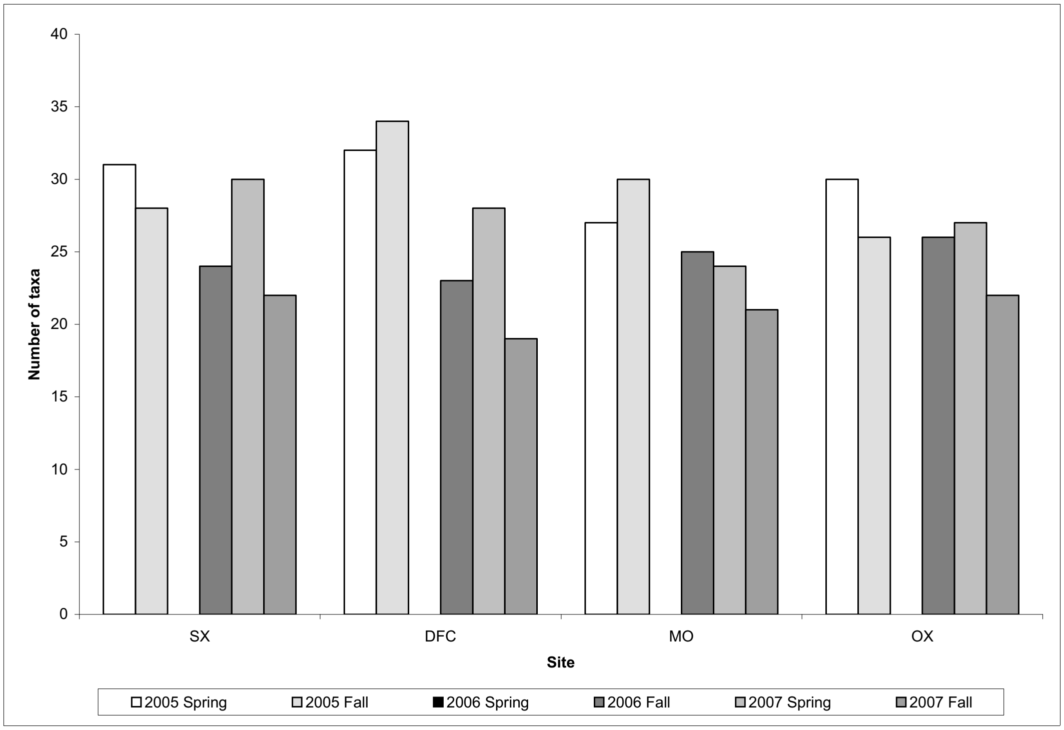
5.3.5 Ephemeroptera, Plecoptera, and Trichoptera (EPT) Taxa Richness

Similar to the total taxa richness data, the EPT taxa richness was higher in the SC and GS sites than in the SI site during each sample in 2005-2007 (Figure 5.12a) (not statistically significant during spring 2005 or spring 2006). There were no trends apparent in any of the three sites over time, but there was significantly higher EPT taxa richness in the autumn 2005 and autumn 2007 samples from the SC site compared with the preceding spring samples in that site (a result similar to that of overall taxa richness). This trend was not observed in 2006 (the spring 2006 sample in the SI site was significantly higher than all other samples collected at that site over the 3 years of monitoring; F=23.2, p<0.001) or in the SC and GS sites. The EPT taxa richness was similar among the four long-term monitoring sites during each sample in 2005-2007 (Figure 5.13a).

Within each of the four long-term monitoring sites (SXW, DFC, MO, and OX), there were no distinct trends over time (Figure 5.14), but in each case the final sample (autumn 2007) had significantly lower EPT taxa richness than many of the preceding samples. In addition, there appeared to be trends in the data when evaluated by season (similar to those observed in total taxa richness). In all four long-term monitoring sites there was a significant trend toward decreasing EPT taxa richness over time among samples collected in the autumn (Figure 5.15; p<0.03 for all sites), but in the spring there was either no trend of change over time (SXW and DFC) or a significant trend of increasing EPT taxa over time (MO: F=12.1, p=0.025; OX: F=12.5, p=0.024) (Figure 5.16).



(a) Hess samples.



(b) Kick-net samples.

Figure 5.8. Taxa richness averaged among three replicate Hess samples (a) and qualitative kick-net samples (b) collected in each of the four long-term monitoring sites in spring and autumn 2005-2007. Error bars represent +/- one standard error.

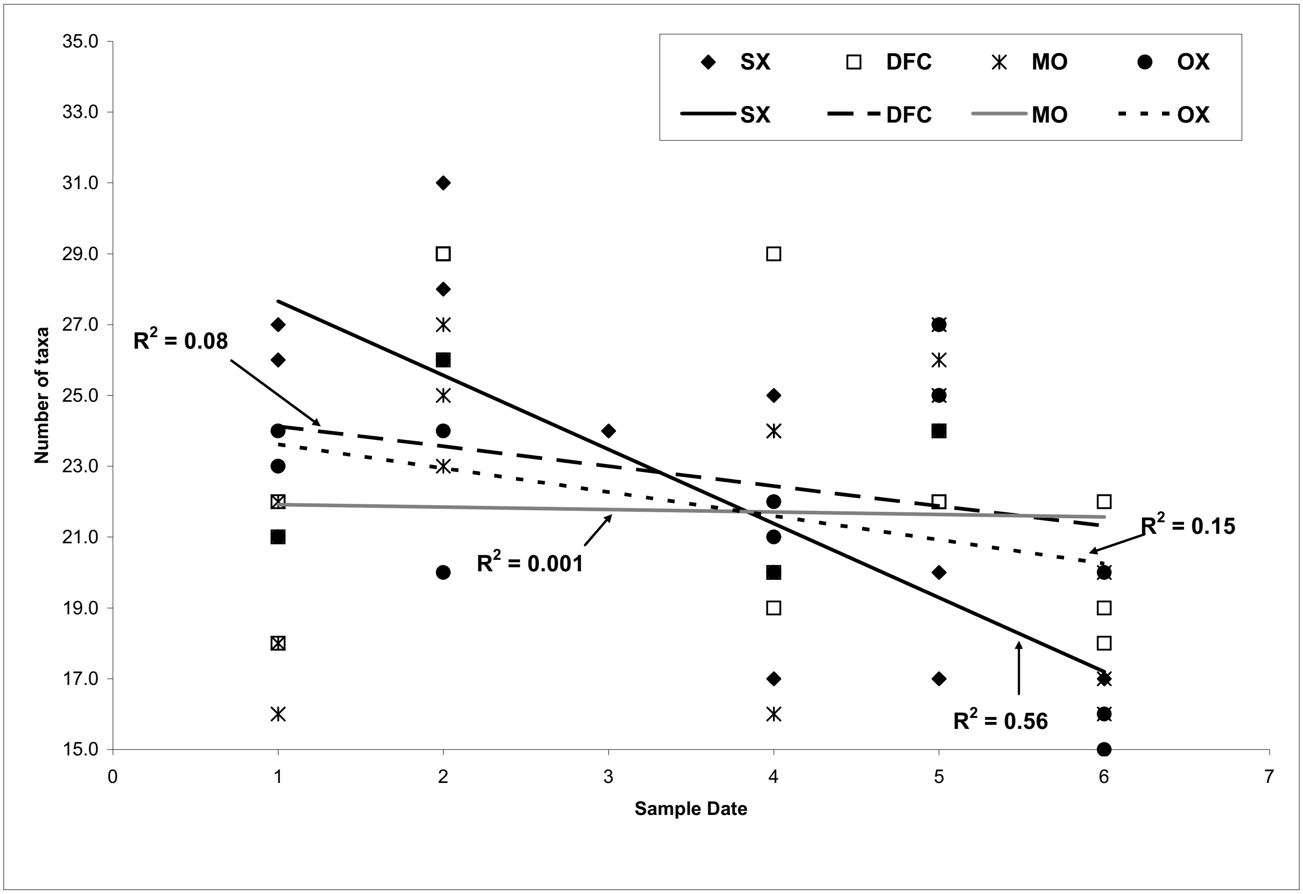


Figure 5.9. Scatterplot and trendline of taxa richness collected in Hess samples in the four long-term monitoring sites from 2005-2007. Sample dates progress from spring 2005 (1) to autumn 2007 (6).

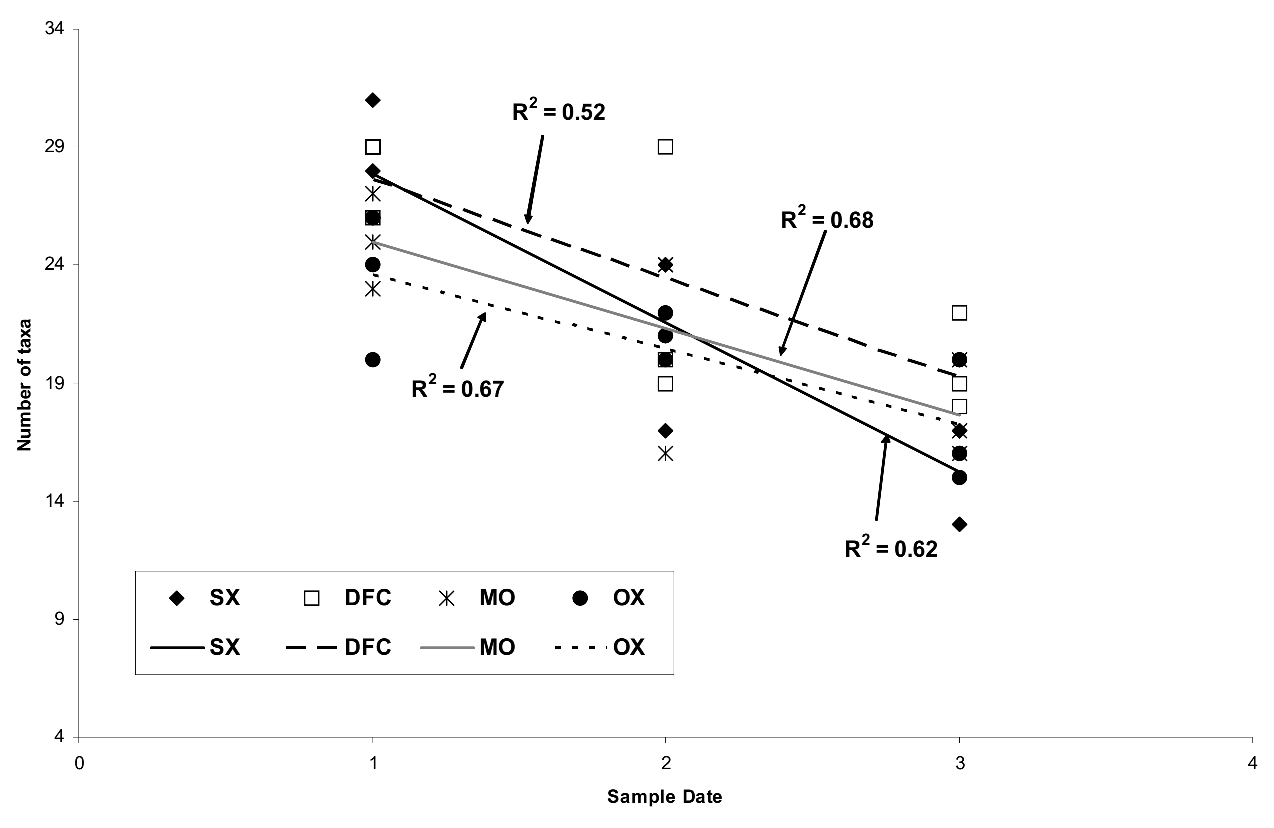


Figure 5.10. Scatterplot and trendline of taxa richness collected in Hess samples during autumn in the four long-term monitoring sites from 2005-2007. Sample dates progress from autumn 2005 (1) to autumn 2007 (3).

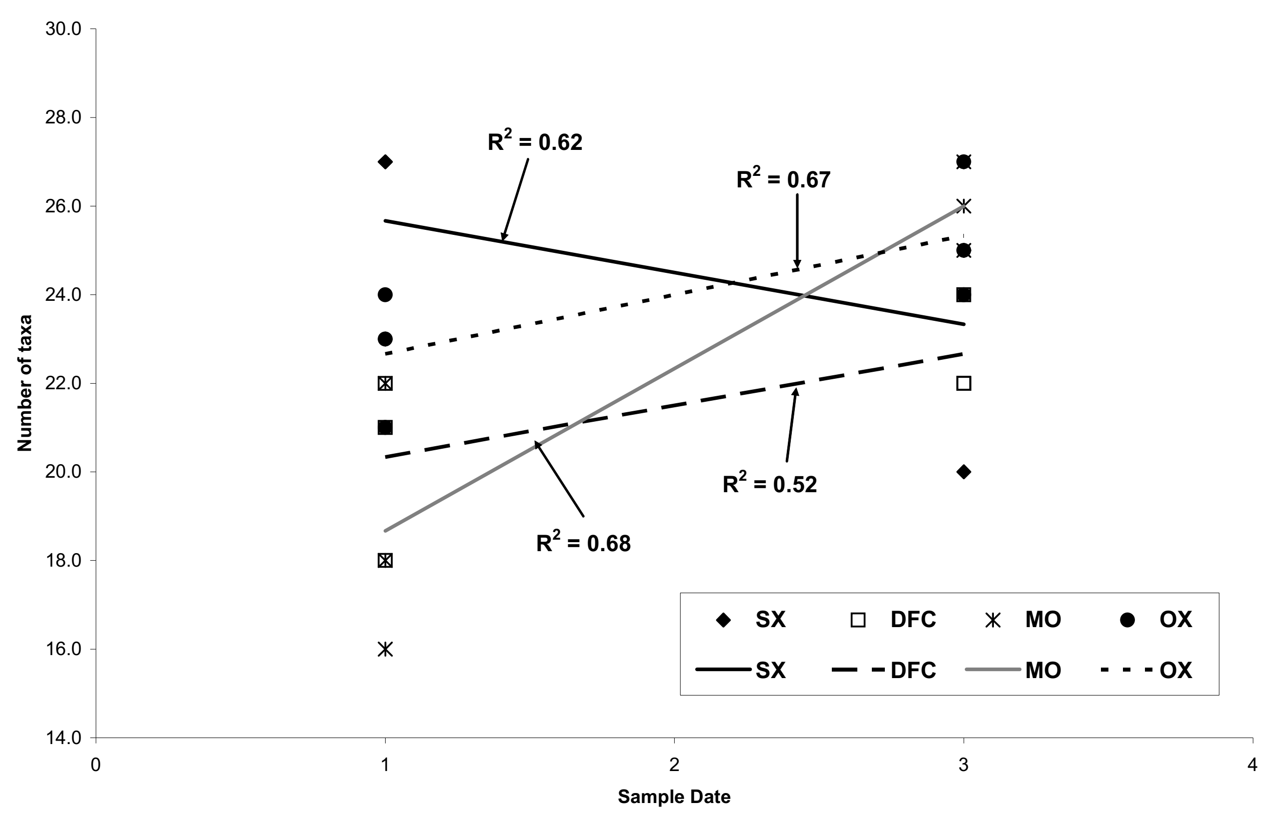
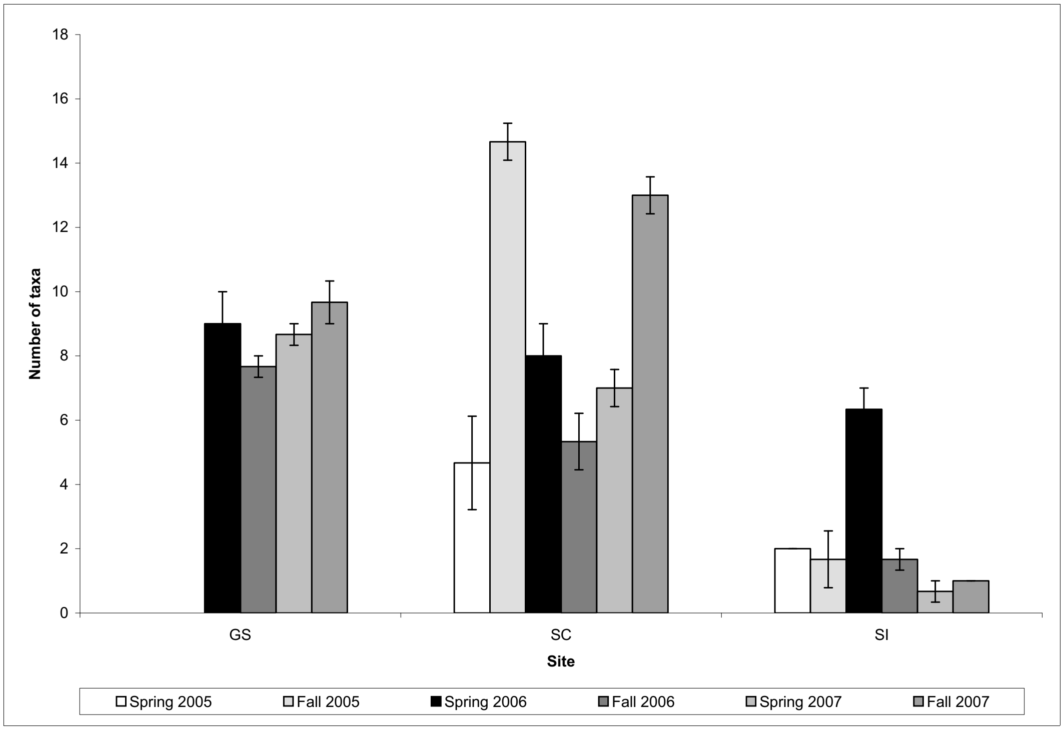
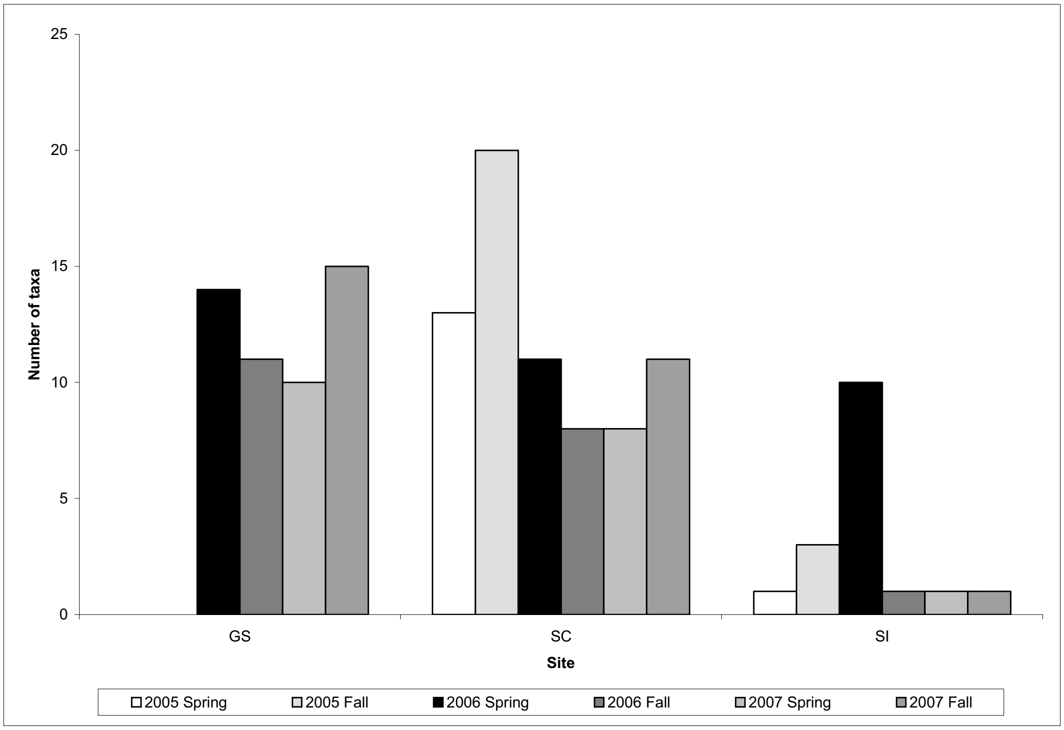


Figure 5.11. Scatterplot and trendline of taxa richness collected in Hess samples during spring in the four long-term monitoring sites from 2005-2007. Sample dates progress from spring 2005 (1) to spring 2007 (3).

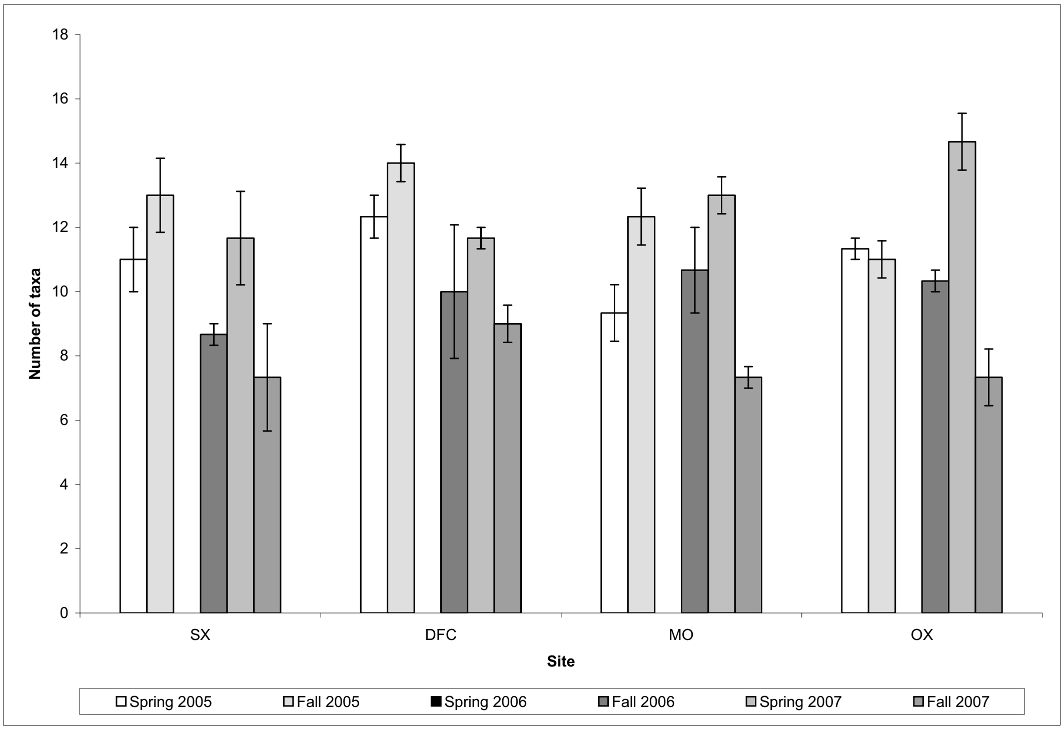


(a) Hess samples.

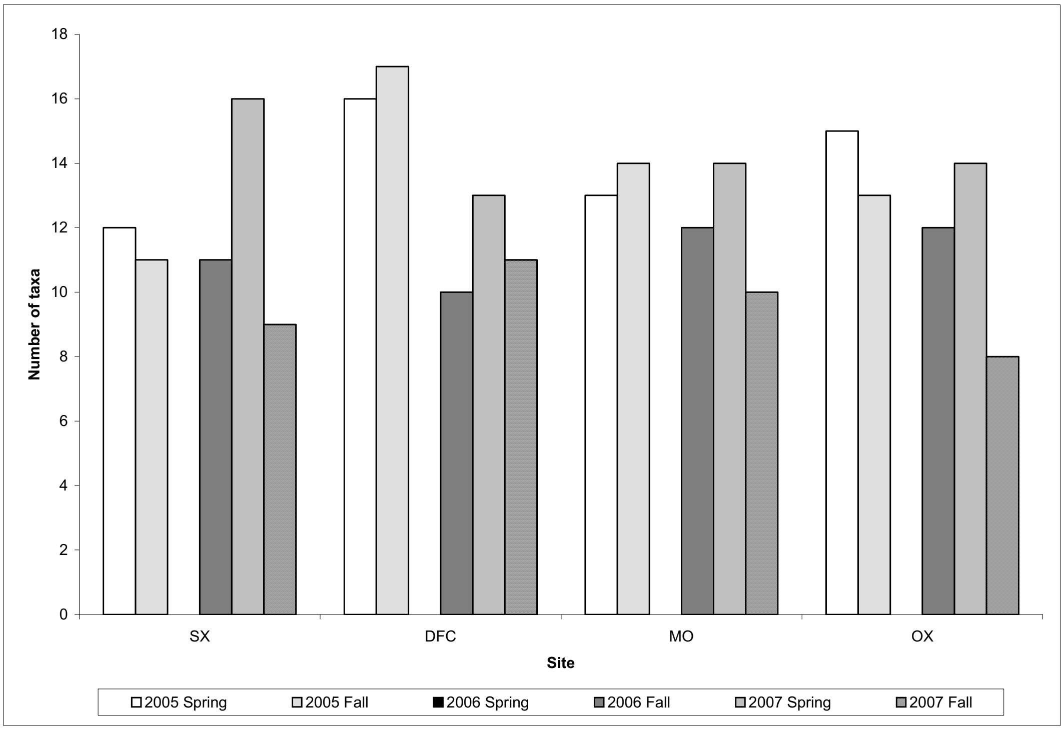


(b) Kick-net samples.

Figure 5.12. The EPT taxa richness averaged among three replicate Hess samples (a) and qualitative kick-net samples (b) collected in each of the three hydrogen sulfide evaluation sites in spring and autumn 2005-2007. Error bars represent +/- one standard error.



(a) Hess samples.



(b) Kick-net samples.

Figure 5.13. The EPT taxa richness averaged among three replicate Hess samples (a) and qualitative kick-net samples (b) collected in each of the four long-term monitoring sites in spring and autumn 2005-2007. Error bars represent +/- one standard error.

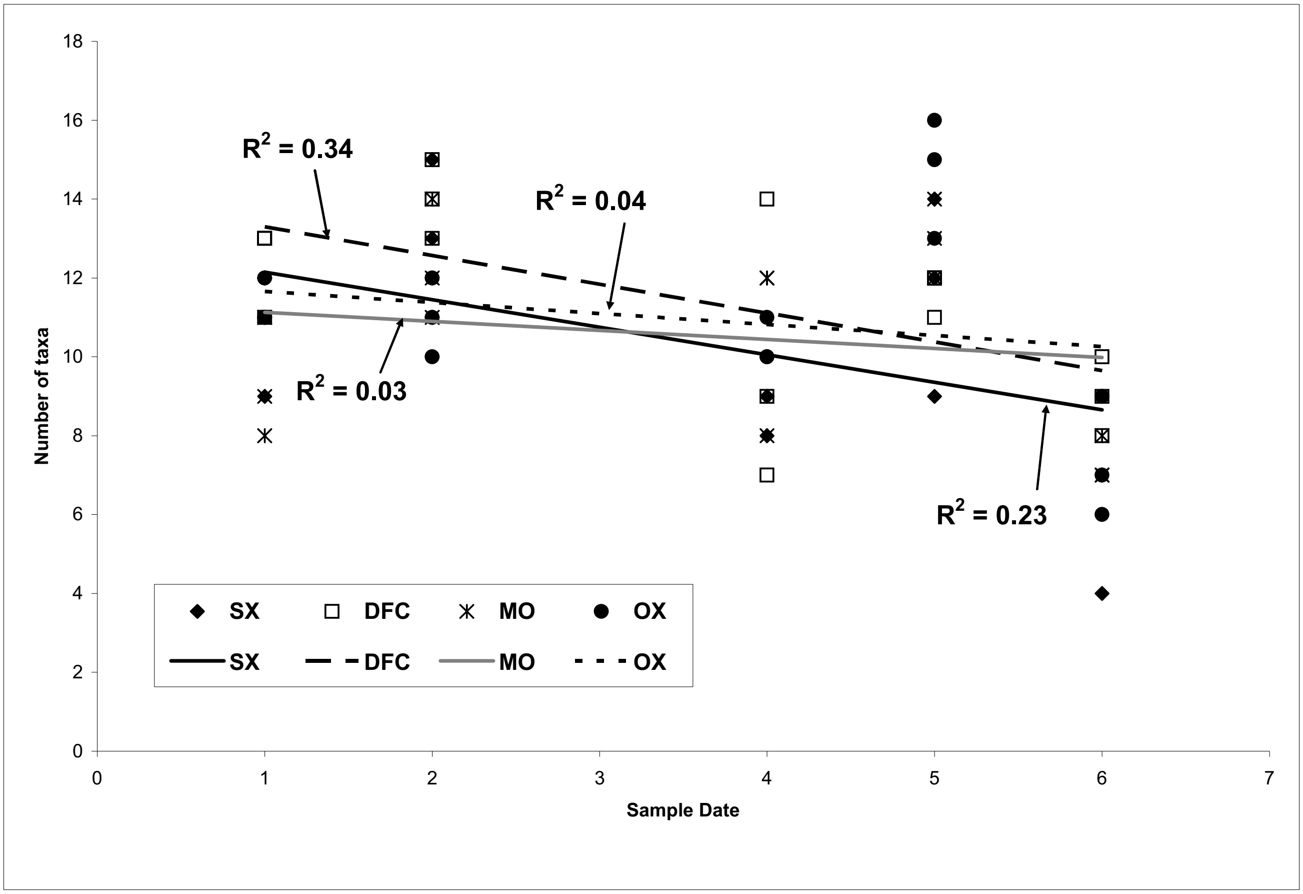


Figure 5.14. Scatterplot and trendline of EPT taxa richness collected in Hess samples in the four long-term monitoring sites from 2005-2007. Sample dates progress from spring 2005 (1) to autumn 2007 (6).

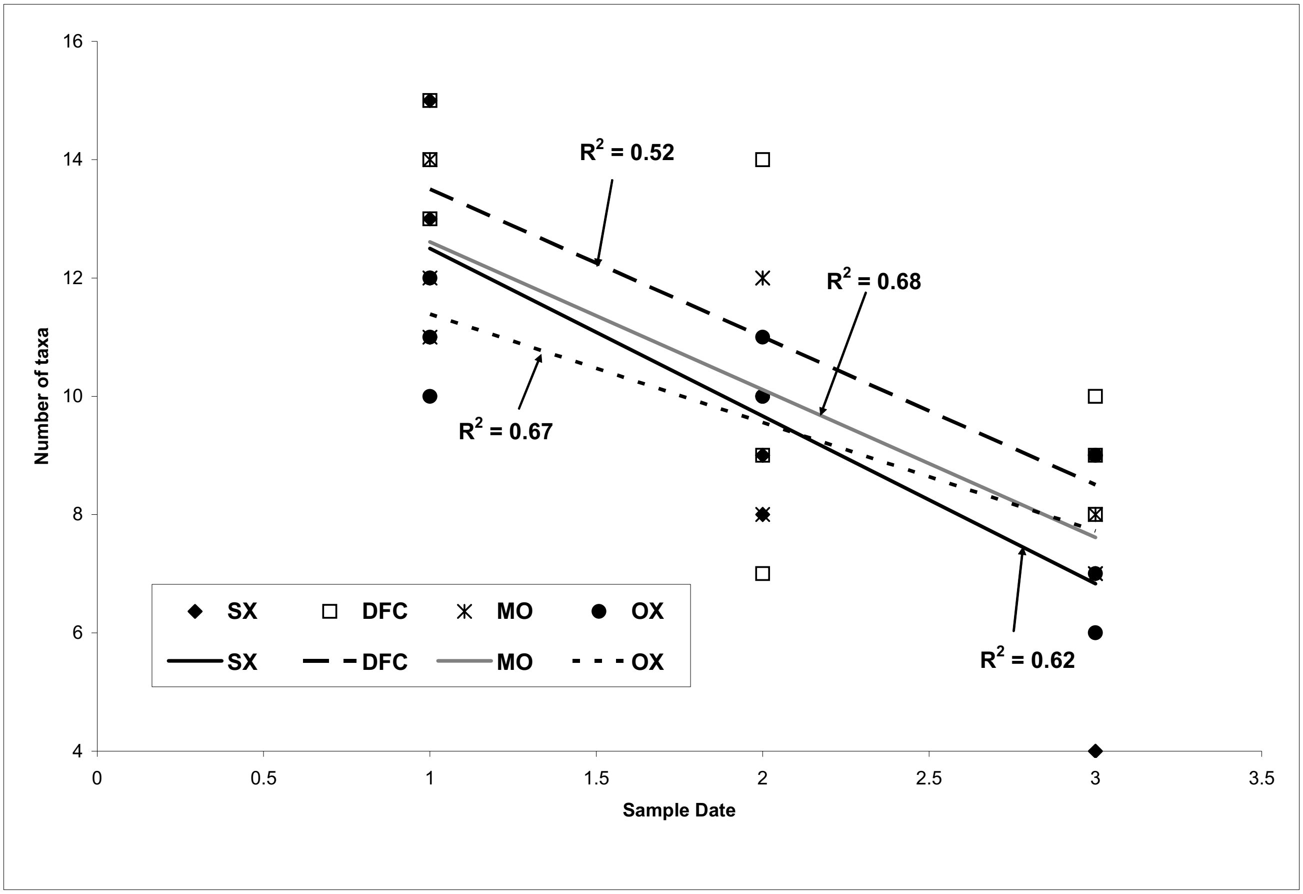


Figure 5.15. Scatterplot and trendline of EPT taxa richness collected in Hess samples during autumn in the four long-term monitoring sites from 2005-2007. Sample dates progress from autumn 2005 (1) to autumn 2007 (3).

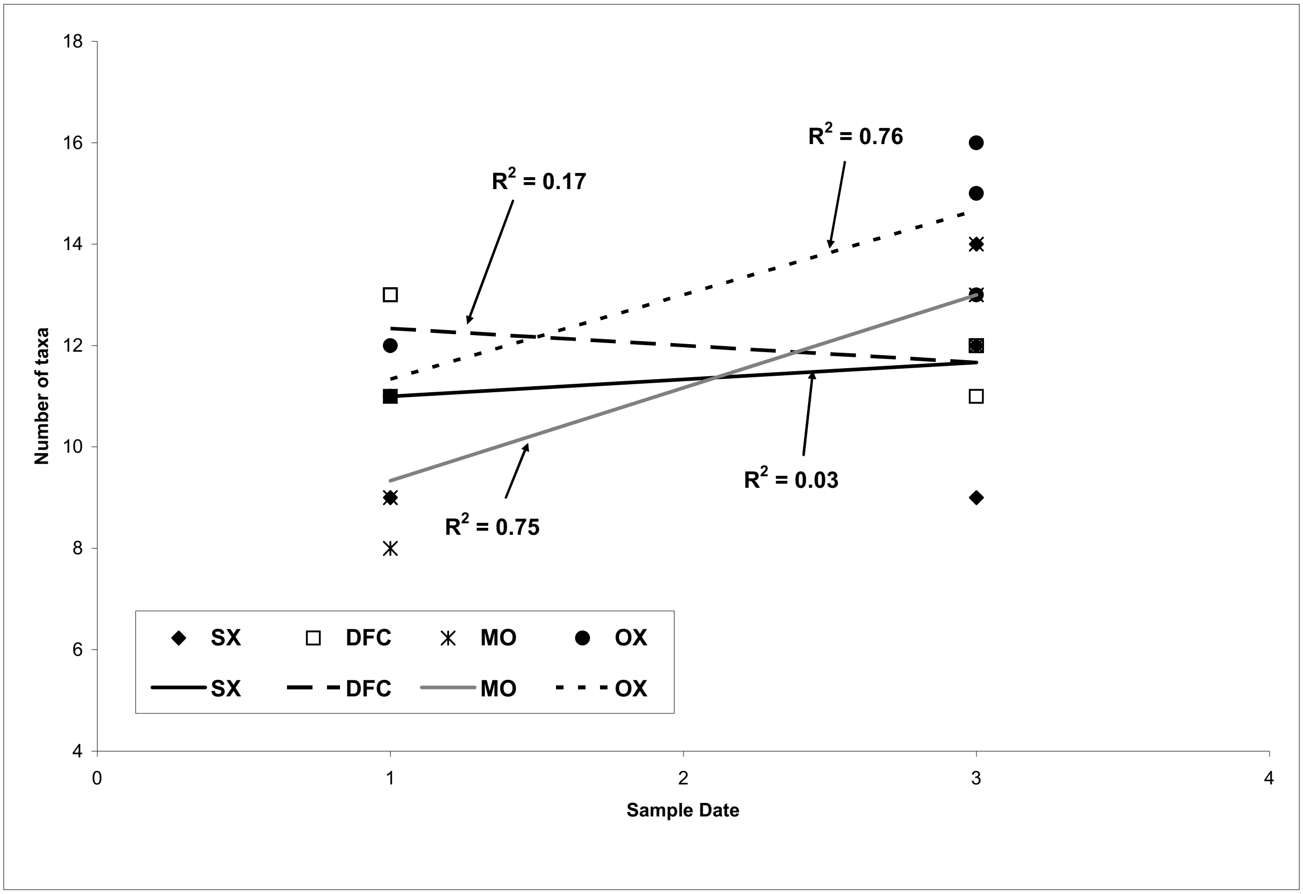


Figure 5.16. Scatterplot and trendline of EPT taxa richness collected in Hess samples during spring in the four long-term monitoring sites from 2005-2007. Sample dates progress from spring 2005 (1) to spring 2007 (3).

The EPT taxa richness results from the quantitative kick-net collections in the three hydrogen sulfide evaluation sites were consistent with Hess sampling data (Figure 5.12b). The EPT taxa richness was higher in GS and SC sites than in SI (barely so in spring 2006 when EPT richness in SI was much higher than in other samples at that site).

Among SXW, DFC, MO, and OX, kick-net results indicated similar EPT richness during each sample event (Figure 5.13b). The trend of decreasing EPT taxa richness in autumn samples was not as pronounced in kick-net samples as the Hess samples, but the trend was evident in three of the four sites (SXW, MO, and OX). The mean difference in EPT taxa richness between kick-net samples and Hess samples was approximately 2.0 more EPT taxa in the kick-net samples.

5.3.6 Hilsenhoff Biotic Index (HBI) Value

The HBI provides an indication of the overall pollution tolerances of the macroinvertebrate community in a site from the taxa collected. This index has been used to detect nutrient enrichment, high sediment loads, low dissolved oxygen, and thermal impacts (Hilsenhoff 1988). It was originally developed to detect organic pollution. Individual families were assigned an index value from 0 to 10. Taxa with HBI values of 0-2 are considered intolerant, clean-water taxa. Taxa with HBI values of 9-10 are considered pollution-tolerant taxa. A family level HBI was calculated for each sample. Samples with HBI values of 0-2 are considered clean, 2-4 slightly enriched, 4-7 enriched, and 7-10 polluted.

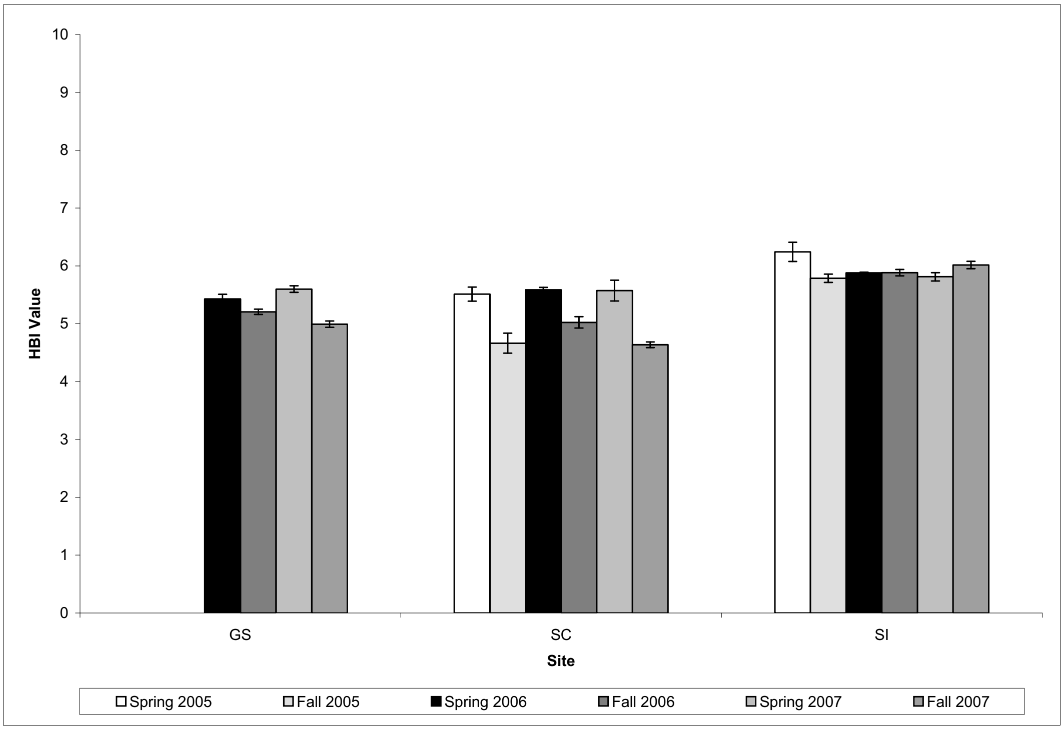
Among SI, SC, and GS, there was little difference in HBI values; since the range of mean values was from 4.6 to 6.2 (Figure 5.17a), all sites would be classified as “enriched.” The HBI value was only slightly higher in the SI site than at SC and GS during each sampling effort, but due to low variability among replicates these differences were statistically significant (except in spring 2007). The only significant trend noted in any individual site was that the HBI values observed in autumn in the SC site were significantly lower than that observed in the spring ($\bar{x}$ autumn =4.8, $\bar{x}$ spring = 5.6; t =1.86; p<0.001); however, all values were within the same enrichment category.

Among SXW, DFC, MO, and OX, most HBI values were within the range of 4-6 (enriched), except in the SXW site, which was the only site with values below 4 (slightly enriched). The SXW site also had the highest value (6.6 in autumn 2007) (Figure 5.18a). There did not appear to be any trends of change over time in either the SI site or SXW, DFC, MO, or OX sites.

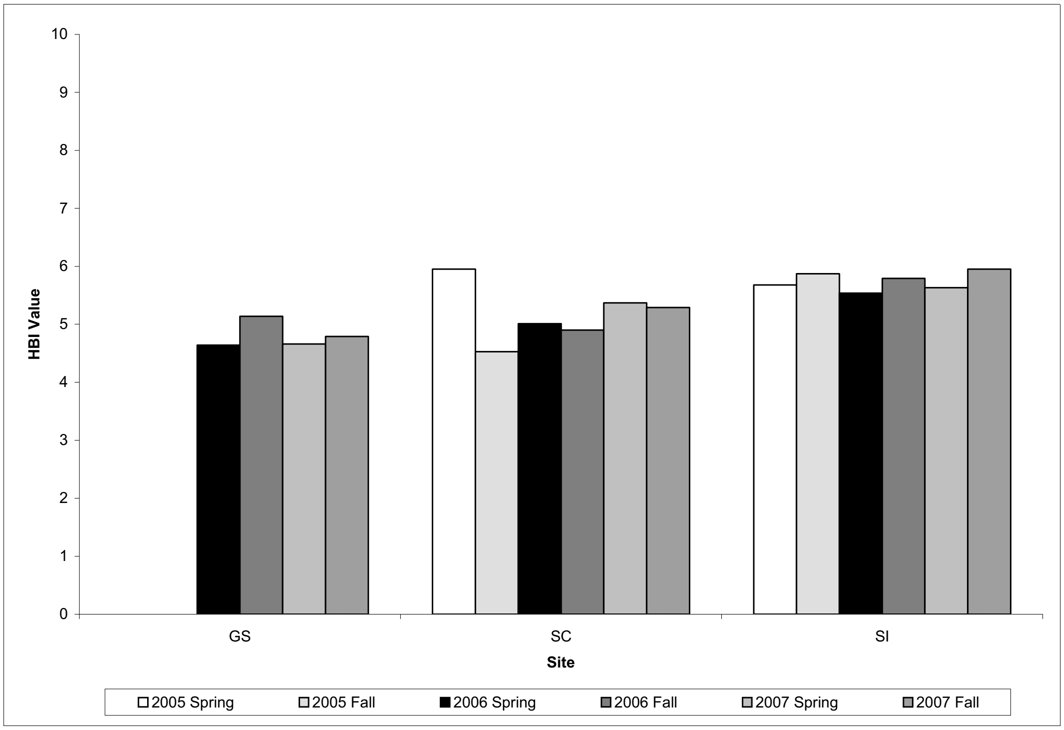
As in the Hess results, the HBI value calculated from quantitative kick-net collections in the three hydrogen sulfide evaluation sites was generally highest in the SI site, but not substantially so (Figure 5.17b). Kick-net data collected in the four long-term monitoring sites also yielded results that were similar to those observed in Hess samples (Figure 5.18b).

5.3.7 Percent Dominance of Most Abundant Taxa

Examining the proportion of the macroinvertebrate community that is comprised of the three most dominant taxa provides an index of evenness in the community. Up to 21 percent of the total number of organisms might be found in the most dominant taxon in high-quality streams in the Wasatch and Uinta Mountains, while the three most dominant taxa might comprise up to 50 percent of the total

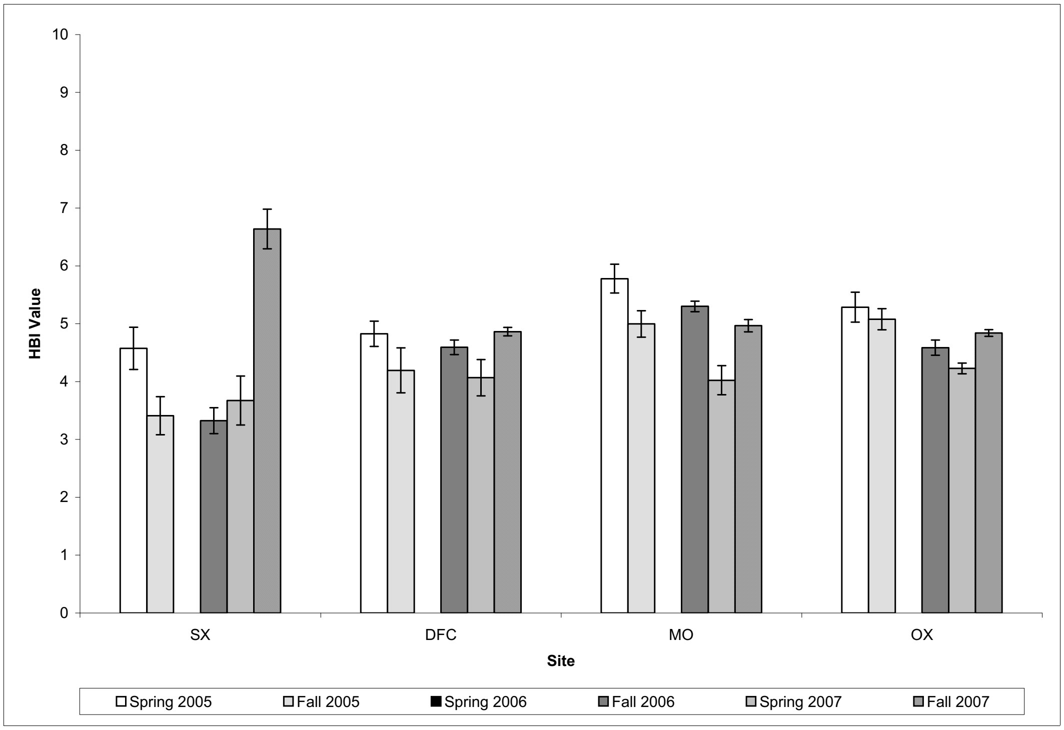


(a) Hess samples.

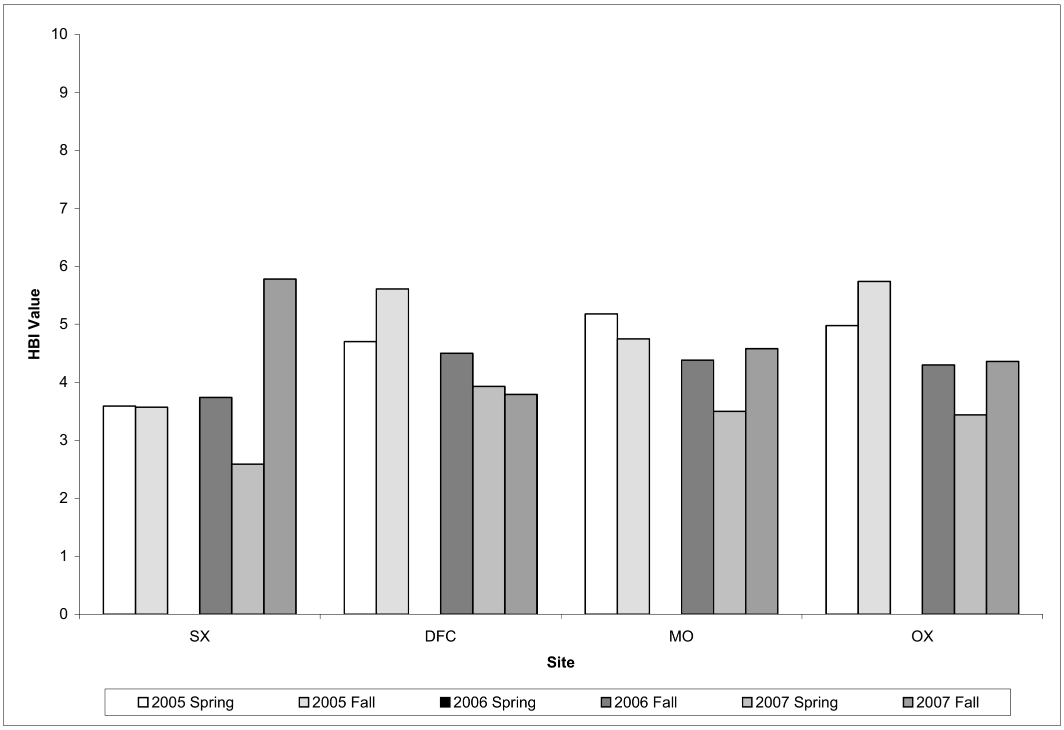


(b) Kick-net samples.

Figure 5.17. Hilsenhoff Biotic Index (HBI) value averaged among three replicate Hess samples (a) and qualitative kick-net samples (b) collected in each of the three hydrogen sulfide evaluation sites in spring and autumn 2005-2007. Error bars represent +/- one standard error.



(a) Hess samples.



(b) Kick-net samples.

Figure 5.18. Hilsenhoff Biotic Index (HBI) value averaged among three replicate Hess samples (a) and qualitative kick-net samples (b) collected in each of the four long-term monitoring sites in spring and autumn 2005-2007. Error bars represent +/- one standard error.

number of organisms (Grafe 2002a, Lester 2005). Additionally, examining the three most dominant taxa at a site can provide additional information about what may be impacting that site. Among the three hydrogen sulfide evaluation sites, the impact site had greater than 70 percent abundance of the most dominant taxa in Hess samples collected each season and year when the range in the other two sites was between 23-72 percent (Table 5.1). In addition, the SI site had a significantly higher percent composition of the three dominant taxa than the control sites in each sample, but nearly all values were greater than 75 percent in each of these three sites (Figure 5.19a). There were no trends of change over time observed in SC, GS, or SI.

Table 5.1. Mean percent abundance of the most common macroinvertebrate taxa observed in the three hydrogen sulfide evaluation sites in Hess samples by site, season, and year.

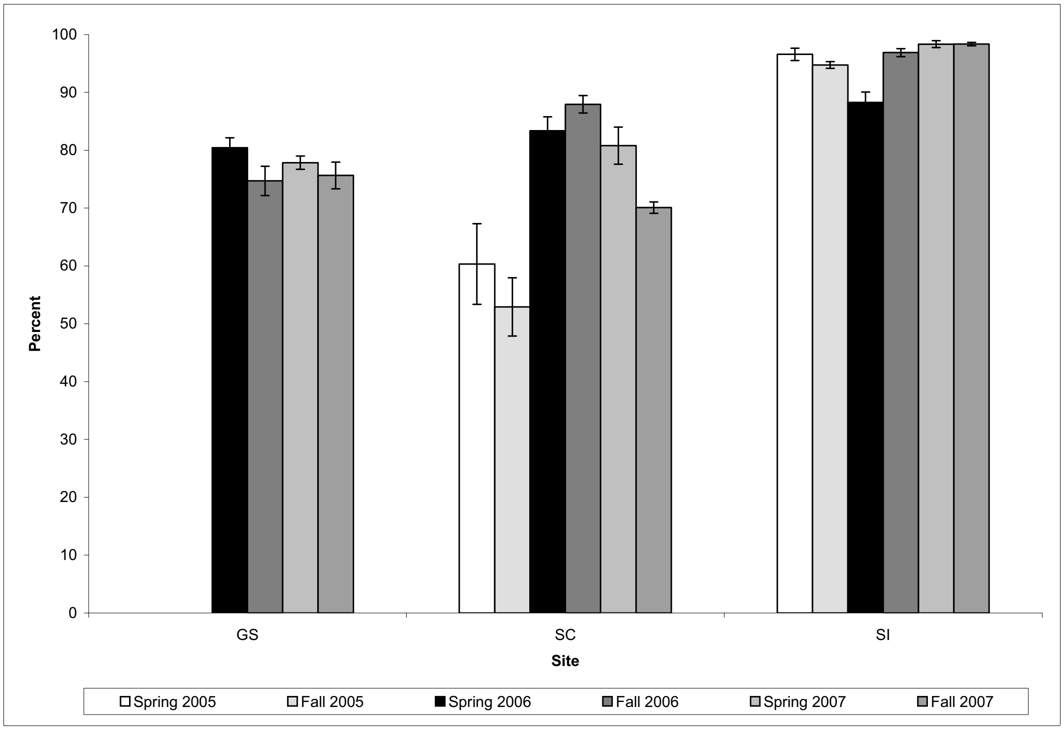
SEASON	SITE	2005	2006	2007
Autumn	GS	40.9	36.7	
	SC	23.4	40.1	47.2
	SI	79.0	89.1	89.1
Spring	GS	67.2	60.0	
	SC	30.7	72.2	52.5
	SI	70.4	82.4	71.8

Among the four long-term monitoring sites, the abundance of the most dominant taxa ranged from 25-62 percent (Table 5.2).

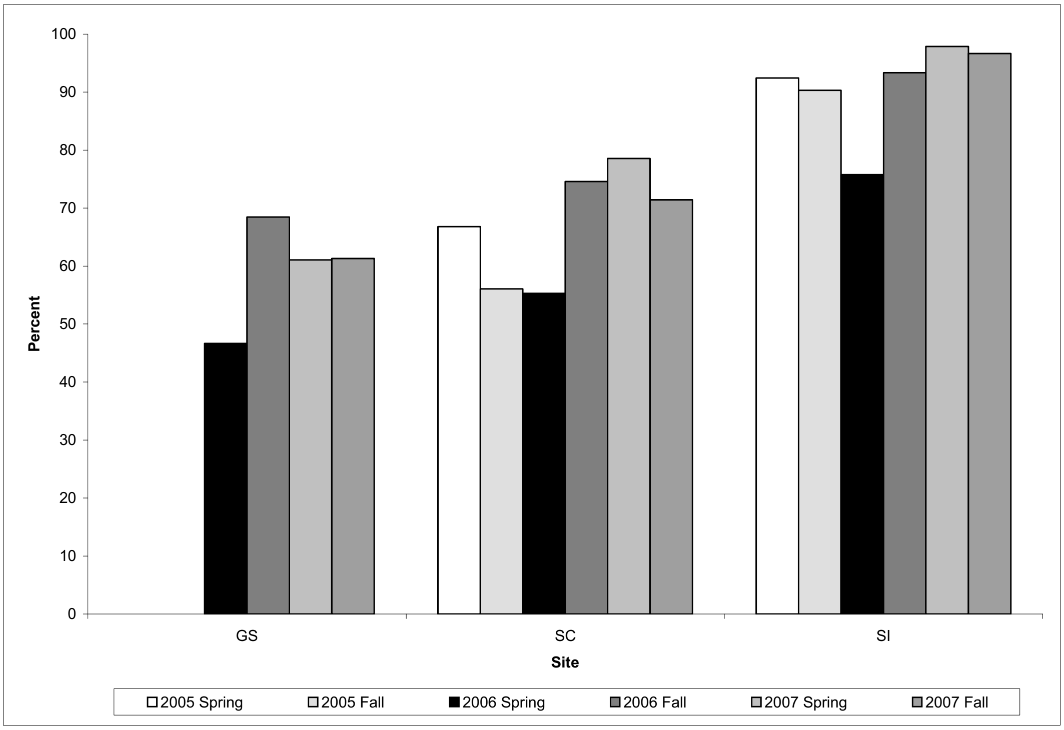
Table 5.2. Mean percent abundance of the most common macroinvertebrate taxa observed in the four long-term monitoring sites in Hess samples by site, season, and year.

SEASON	SITE	2005	2006	2007
Autumn	SX	27.1	41.9	52.1
	DFC	27.4	33.4	62.0
	MO	28.1	52.0	53.8
	OX	26.4	30.8	61.0
Spring	SX	33.8	N/A	37.2
	DFC	50.0	N/A	32.0
	MO	47.9	N/A	25.5
	OX	46.9	N/A	27.4

There was some variation in percent composition of the three dominant taxa during each sample period, but no significant differences among sites or persistent trends over time (Figure 5.20a).

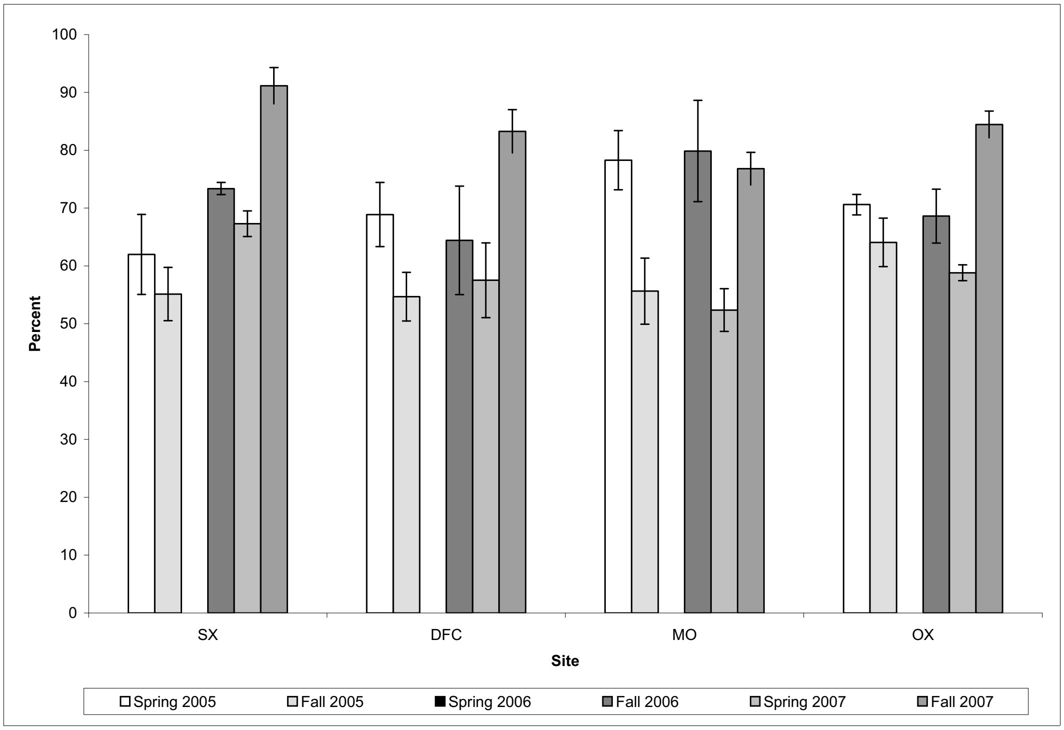


(a) Hess samples.

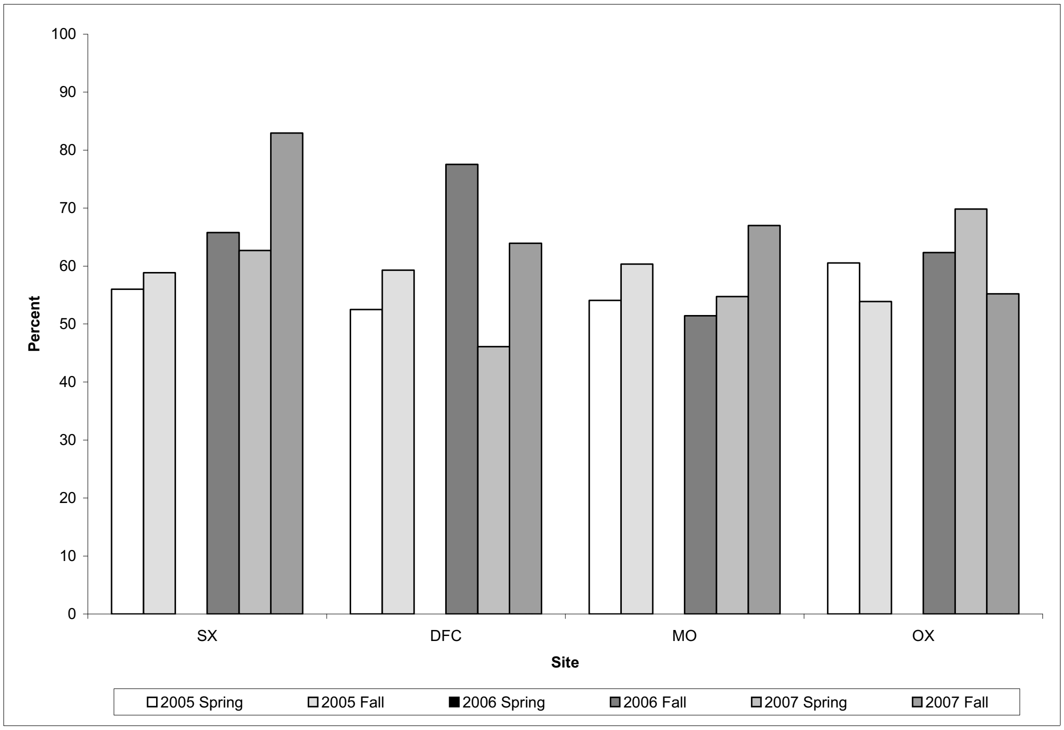


(b) Kick-net samples.

Figure 5.19. The percent of the three most abundant taxa averaged among three replicate Hess samples (a) and qualitative kick-net samples (b) collected in each of the three hydrogen sulfide evaluation sites in spring and autumn 2005-2007. Error bars represent +/- one standard error.



(a) Hess samples.



(b) Kick-net samples.

Figure 5.20. The percent of the three most abundant taxa averaged among three replicate Hess samples (a) and qualitative kick-net samples (b) collected in each of the four long-term monitoring sites in spring and autumn 2005-2007. Error bars represent +/- one standard error.

Within each site there did not appear to be a distinct trend of increasing or decreasing percent composition of the three dominant taxa overall, but there were trends observed when evaluated separately by season. In the autumn samples, there was a significant increasing trend in the SXW, DFC, and OX sites (SXW: F=70.4, p<0.001; DFC: F=11.3, p=0.012; OX: F=13.1, p<0.01) (MO was nearly significant with p=0.074) (Figure 5.21). In the spring samples, there was no trend over time in the SXW or DFC sites, but there was a significant decreasing trend in the MO and OX sites (MO: F=16.9, p<0.015; OX: F=27.3, p=0.006) (Figure 5.22).

The quantitative kick-net collections in the three hydrogen sulfide evaluation sites yielded a higher percent abundance of the three dominant taxa, with most values above 90 percent compared with most values being below 75 percent for the other two sites (Figure 5.19b). Among the four long-term monitoring sites there appeared to be a trend of increasing abundance of the three dominant taxa in the SXW site over time (trend occurred in both seasons), but no other distinct pattern was noted between or within sites (Figure 5.20b).

In addition to using the percentage of dominance of the three most abundant taxa, the characteristics of each taxon are also indicators of characteristics at the site (Table 5.3). Among the three hydrogen sulfide evaluation sites, tolerant groups made up the majority of the top three taxa in each sample. These include worms (Oligochaetes), midges (Chironomids), and blackflies (*Simulium* sp.). There was also one riffle beetle (*Optioservus* sp.) and a mayfly (*Baetis tricaudatis*) that were commonly among the most abundant taxa, but these are considered tolerant of degraded conditions (Hilsenhoff 1988, Barbour et al. 1999). The only other taxa to be among the three most abundant in these sites were a caddisfly genus (*Hydropsyche* sp.) and another mayfly genus (*Paraleptophlebia* sp.); each of these is in a family that is considered more intolerant of degraded conditions (Hilsenhoff 1988, Barbour et al. 1999).

Among the four long-term monitoring sites there was a greater diversity of dominant taxa, although many of the same taxa—including many tolerant taxa—were commonly in the top three (Table 5.4). The tolerant group of midges (Chironomidae) was in the top two most abundant taxa in all sites during each sample, except in the OX site in the autumn 2007 sample. Midges were relatively uncommon in that sample (though present), but the sample was dominated by another tolerant taxa, blackflies. As in the hydrogen sulfide evaluation sites, worms, riffle beetle, and mayfly were commonly among the three most abundant species at each site. Round worms (nematodes) were also common in the spring 2005 sample in both MO and OX. Aside from these common taxa, there were only four others that were among the three most abundant in these sites during the 3 years of sampling. Those include two caddisflies of the Family Brachycentridae—*Micrasema* sp. and *Brachycentrus occidentalis*—a third caddisfly (*Oligophlebodes* sp.), and a mayfly *(Ephemerella inermis/infrequens*). Each of these latter four taxa is intolerant to degraded conditions (Barbour et al. 1999).

5.3.8 Comparisons with Historical Data

During 1999-2002 the National Aquatic Monitoring Center (NAMC) collected several samples near some of the sites sampled for this study (NAMC 2006, Vinson 2006). Samples from that period were collected prior to the complete bypass of irrigation deliveries and the institution of the minimum-flow requirements on the Sixth Water and Diamond Fork Creeks. These samples were also collected

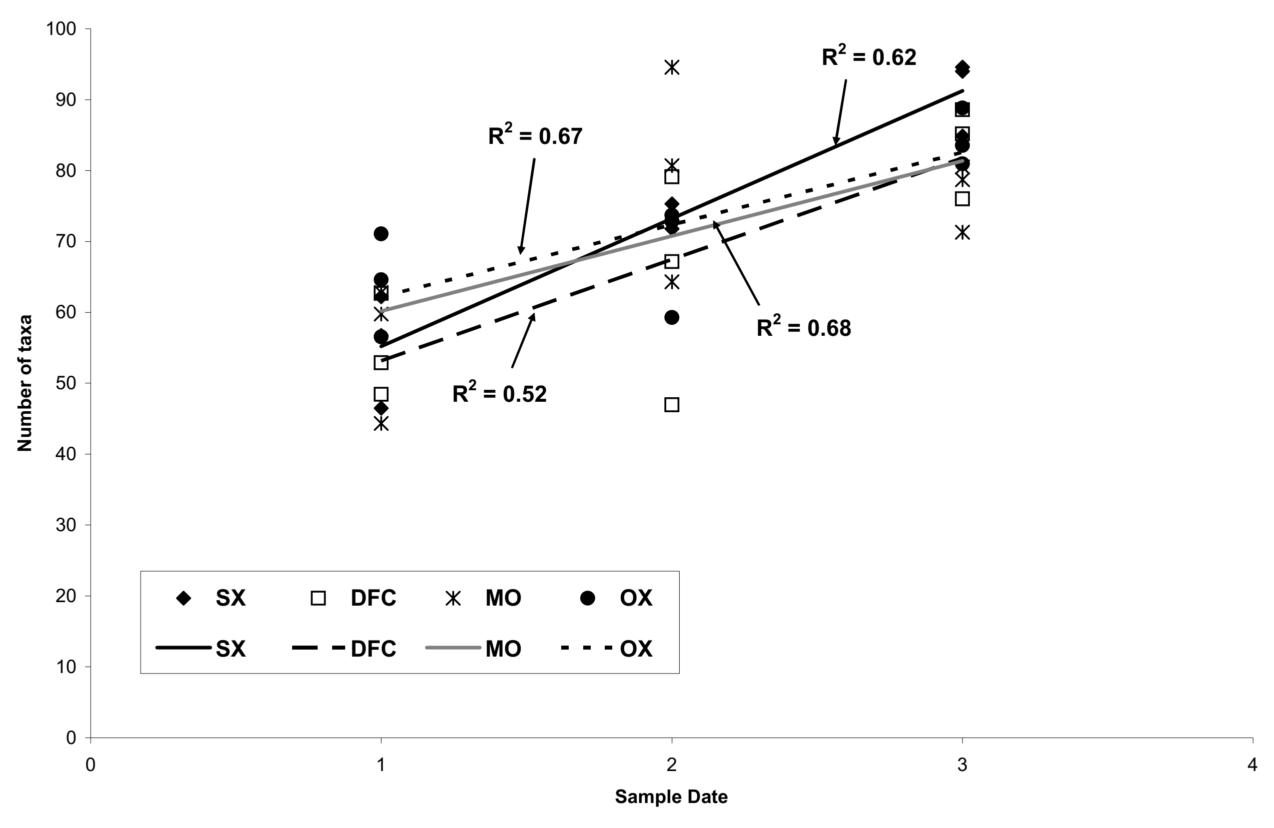


Figure 5.21. Scatterplot and trendline of the percent of the three most abundant taxa collected in Hess samples during autumn in the four long-term monitoring sites from 2005-2007. Sample dates progress from autumn 2005 (1) to autumn 2007 (3).

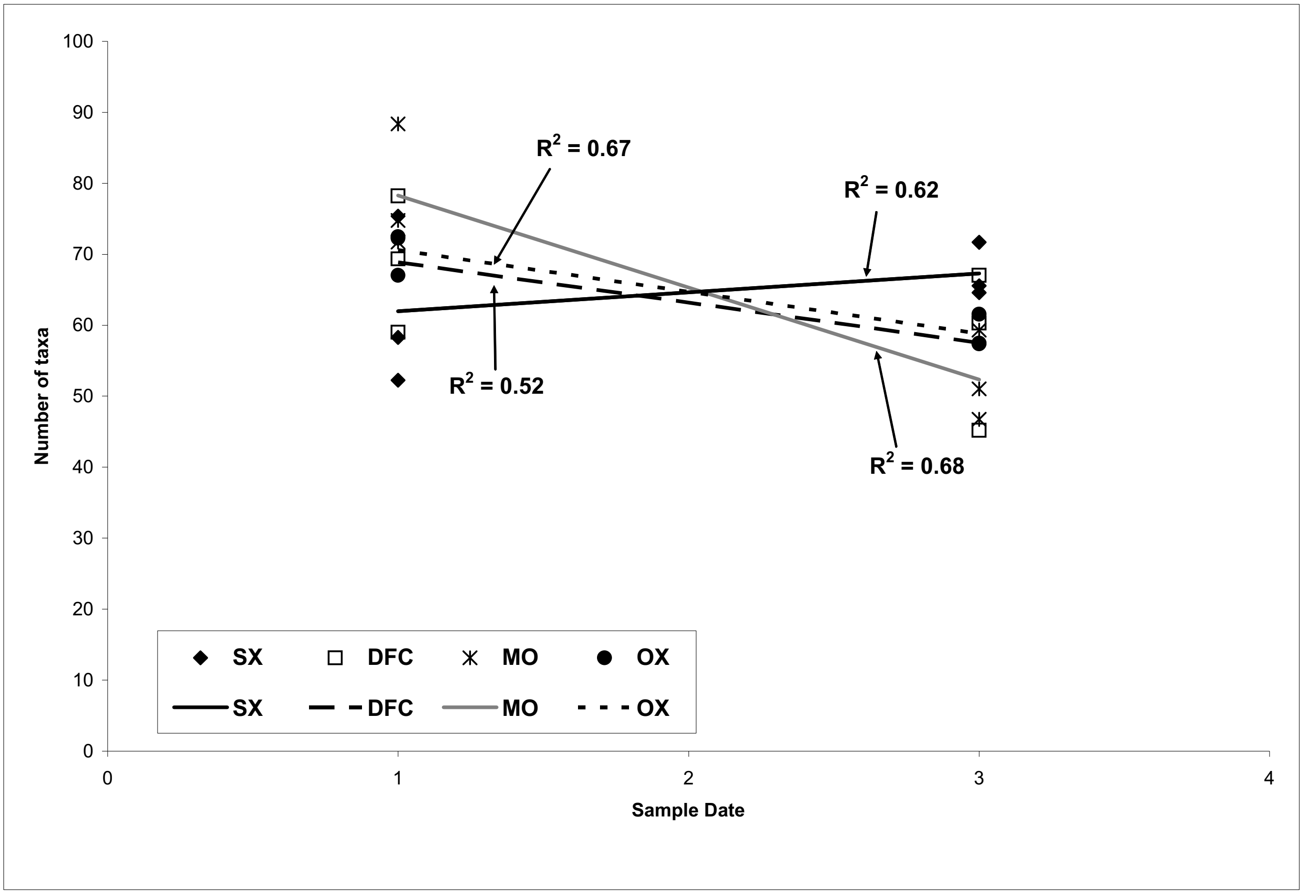


Figure 5.22. Scatterplot and trendline of the percent of the three most abundant taxa collected in Hess samples during spring in the four long-term monitoring sites from 2005-2007. Sample dates progress from spring 2005 (1) to spring 2007 (3).

Table 5.3. Three most dominant taxa at the three hydrogen sulfide evaluation sites in spring and autumn 2005-2007.

DOMINANCE	GS	SC	SI
Spring 2005			
First	N/A	Oligochaeta	Chironomidae
Second	N/A	Chironomidae	Oligochaeta
Third	N/A	*Optioservus* sp.	*Simulium* sp.
Autumn 2005			
First	N/A	Chironomidae	Chironomidae
Second	N/A	*Optioservus* sp.	*Baetis tricaudatus*
Third	N/A	*Hydropsche* sp.	Oligochaeta
Spring 2006			
First	Chironomidae	Chironomidae	Chironomidae
Second	*Simulium* sp.	*Baetis tricaudatus*	*Baetis tricaudatus*
Third	*Baetis tricaudatus*	*Optioservus* sp.	Oligochaeta
Autumn 2006			
First	Chironomidae	Chironomidae	Chironomidae
Second	*Optioservus* sp.	*Optioservus* sp.	*Simulium* sp.
Third	Oligochaeta	*Baetis tricaudatus*	Oligochaeta
Spring 2007			
First	Chironomidae	Chironomidae	Chironomidae
Second	*Optioservus* sp.	Oligochaeta	*Optioservus* sp.
Third	*Baetis tricaudatus*	*Baetis tricaudatus*	*Oligochaeta*
Autumn 2007			
First	*Optioservus* sp.	*Optioservus* sp.	Chironomidae
Second	Chironomidae	*Paraleptophlebia* sp.	Oligochaeta
Third	*Hydropsyche* sp.	Chironomidae	*Baetis tricaudatus*

before the increased leaching of hydrogen sulfide into the system. Unfortunately, there were no historical data from locations near some of the sites sampled for this study, and the collection methods used in the earlier samples differed from those of the NAMC (Table 5.5).

There were some differences between the NAMC kick-net sample collection methods and those of this study. The NAMC protocol was one kick in a riffle, while samples collected for this study included 20 kicks throughout multiple habitats. Preliminary analyses showed conflicting trends when total abundance and total density from kick-net samples taken by NAMC and kick-net samples collected in 2005 for this study were compared. Since kick-net samples for this study were taken in multiple habitats, they should, and did, have higher taxa richness in the preliminary analyses (BIO-WEST 2006). Because of this incompatibility and the fact that the NAMC samples occurred in

Table 5.4. Three most dominant taxa at the four long-term monitoring sites in spring and autumn 2005-2007.

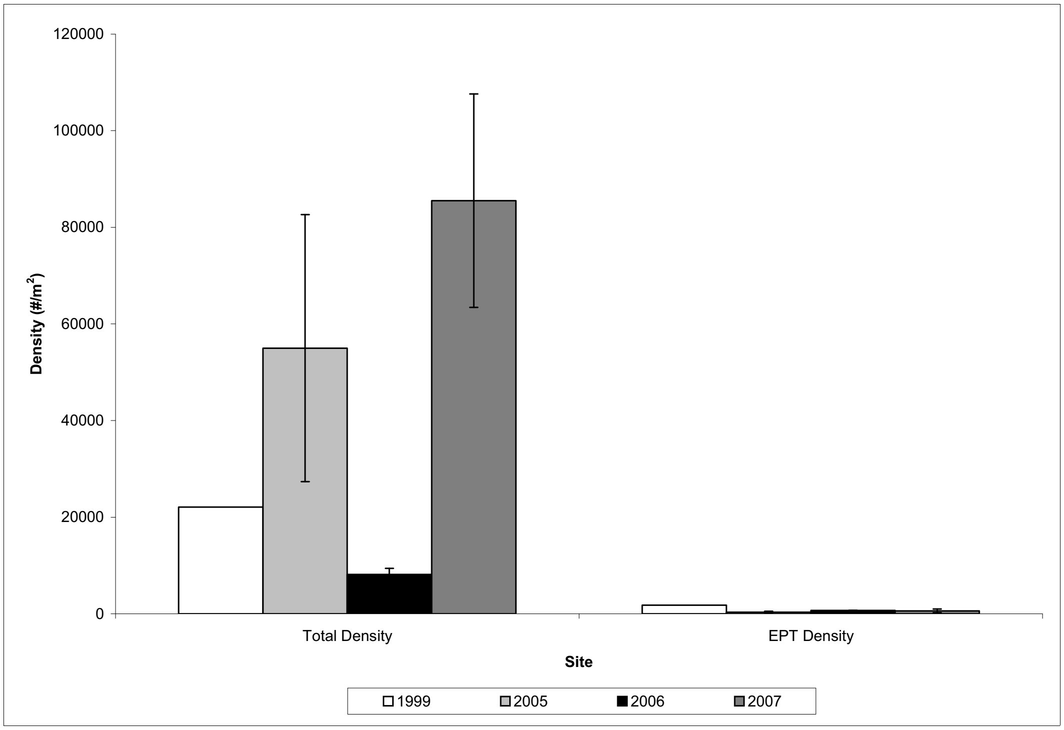
DOMINANCE	SXW	DFC	MO	OX
Spring 2005				
First	Chironomidae	Chironomidae	Chironomidae	Chironomidae
Second	*Baetis tricaudatus*	*Baetis tricaudatus*	Oligochaeta	Oligochaeta
Third	*Micrasema* sp.	*Ephemerella inermis/infrequens*	Nematoda	Nematoda
Autumn 2005				
First	*Oligophlebodes* sp.	Chironomidae	Chironomidae	Chironomidae
Second	Chironomidae	Oligochaeta	*Optioservus* sp.	Oligochaeta
Third	Micrasema sp.	*Optioservus* sp.	Oligochaeta	*Optioservus* sp.
Spring 2006				
First	N/A	N/A	N/A	N/A
Second	N/A	N/A	N/A	N/A
Third	N/A	N/A	N/A	N/A
Autumn 2006				
First	*Oligophlebodes* sp.	*Simulium* sp.	Chironomidae	*Baetis tricaudatus*
Second	Chironomidae	Chironomidae	*Simulium* sp.	Chironomidae
Third	*Optioservus* sp.	*Baetis tricaudatus*	*Baetis tricaudatus*	*Simulium* sp.
Spring 2007				
First	Chironomidae	*Baetis tricaudatus*	Chironomidae	Chironomidae
Second	*Ephemerella inermis/infrequens*	Chironomidae	*Ephemerella inermis/infrequens*	*Brachycentrus occidentalis*
Third	*Oligophlebodes* sp.	*Ephemerella inermis/infrequens*	*Optioservus* sp.	*Optioservus* sp.
Autumn 2007				
First	Oligochaeta	*Simulium* sp.	*Simulium* sp.	*Simulium* sp.
Second	Chironomidae	Chironomidae	Chironomidae	*Baetis tricaudatus*
Third	*Oligophlebodes* sp.	*Brachycentrus occidentalis*	*Optioservus* sp.	*Optioservus* sp.

Table 5.5. Historical sampling near 2005-2007 sampling sites, and the number and types of samples collected.

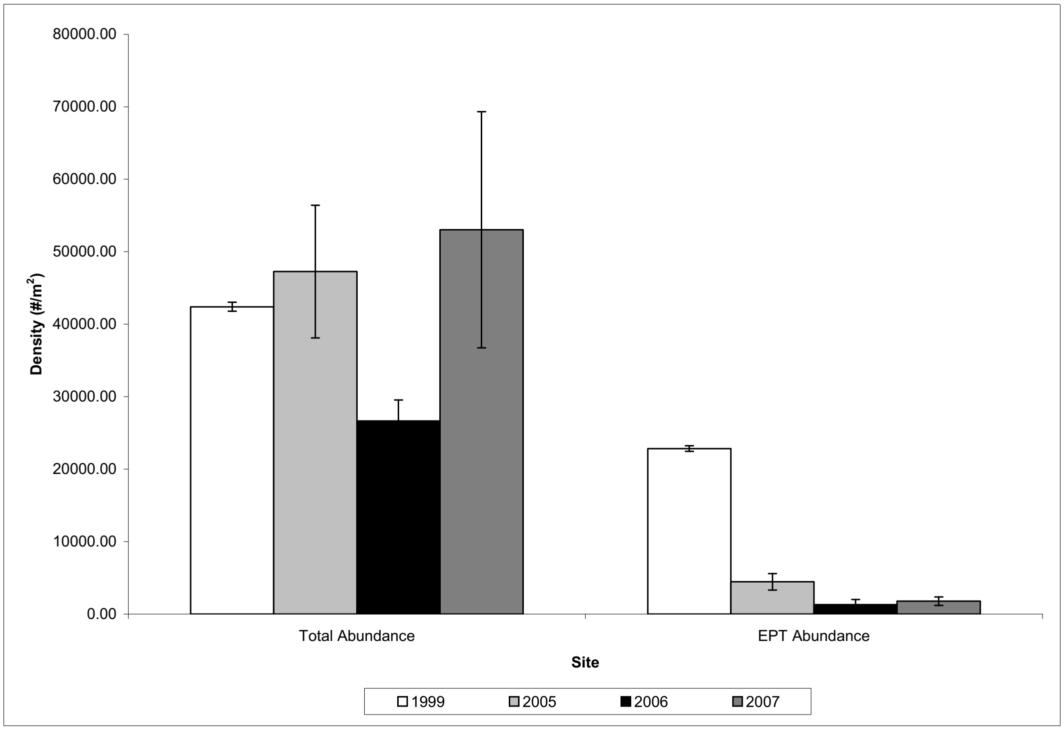
CURRENT SITE	HISTORICAL SAMPLES	1999	2000	2001	2002
Forest Service Guard Shack (GS)	No	N/A	N/A	N/A	N/A
Sawmill Canyon (SC)	No	N/A	N/A	N/A	N/A
Sulfur Impact (SI)	Yes (near Three Forks confluence)	1 D-frame	N/A	3 D-frame	N/A
Sixth Water (SXW)	No	N/A	N/A	N/A	N/A
Diamond Fork Campground (DFC)	Yes (near current site)	N/A	N/A	N/A	1 D-frame
Mother (MO)	Yes (near current site)	1 D-frame	N/A	N/A	N/A
Oxbow (OX)	Yes (near confluence with Spanish Fork River)	1 Basket sample	1 Hess sample	N/A	N/A

riffles, the Hess samples collected for this study may be more comparable with the kick-net samples collected by the NAMC. Therefore, the Hess sample data collected for this study (2005-2007) were compared with the kick-net information and Hess sample information collected by the NAMC.

The site with the most historical information collected nearby was SI. The comparison site was 2.1 km downstream near the confluence with Three Forks, but those data should be similar to data from the SI site (adjusting for impacts associated with hydrogen sulfide inputs). One D-frame kick-net sample was collected by the NAMC in June 1999, and three replicate D-frame kick-net samples were collected in November 2001 from the NAMC site above Three Forks. Data collected in spring of each year during this study (2005-2007) were compared with the NAMC's June 1999 sampling data. Data collected in autumn of each year of this study were compared with NAMC's November 2001 data. Total density of macroinvertebrates at the SI site was lower during spring 2006 than at the NAMC site in 1999 but higher in both spring 2005 and spring 2007 (Figure 5.23a). The EPT density was lower in all recent spring samples compared with the 1999 NAMC sample (Figure 5.23a). There was a similar trend in total abundance and EPT abundance in autumn data from this study compared with the 2001 NAMC sample (Figure 5.23b). Total taxa richness and EPT taxa richness were higher in the 1999 NAMC sample (Figure 5.24a) and the 2001 NAMC sample (Figure 5.24b) compared with the more recent samples. The HBI values recorded in recent measurements were higher than previous NAMC samples (Figure 5.25), and percent abundance of the three most dominant taxa of the macroinvertebrate community was higher at the SI site in recent samples compared with samples taken there in 1999 and 2001 (Figure 5.26).

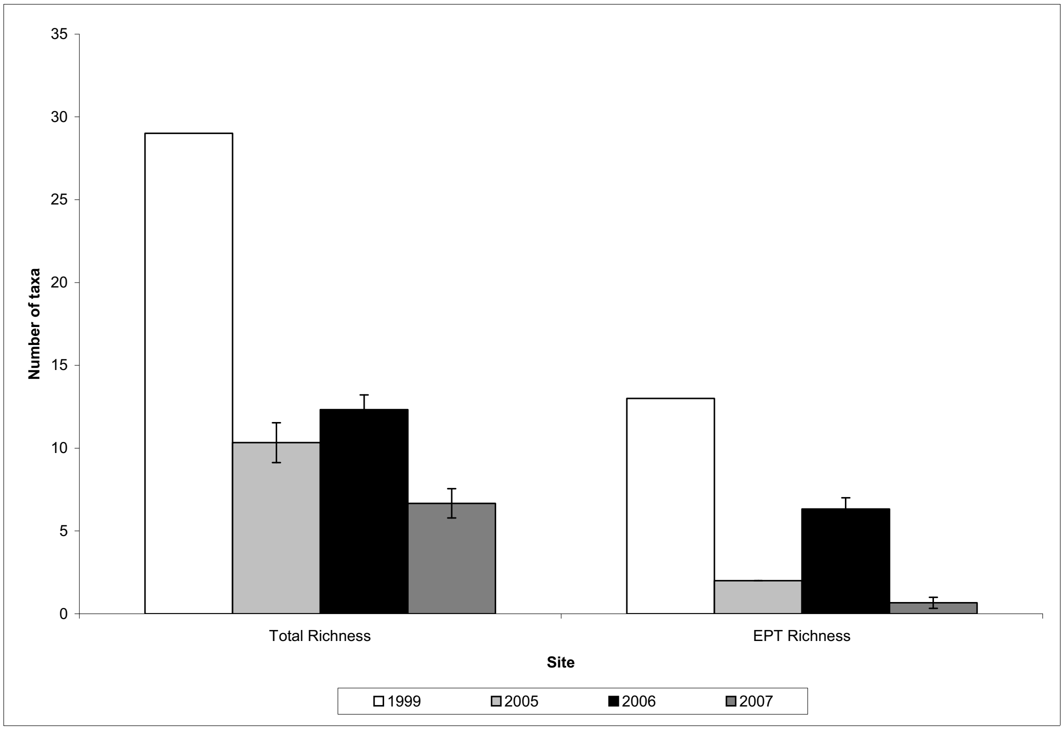


(a) densities from samples in spring 1999 and 2005-2007.

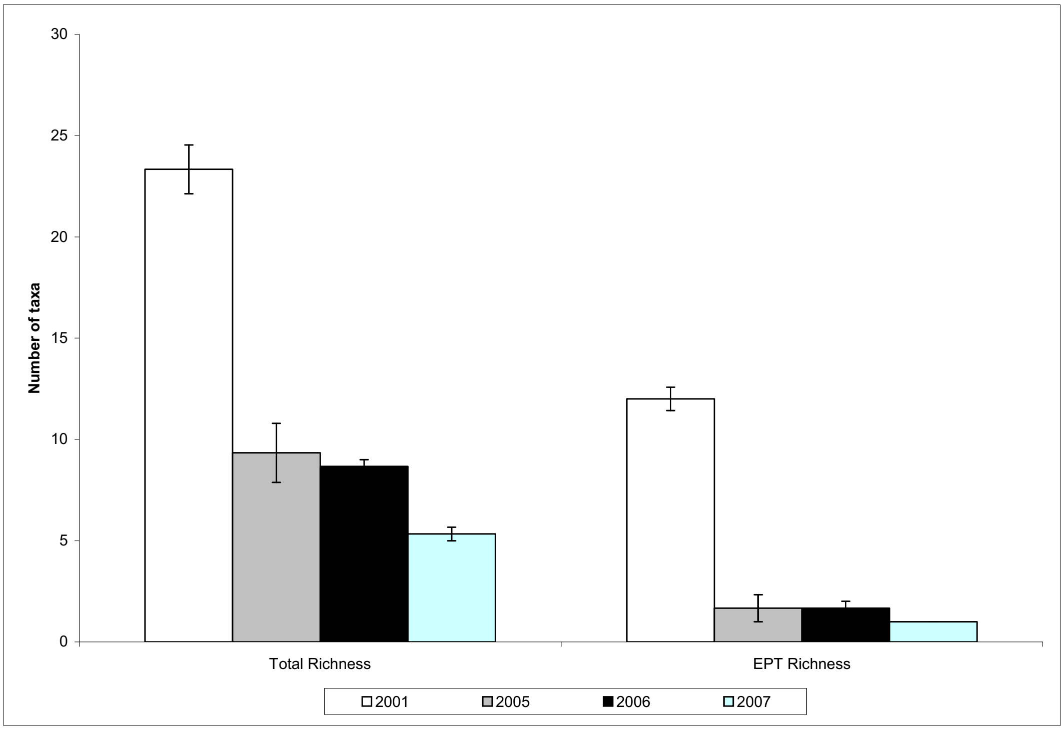


(b) densities from samples in autumn 2001 and 2005-2007.

Figure 5.23 Total density and EPT taxa density from kick-net samples and Hess samples taken near the impact site (SI) in (a) spring 1999 and 2005-2007 and (b) autumn 2001 and 2005-2007. Error bars represent +/- one standard error.



(a) richness from samples in spring 1999 and 2005-2007.



(b) richness from samples in autumn 2001 and 2005-2007.

Figure 5.24 Total taxa richness and EPT taxa richness from kick-net samples and Hess samples taken near the impact site (SI) in (a) spring 1999 and 2005-2007 and (b) autumn 2001 and 2005-2007. Error bars represent +/- one standard error.

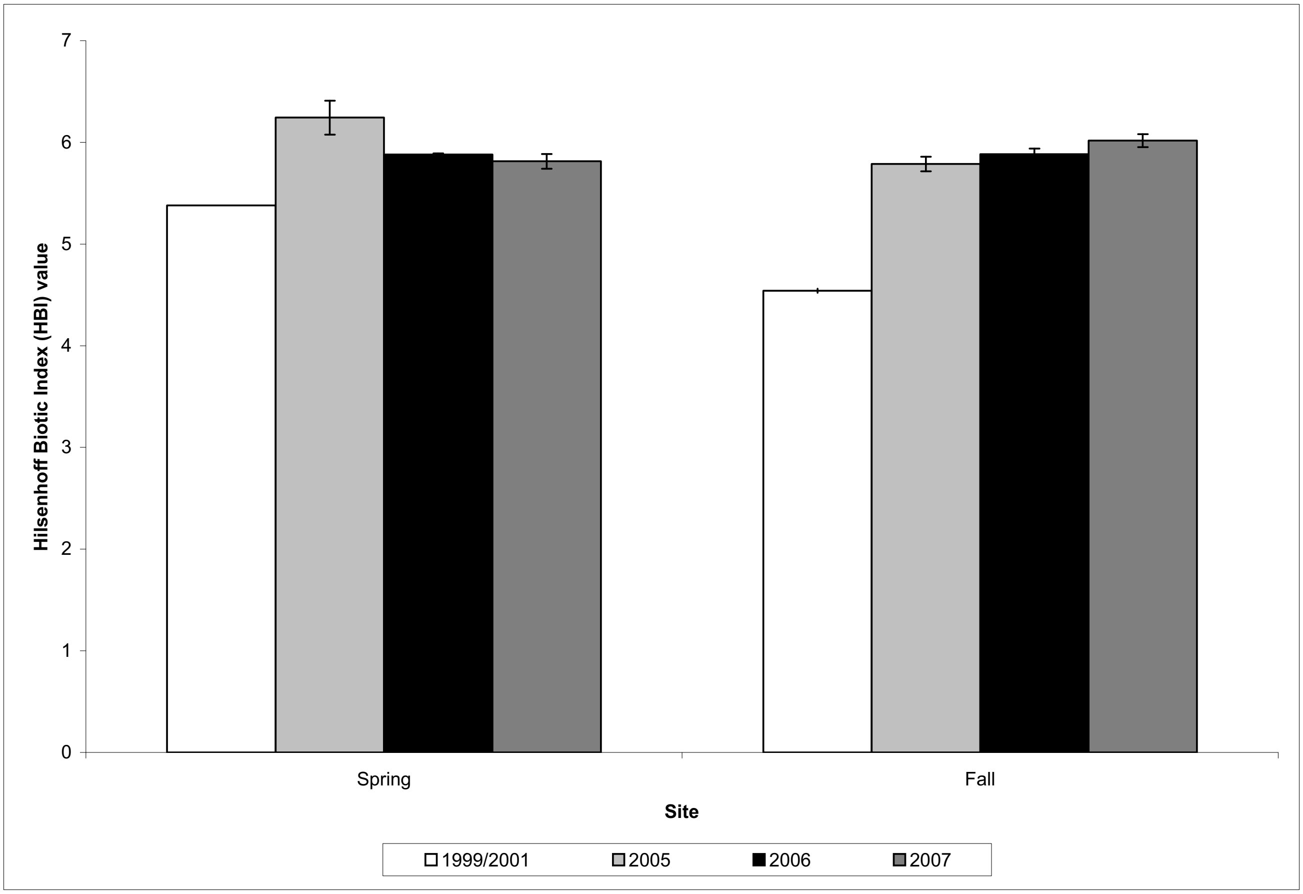


Figure 5.25 Hilsenhoff Biotic Index (HBI) values from kick-net samples and Hess samples taken near the impact site (SI) in spring 1999 and 2005-2007 and autumn 2001 and 2005-2007. Error bars represent +/- one standard error.

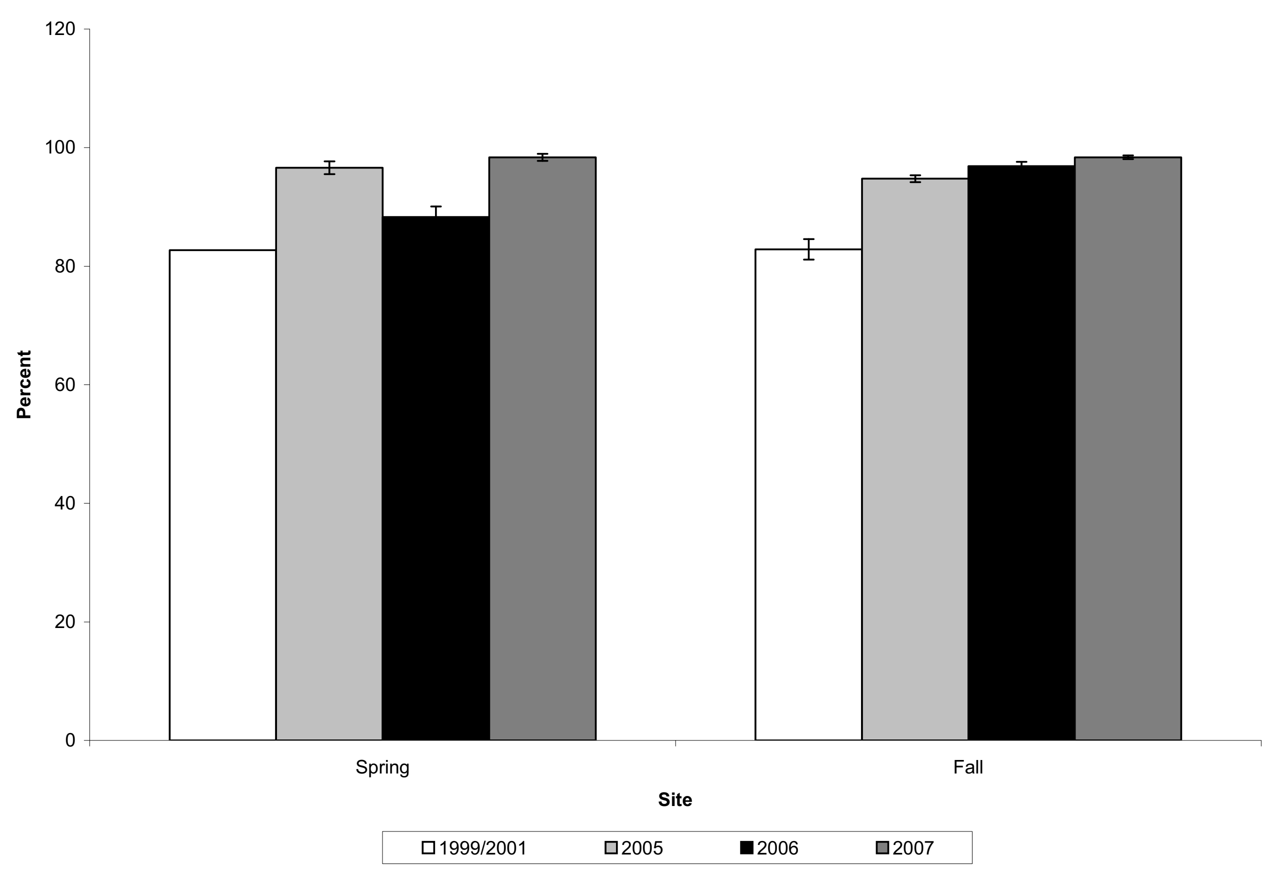


Figure 5.26 Percentage of the macroinvertebrate community comprised of the three most abundant taxa from kick-net samples and Hess samples taken near the impact site (SI) in spring 1999 and 2005-2007 and autumn 2001 and 2005-2007. Error bars represent +/- one standard error.

The dominant taxa (midges, *Baetis tricaudatus*) were fairly similar between the 1999/2001 and 2005-2007 collections in the SI site and comparable NAMC site, but the riffle beetle was the second most abundant taxa in June 1999 and blackflies were much more abundant in recent samples. The biggest difference in the community between the 1999/2001 and 2005-2007 collections was in the number of EPT taxa. Four stonefly taxa (*Pteronarcella badia*, *Pteronarcys californica*, *Isoperla* sp., and Chloroperlidae), two caddisfly taxa (*Rhyacophila* sp. and *Arctopsyche* sp.), and one mayfly taxa (*Tricorythodes* sp.) were found in the 1999/2001 collections but not in the 2005-2007 collections. In the June 2006 sample, several stonefly species were observed, along with one caddisfly species (*Rhyacophila coloradensis*), but the only common EPT taxon in all other samples was the mayfly *Baetis tricaudatus*. In addition, the relatively few EPT taxa that were collected in the 2005-2007 samples were generally found in lower abundance than in the 1999/2001 collections.

The NAMC also collected a kick-net sample near the DFC site identified in this study during January 2002, a kick-net sample near MO in June 1999, and a Hess sample downstream from OX, near the confluence with the Spanish Fork River, in March 2000. Since the NAMC efforts occurred in winter and spring, data collected in the spring during this study were used for comparison (except in 2006, when no spring data were collected, so autumn data were used). In the first sample for this study (2005), total density of macroinvertebrates in samples collected was higher than previous data collected near the DFC, MO, and OX sites, but in 2006 total density was similar between NAMC data and that collected for this study. In 2007, however, total density was lower in the MO and OX sites compared with historical data (Figure 5.27). For EPT density, the results were similar to NAMC data at DFC, slightly higher than NAMC data at MO, and lower than NAMC data at OX (the historical value near the OX site was very high; recent data were similar among sites) (Figure 5.28). Total taxa richness and EPT taxa richness were similar (or within the range of variability among samples) between the NAMC collections and data collected in 2005-2006, but in 2007 both taxa richness and EPT taxa richness were higher at MO and OX (Figures 5.29 and 5.30). The HBI values of historical collections were better than more recent data collections for this study, most notably at OX in 2000 (Figure 5.31). In 2005-2007 all sites fell into the enriched category, whereas the samples from OX in 2000 and DFC in 2002 fell into the slightly enriched category.

Compared with NAMC data, the percentage of the community comprised of the three most dominant taxa was similar in 2005 and 2006 and slightly lower in 2007 (Figure 5.32). Despite the similarities in overall percentage between NAMC data and more recent collections, the taxa that were most abundant were different. In 2000 the caddisfly taxon *Brachycentrus* sp. and the mayfly taxa Ephemerellidae and *Rhithrogena* sp. were abundant compared with the dominance of midges and worms found at OX in 2005-2007. In 2000 almost the entire community at OX was comprised of EPT taxa (however, these data represent a single kick-net sample and this result appears to be inconsistent with other samples in upstream locations at the same time). While there were abundance differences in the taxa found at OX in 2000 and 2005-2007, nearly all of the EPT taxa found in the 2000 NAMC samples were also found in each of the 2005-2007 samples, which suggests that the major difference was the high relative abundance of midges and worms in the recent samples.

In 2005 and 2006, approximately 15 percent more of the community at MO was comprised of the three dominant species compared with the June 1999 NAMC collection. In 2007 this decreased substantially (Figure 5.32). Midges, the mayfly Family Ephemerellidae, and the mayfly *Baetis tricaudatus* were the three most abundant taxa at MO in June 1999. In 2005 midges, worms, and round worms (Nematoda) were the three most abundant taxa. In 2006 midges, blackflies, and the

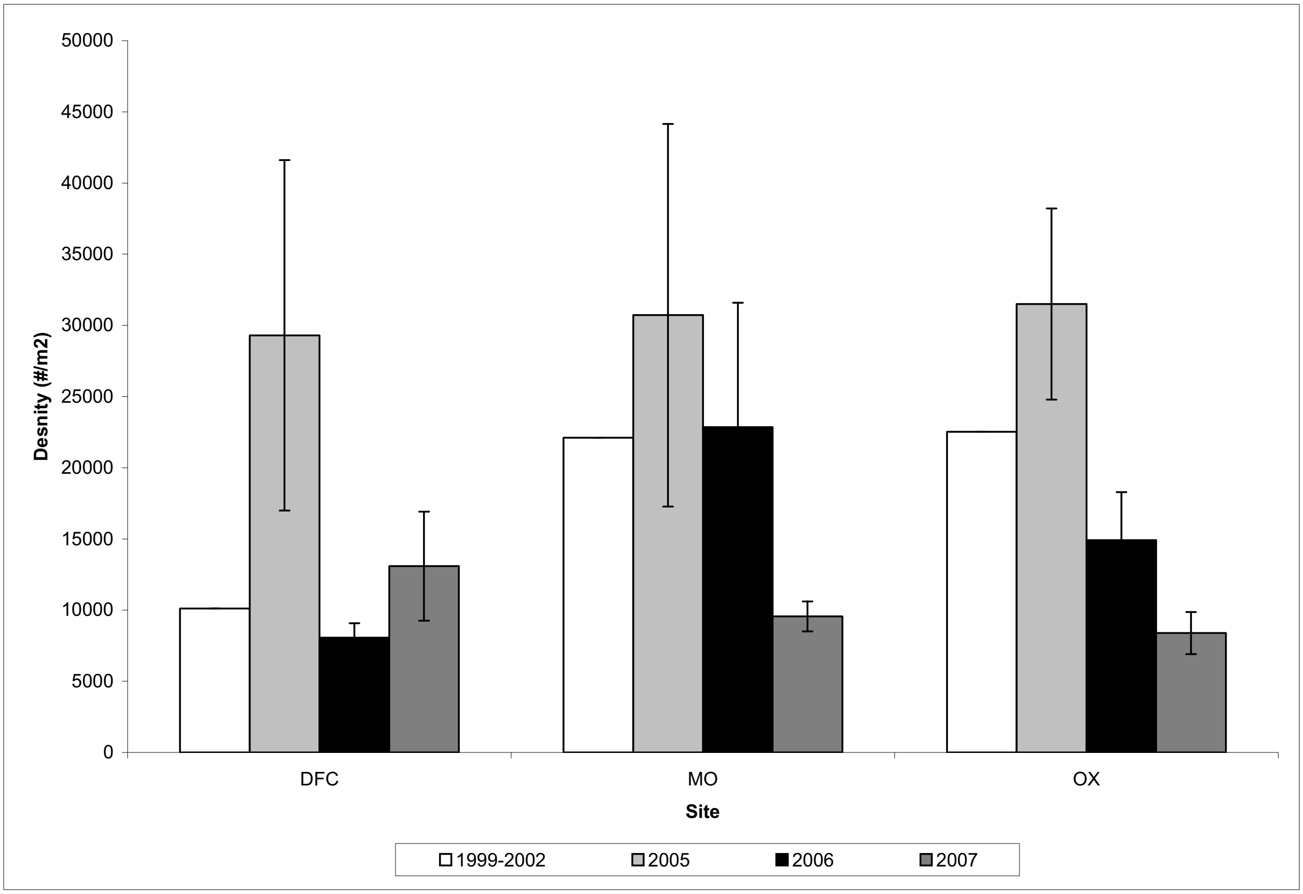


Figure 5.27 Total macroinvertebrate density from historical data, April 2005, June 2006, and April 2007 samples from Diamond Fork (DFC), Motherlode (MO), and Oxbow (OX). Error bars represent +/- one standard error.

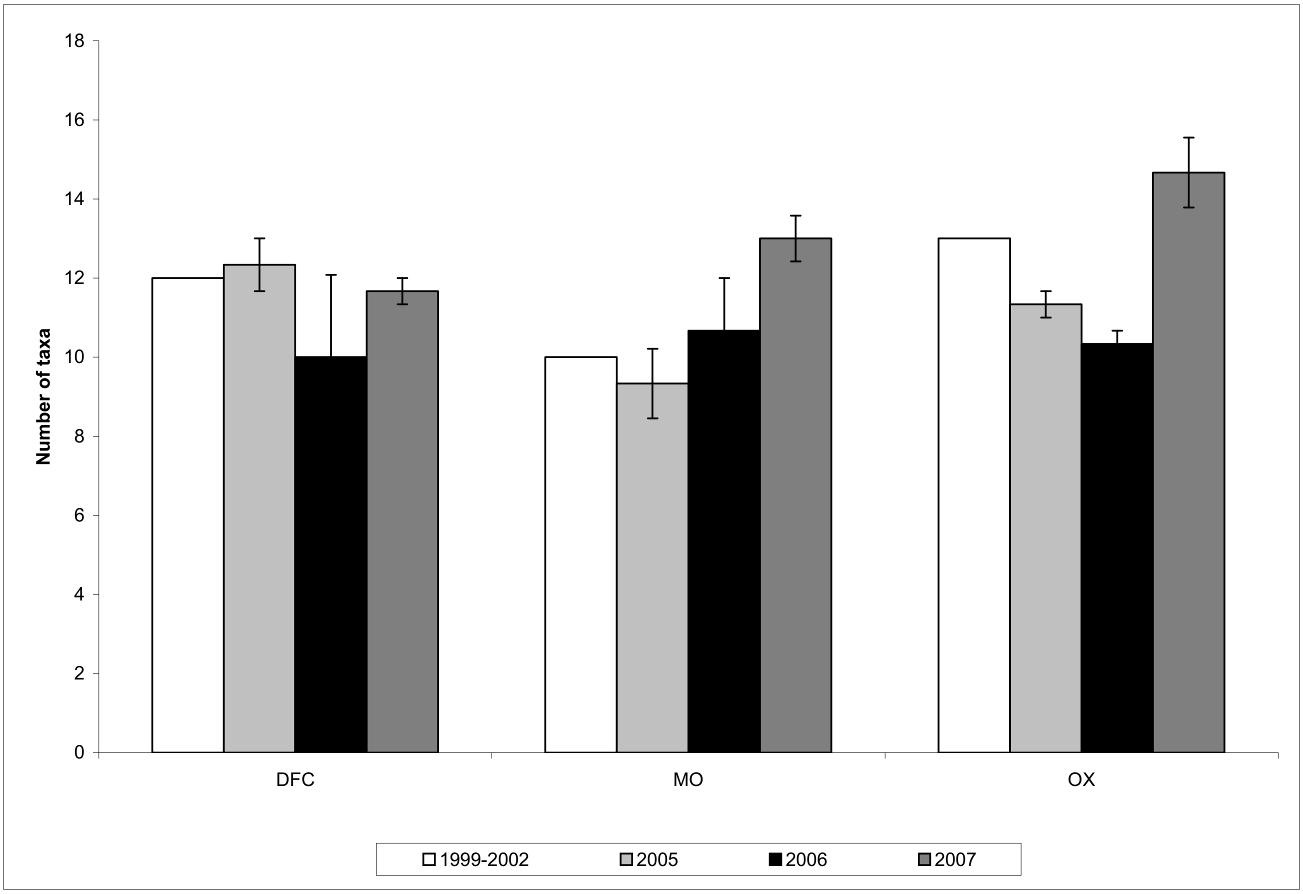


Figure 5.30 Total EPT richness from historical data and 2005-2007 samples from Diamond Fork (DFC), Motherlode (MO), and Oxbow (OX). Error bars represent +/- one standard error.

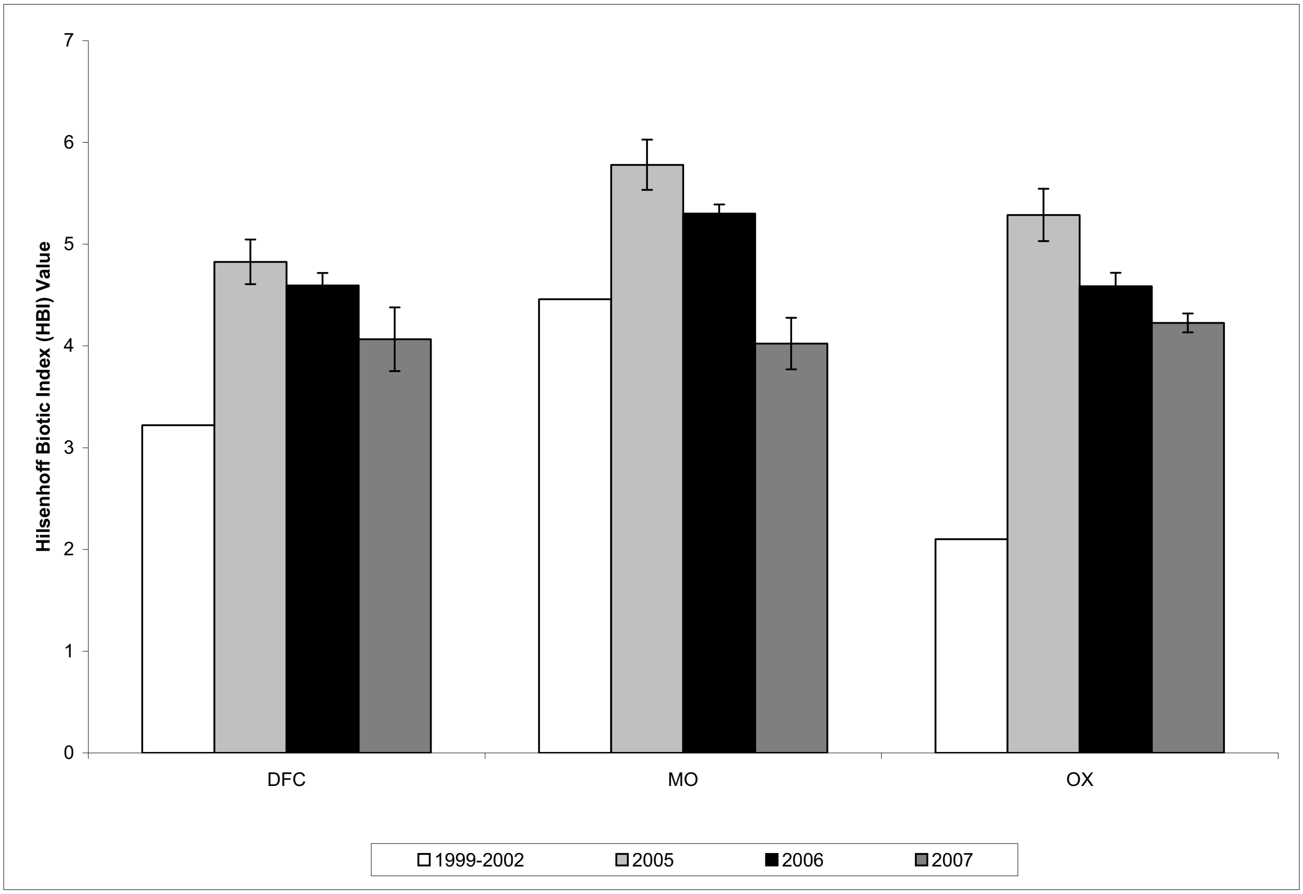


Figure 5.31 Hilsenhoff Biotic Index (HBI) values from historical data, April 2005, June 2006, and April 2007 samples from Diamond Fork (DFC), Motherlode (MO), and Oxbow (OX). Error bars represent +/- one standard error.

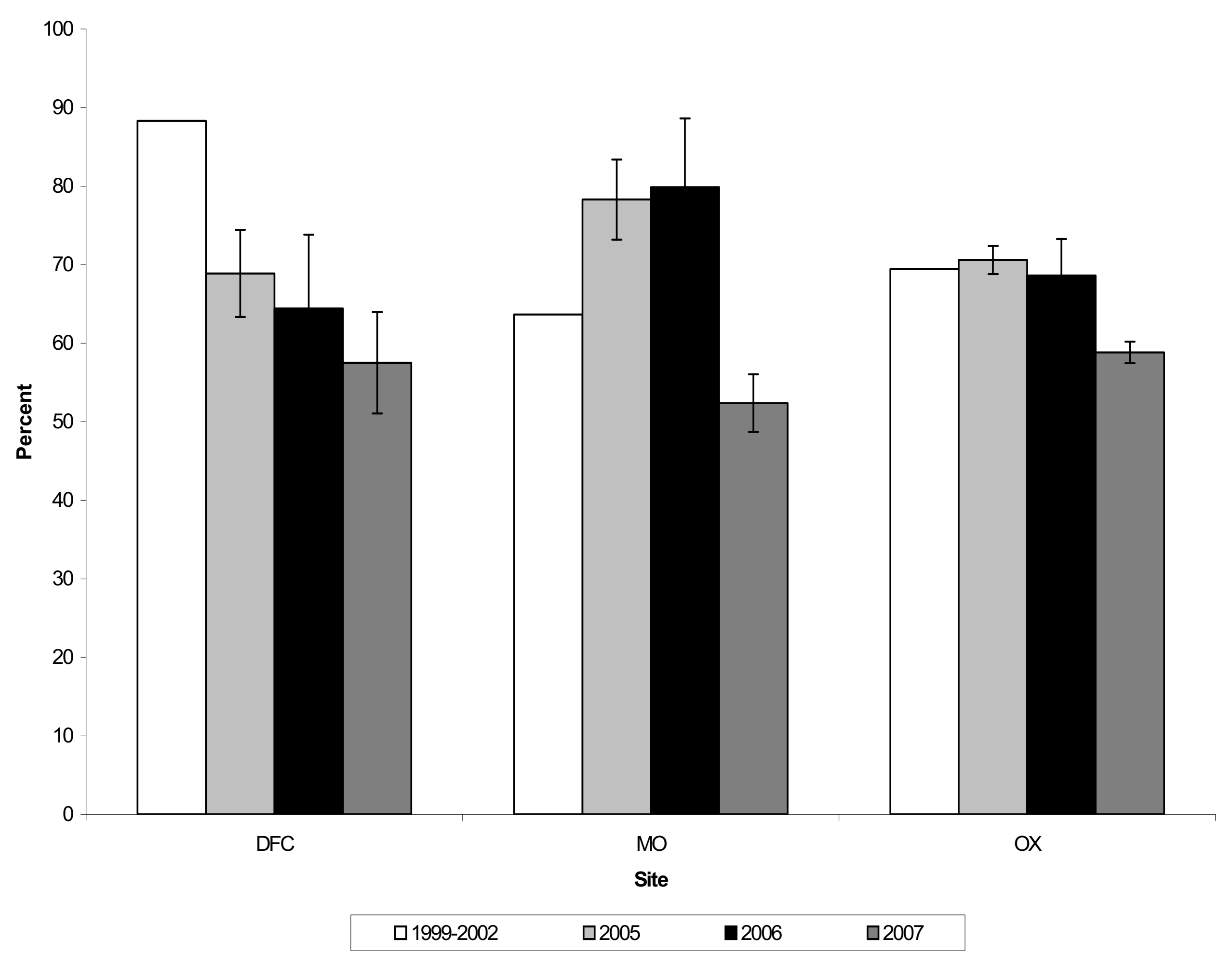


Figure 5.32 Percentage of macroinvertebrate communities comprised of the three most dominant taxa from NAMC data compared with 2005-2007 data. Error bars represent +/- one standard error.

mayfly *Baetis tricaudatus* were most abundant, and in 2007 midges, worms, and the tolerant riffle beetle *Optioservus* sp. were most abundant. However, nearly all of the EPT taxa collected in the June 1999 NAMC sample were also found in each of the 2005-2007 samples, which suggests that the major difference was the high relative abundance of midges and worms in the recent samples.

In the DFC site, the percent of the community was comprised of the three dominant taxa was at least 20 percent less in 2005-2007 samples than in the 2002 sample. As in both the OX and MO sites, the composition of the abundant species was different, but the differences are largely ascribed to an increase in relative abundance of midges and worms in recent samples.

5.4 DISCUSSION

Over 3 years of monitoring from 2005-2007, many trends in the aquatic macroinvertebrate community of the Diamond Fork Creek were observed. The evaluation of these data were focused on two separate issues; observing trends in recent data collected at four long-term monitoring sites (SXW, DFC, MO, OX) that may be influenced by the altered flow conditions resulting from the complete bypass of irrigation deliveries; and evaluating the potential impacts of hydrogen sulfide inputs upstream of the confluence with the Sixth Water Creek with one impact (SI) and two control sites (GS, SC). In addition, data from several sites were compared with data collected between 1999 and 2002, prior to the complete bypass of irrigation deliveries and the institution of the minimum-flow requirements on the Sixth Water and Diamond Fork Creeks.

5.4.1 Long-term Monitoring Sites

There were some interesting trends observed in the data collected from the four long-term monitoring sites in 2005-2007. Many of the trends that were observed in the Hess data (which could be evaluated statistically) were also evident in the kick-net data. Also, many of the trends observed in one metric (such as a change over time or a difference among sites) were persistent among several metrics.

Changes in the seasonal timing of the flow and temperature regimes of a system can impact the life history characteristics of individual species (Stanford and Ward 1979, Vannote and Sweeney 1980, Power et al. 1996). Changes in water velocity can impact channel-forming flows, which structure the bedform and substrate composition of the stream. Reducing spring peak flows can alter the maintenance of certain habitat types. More constant, higher flows can lead to the development of uniform substrates, which reduces the number of niches available. All of these factors may have worked to limit the diversity of habitat available for macroinvertebrates during the past century of water deliveries in Sixth Water and Diamond Fork Creeks. It took many years for the community to adjust to the irrigation-related pattern of flows in this watershed, and it may take many years to see changes resulting from the new flow pattern where irrigation flows bypass the system.

One of the changes that may be associated with altered flows is often a reduction in species diversity (Ward 1974, Stanford and Ward 1979). For example, taxa richness in Hess samples for three of the four long-term monitoring sites (DFC, MO, and OX) remained within a range of impacted sites in the region (Grafe 2002b) throughout the monitoring effort. Only the SXW site had taxa richness similar to non-impacted small streams in the region (Grafe 2002b). The EPT taxa richness results from the four long-term monitoring sites were similar to the total taxa richness results. The EPT taxa richness in Hess and kick-net samples from SXW was near or above the average for non-impacted small streams.

The HBI value is another factor that did not appear to be improving with the change in flow conditions: Results indicated some level of impacts at all four long-term monitoring sites. Three of the long-term monitoring sites (MO, OX, and DFC) fell into the enriched category for HBI values during all samples, while SXW was the only site where the HBI value dropped (improved) into the slightly enriched category (September 2005). This was also the only value to be close to the average value for least-impacted small streams in Idaho (Grafe 2002a). Almost all other samples were within the range of impacted small streams and well above the median of 4.0 listed for larger rivers in Idaho (Grafe 2002a, 2002b). Although some caution must be employed when interpreting richness and HBI indices for these data (mainly because of the level of taxonomic resolution used in this study), there still appears to be an indication of degraded conditions.

One of the most promising indications that habitat conditions may be improving was a significant trend of increasing EPT density in the MO site. An increasing trend of EPT taxa in a site suggests that the habitat is supporting more individual organisms that are intolerant to degraded conditions (but not necessarily more taxa). It is not clear, however, why the trend occurred in this site when none of the other long-term monitoring sites had a similar pattern. One might anticipate that improving conditions in any of the monitoring sites (particularly any of the three sites in the mainstem Diamond Fork Creek) would be apparent in the other sites as well. Another interesting trend occurred in the kick-net data: Each of the long-term monitoring sites had a decreasing trend in EPT abundance between autumn 2005 and spring 2007 and then an increase in autumn 2007. Although this trend was consistent across all sites, it was not substantiated by the Hess data, which can be used to evaluate trends statistically because of replication and standardization of area sampled.

Unfortunately, any results suggesting improving conditions were overshadowed by results indicating that there may some areas of concern. Snaddon and Davies (1998) showed that elevated summer flows from an inter-basin transfer in South Africa (similar condition to the Diamond Fork Creek prior to 2005) resulted in a decrease in taxa richness in the receiving river. It is logical then that taxa richness was likely suppressed in Diamond Fork Creek as a result of the increased irrigation flows in the watershed. Once those conditions changed and excess flows were removed (or substantially reduced) one might anticipate that there would be a corresponding increase in taxa richness as the habitat recovers. However, in each of the long-term monitoring sites there appeared to be a trend of decreasing total taxa richness (the trend was significant across all samples in the SXW site but only in autumn in the other sites) over the 3-year monitoring period immediately following flow reduction. Similarly, there was a significant trend of decreasing EPT taxa richness over time in all four long-term monitoring sites in autumn samples (even in the MO site where EPT density was increasing over time). A decreasing trend of taxa richness was an unexpected result for these monitoring sites. The change in flow conditions was assumed to be favorable for the aquatic community in each of these sites, but the data suggest otherwise. The distinct seasonal component of this observation was also interesting. It is possible that the changes associated with the modified flow rate are not creating improved habitat conditions, particularly in the autumn. This potentially important observation suggests that there may be some cause for concern over the long-term process of adjustment of the aquatic macroinvertebrate community to the new flows. Three years of data are not long enough to generate conclusive observations on biological communities that have great natural variability over time and are potentially responding to other stimuli in addition to or separate from the changes in flow patterns. However, decreasing taxa richness is worthy of subsequent monitoring (probably just during the autumn when the trend was most distinct) to determine whether this trend will continue and what might be causing the undesirable conditions during this time of the year. It is interesting that each following spring, samples showed higher mean taxa richness at each site than the proceeding fall sample.

In addition to decreasing taxa richness over time, the relative abundance of dominant taxa was very high in the Diamond Fork River compared with other streams in the Wasatch and Uinta Mountains (Grafe 2002a, Lester 2005), and there appeared to be a trend toward increasing percent abundance of these dominant taxa in the autumn (another indication that habitat conditions may be declining in the autumn). Further, these dominant taxa are generally tolerant to degraded conditions. The one positive indication for improving conditions is that a relatively intolerant taxon (*Paraleptophlebia* sp.) was found in the autumn 2007 sample from the SC site. More encouraging is that three intolerant taxa (*Brachycentrus occidentalis*, *Oligophlebodes* sp., and *Ephemerella inermis/infrequens*) were occasionally among the top three dominant taxa found at SXW, DFC, MO, and OX, despite the prevalence of tolerant midges, blackflies, and worms.

Among sites SXW initially appeared to have a macroinvertebrate community with better characteristics, but when all 3 years of monitoring data are evaluated the trend is less evident. The SXW site was similar to other sites in most metrics used for comparison of sites, but it had a slightly lower HBI value and a higher EPT density in many samples. This latter result might suggest that conditions were better in this site because of the importance of EPT taxa as indicators of good conditions, but the difference was not observed in the final study sample (autumn 2007). In addition, the HBI at SXW was enriched—as it was at all other sites—on all but one occasion, and was highest among all sites in the final sample. BIO-WEST (2006) noted that, based on the river continuum concept, the SXW site (a second order tributary to the Diamond Fork Creek) should have a lower taxa richness than the three downstream sites (all fourth-order sites on the main stem). Since there were no differences among sites, it was hypothesized that SXW represented a higher-quality condition and that the downstream sites still needed to improve. However, there was a trend of decreasing taxa richness in SXW over the 3-year monitoring period. Finally, there was a trend of increasing percent composition of the three most abundant taxa among autumn samples in the SXW site. Three years of monitoring the data provide a more complete evaluation of this site, and the results are not as good as expected or described in earlier reports. The autumn trends observed in samples in this site, as well as the others, suggest that there may be cause for concern during the fall and that further monitoring may be warranted.

In contrast to many of the results, the data collected in this study and compared with recent historical data (from 1999-2002) suggest that conditions may have improved over time, particularly in the MO and OX sites. However these comparisons were conducted using data collected during the spring because the historical data were also collected in spring. As noted above, there were several trends of decreasing benthic community diversity and abundance in autumn samples and, as a result, the comparison with historical data using only spring data may not provide a complete picture. Using the data collected in spring, it was noted that total density of macroinvertebrates may have been lower but still within a good range compared with other streams in the region (Grafe 2002b). The EPT density did not improve drastically between sample periods, but the more recent taxa richness and EPT taxa richness data used in the comparisons are the most indicative of improved and improving conditions. There did appear to be more midges and worms in these sites in recent years, but there was still a diverse community including many EPT taxa.

It might be argued that sample date may have influenced the results, but there was only an approximate 2-week difference in sample dates among years with the sample in 2007 occurring on the earliest date. If sample date were to influence the data, samples conducted later may occur after some aquatic insects (sampled as larvae) emerge as adults and leave the stream in abundance, which could result in lower numbers of certain taxa in aquatic samples (early instar larvae resulting from the mating adults would not be large enough to sample within such a short time frame). It is also possible, however, that many larvae emerged prior to the September sample period (e.g., in August) and a generation of larvae existed that were too small to sample just a week or two earlier. To assess this possibility would require a detailed evaluation of life history characteristics of the local benthic macroinvertebrate community as well as multiple years of data to assess emergence patterns in this stream. It is also possible that a wide range of variability in the community patterns has not been fully captured during the 3-year monitoring period.

The trends of reduced taxa richness and increasing dominance of a few taxa in autumn samples may be correlated with the observed sedimentation in Diamond Fork Creek (see Chapter 4). Fine sediment transport and deposition can have negative impacts on aquatic invertebrates (Waters 1995). The higher-than-average transport of gravel and fine sediments could be impacting the diversity of macroinvertebrates found at SXW, DFC, MO, and OX.

The effects of fine sediment on stream insects have been studied in recent years (Relyea et al. 2000). With the exception of SXW, the average weighted Fine Sediment Biotic Index (FSBI) scores for each site as described in Relyea et al., (2000), suggest that their macroinvertebrate communities are predominantly comprised of organisms at least moderately tolerant to fine sediments (Appendix 5.1). However, when evaluated over time, the FSBI score decreased over the three autumn samples in DFC, MO, and OX (Figure 5.33). There was no distinct pattern among spring samples. The FSBI score in the SXW site increased slightly (not statistically significant) over time and was higher than the other sites (its mean FSBI value of 5.7 falls just below the threshold for a moderately intolerant community). In earlier reports of these data, it was noted that a caddisfly classified as intolerant to fine sediment (*Arctopsyche grandis*; Relyea et al. 2000) was present at all four of the monitoring sites, but in autumn 2007 no individuals were collected in Hess samples from any site. In addition to *Arctopsyche grandis*, another caddisfly that is intolerant to sediment, *Oligophlebodes* sp., was common at the SXW site but not found in any of the three lower Diamond Fork monitoring sites in autumn 2007. The observed trend of the FSBI scores at DFC, MO, and OX indicates sedimentation problems are occurring in lower Diamond Fork Creek during the fall season.

5.4.2 Hydrogen Sulfide Evaluation Sites

The severe impacts to the benthic community associated with the increased hydrogen sulfide inputs above the Three Forks area were evident from the monitoring data. Total macroinvertebrate density was usually much higher in the SI site compared with the GS and SC sites (due to high densities of tolerant taxa), EPT density was lowest in the SI site, total taxa richness and EPT taxa richness

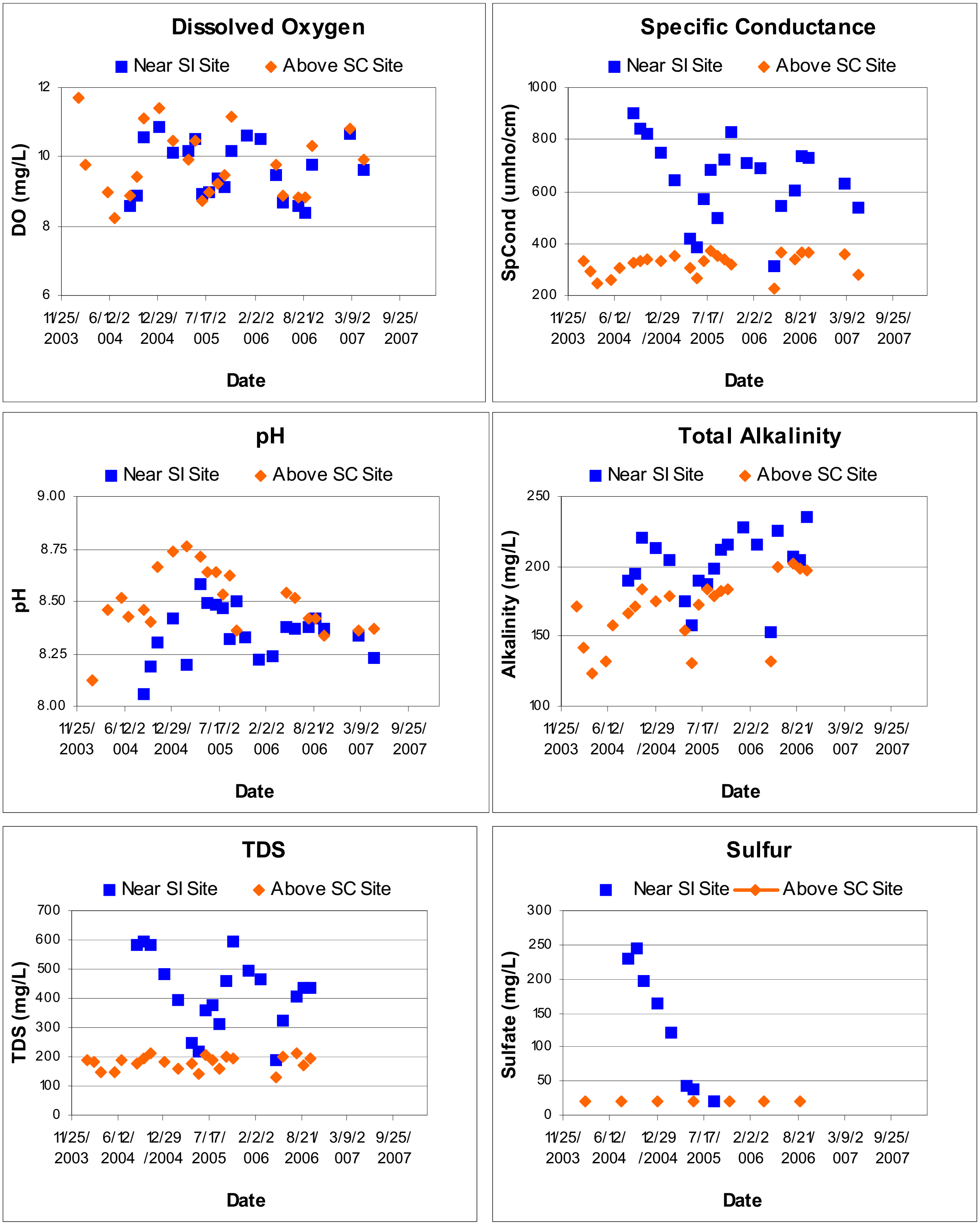


Figure 5.33. Water quality data from the EPA STORET database (https://www.epa.gov/storet/dbtop.html). The “Above SC” site is STORET site number 4995710, Diamond Fork Creek above Sixth Water Creek, and the “Near SI” site is STORET site number 4995760, Diamond Fork Creek at Ray’s Crossing.

were significantly higher in the GS and SC sites (for taxa richness, the impact site had a decreasing trend compared with an increasing trend over time in the control sites), and only a few taxa (primarily midges and blackflies, which are very tolerant of degraded conditions), dominated samples in the impact site. The only EPT taxon in which more than a few individuals were collected was a relatively tolerant colonizing mayfly, *Baetis tricaudatus*. All of these conditions show a clear impact to the benthic macroinvertebrate community in the area of the hydrogen sulfide inputs relative to the control sites. For most metrics, the values were consistent over the 3-year sampling period and indicate little has changed since the monitoring began. However, the trend toward decreasing total taxa richness in the impact site suggests that conditions may be continuing to deteriorate. Though the benthic macroinvertebrate community cannot be degraded much further, since the few remaining taxa that are very tolerant to degraded conditions, the trend suggests that it may be some time before improvements are observed.

The composition of the macroinvertebrate community in the SI site also deviated greatly from historical data collected in the same area. Earlier samples (collected in 1999 and 2001) showed a community more similar to those of other sites sampled on Diamond Fork Creek during this study including a large number of EPT taxa. Four stonefly taxa (*Pteronarcella badia*, *Pteronarcys californica*, *Isoperla* sp., and Chloroperlidae), two caddisfly taxa (*Rhyacophila* sp. and *Arctopsyche* sp.), and one mayfly taxa (*Tricorythodes* sp.) were found in the 1999/2001 collections but not in the 2005-2007 collections (with the exception of the June 2006 sample). The historical samples, taken less than 2.1 km downstream of the SI site, had substantially higher density and diversity of EPT taxa and a substantially lower HBI value than the SI site. Because the only known major impact to the system upstream of Three Forks between 2001 and 2005 has been the increased hydrogen sulfide input that began in 2002, the assumption is that this is responsible for the impacts seen in the invertebrate community at the SI site.

The fish community appears to be similarly influenced by the hydrogen sulfide inputs, particularly in the autumn when discharge is low and inputs are concentrated. The Utah Department of Wildlife Resources (UDWR) found that fish held in cages downstream of the hydrogen sulfide inputs during the autumn only survived for about an hour (R. Hepworth 2005, pers. comm.).

Water quality readings collected with a Hydrolab multi-sonde in 2005-2007 (Tables 5.6-5.8) indicate elevated levels of conductivity and turbidity at the SI site compared with the control sites. These values are high, but neither water quality parameter is directly toxic to aquatic biota (individual water quality parameters that comprise the high turbidity values, such as sulfur, may be toxic; however, this study did not attempt to generate a detailed water quality analysis of the impact site). Other parameters deviated slightly between the impact and control sites (e.g., temperature and dissolved oxygen), but these differences were likely associated with time of sampling and natural variability (i.e., field measurement error). In addition to the data collected for this study, there is historical available on STORET (http://www.epa.gov/storet/dbtop.html) for samples collected by the Utah Department of Environmental Quality (Figure 5.34). These data reveal high specific conductivity and total dissolved solids in the impact area, compared with an upstream site, but similar values for dissolved oxygen and pH between sites. The Utah Department of Environmental Quality measured sulfur several times prior to and including September 2005, but this parameter has

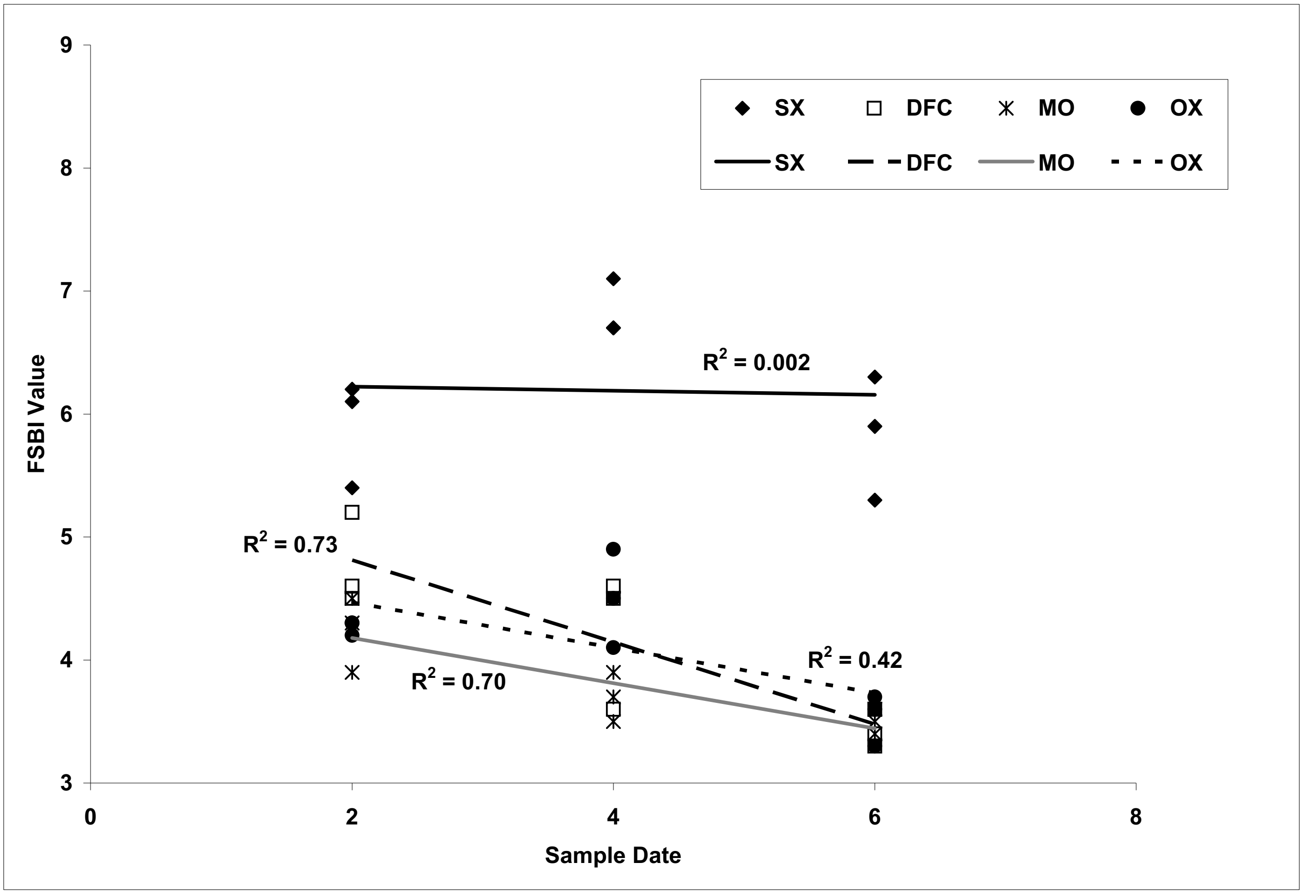


Figure 5.34. Scatterplot and trendline of Fine Sediment Biotic Index (FSBI) values from Hess samples collected during autumn in the four long-term monitoring sites from 2005-2007. Sample dates include autumn 2005 (2), autumn 2006 (4), and autumn 2007 (6).

Table 5.6. HYDROLAB readings taken at the control site (SC) and the impact site (SI) on September 28, 2005.

WATER QUALITY CONSTITUENT	SC SITE	SI SITE
Temperature (°C)	8.84	10.54
Specific Conductivity (mohs)	336.0	551.8
pH	7.95	7.91
Dissolved oxygen (mg/L)	9.16	8.35
Total dissolved solids (mg/L)	0.2153	0.3525
Turbidity (NTUs)	101.6	696.9

Table 5.7. HYDROLAB readings taken at the control sites (GS and SC) and the impact site (SI) on September 19, 2006.

WATER QUALITY CONSTITUENT	GS SITE	SC SITE	SI SITE
Temperature (°C)	11.02	5.32	9.47
Specific Conductivity (mohs)	327.0	392.0	645.0
pH	8.46	8.40	8.23
Dissolved oxygen (mg/L)	10.59	12.24	11.05
Total dissolved solids (mg/L)	-	-	-
Turbidity (NTUs)	-	-	-

Table 5.8. HYDROLAB readings taken at the control sites (GS and SC) and the impact site (SI) on September 12, 2007.

WATER QUALITY CONSTITUENT	GS SITE	SC SITE	SI SITE
Temperature (°C)	14.92	13.66	16.41
Specific Conductivity (mohs)	327	371	762
pH	8.67	8.58	8.20
Dissolved oxygen (mg/L)	9.30	9.53	7.35
Total dissolved solids (mg/L)	-	-	-
Turbidity (NTUs)	11.7	11.1	37.4

not been measured since. Measurements of sulfur appear to have declined progressively between 2004-2005 to a level that is below detection limits for the most recent data point. These data suggest that there may be near-term improvement in water quality conditions that should allow the SI site to return to a non-impacted condition.

The one promising observation that occurred during this monitoring effort was in 2006 when the three hydrogen sulfide evaluation sites were sampled immediately following runoff conditions (due to an unexpectedly early runoff that year). In most samples there were several sensitive species of mayfly (e.g., *Ephemerella inermis/infrequens*), stonefly (e.g., *Pteronarcella badia*, *Pteronarcys californica*, *Isogenoides* sp.), and caddisfly (e.g., *Arctopsyche grandis*, *Glossosoma* sp., *Lepidostoma* sp.) that were common at most of the other Diamond Fork Creek sites, including the control sites, but these were absent from the SI site. In the spring 2006 post-runoff sample, several of the taxa listed above were found in the SI site including each of the mayflies and stoneflies and one of the three caddisflies listed as common in the other sites (*Lepidostoma* sp.). The runoff flows hypothetically transported many of these organisms into the site during runoff, but the subsequent sample revealed that the increased diversity was short lived. This suggests that if/when the hydrogen sulfide inputs are suppressed, the benthic macroinvertebrate community at the site will be supported by drift from upstream locations. When conditions allow these organisms to persist in the site, it should recover relatively quickly from the disturbance. However, as long as the hydrogen sulfide inputs persist, a severely degraded community will exist.

The exact downstream extent of the impacts from the hydrogen sulfide inputs is unknown, but there has been little evidence of impact at the next downstream sample location (the DFC site) and no indication of a downstream trend among those sites. The inputs from the Sixth Water Creek appear to dilute the hydrogen sulfide inputs sufficiently to reduce further downstream impacts to the benthic macroinvertebrate community.

6.0 SUMMARY AND RECOMMENDATIONS

6.0 SUMMARY AND RECOMMENDATIONS

For many years, Diamond Fork Creek and its tributary Sixth Water Creek conveyed water imports from Strawberry Reservoir to the Wasatch Front as an important component of the Strawberry Valley Project. Such flows ceased with the completion of the Diamond Fork System, which is part of the Bonneville Unit in the Central Utah Project. Today, the Diamond Fork System transports imported water through a series of tunnels and pipes to Spanish Fork River with the capability of bypassing Sixth Water and Diamond Fork Creeks to a large degree. Currently, the only imported water sent through Sixth Water and Diamond Fork Creeks is to satisfy the instream flow requirements and water deliveries when the pipe is at capacity.

Mitigation of impacts that were caused by the Diamond Fork System is required under the Central Utah Project Completion Act (1992). In order to fulfill these commitments, the Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) established a monitoring program to evaluate the geomorphic and ecological changes related to the new flow regime set by instream flow requirements. Monitoring over the past 3 years has established a "baseline" condition for the stream and riparian corridor following completion of the Diamond Fork System, and will allow analysis of change over time in order to set and prioritize restoration efforts and adaptively maintain the riverine and riparian ecosystem in a desirable and functional condition. This report documents the findings of the 2007 monitoring efforts including comparisons with and summaries of the 2005 and 2006 data.

The watershed experienced average runoff in 2005, high runoff in 2006, and low runoff in 2007. Instream flows were similar between years with approximately 32 cubic feet per second (cfs) or more in upper Sixth Water Creek, and 80 cfs or more in lower Diamond Fork Creek until October when flows in Diamond Fork Creek are reduced to 60 cfs or more. The initial response of aquatic and riparian habitat to the previously altered Diamond Fork System has begun. The channel in lower Diamond Fork Creek narrowed and became more sinuous and single threaded between 2006 and 2007. Although gravel transport occurred, the peak flows in 2007 were insufficient to cause the same channel change that occurred in 2006. Bars that were bare in 2005 are becoming more and more vegetated, and vegetation is encroaching into areas that were otherwise bare in 2005. Willows and other encroaching vegetation types are getting taller and becoming more established, and previously dynamic features—such as bare bars, migrating meanders, and active secondary channels—are becoming more stable with this vegetative cover. It will be interesting to see whether another high peak flow year, like 2006, will result in the same amount of channel change in the future, or whether the channel is becoming more resistant to change as the newly established vegetation matures.

A significant amount of seasonal sedimentation is occurring in the lower reaches of Diamond Fork Creek. The problem is likely twofold: First, the summer and winter instream flows are too high and cause a significant amount of "unnatural" bedload transport in both Sixth Water and Diamond Fork Creeks; second, the source of suspended sediment in the Sixth Water Creek watershed (likely coming from the landslide upstream of Ray's Crossing) remains active during high instream flows, and this material falls out of suspension in the flatter downstream reaches of lower Sixth Water and lower Diamond Fork Creeks during the summer and fall. The fall benthic macroinvertebrate data indicate that sedimentation is likely causing a downward trend in sensitive taxa, and conditions have become more degraded in the lower portions of Diamond Fork Creek instead of improving with completion of the Diamond Fork System.

A potentially alarming problem is the year-round fine- and coarse-grained sediment transport and associated sedimentation and embeddedness occurring in the lower reaches of Diamond Fork Creek. The geomorphic monitoring plan was adapted in 2007 to focus on these potential concerns. The percent of the streambed covered with fines (<2 millimeters) doubled and tripled during the summer and fall base-flow months in lower Diamond Fork Creek, but there were insignificant changes during the same period in Sixth Water Creek and Hobble Creek. The results indicate that the instream flows are causing sedimentation and habitat degradation in lower Diamond Fork Creek.

The following recommendations are made for future monitoring and adaptive management measures in Sixth Water and Diamond Fork Creeks:

1. Sample sediment transport (bedload, suspended sediment, and turbidity) during a test “low flow” in 2008. Determine when bedload transport shuts down and how much less suspended sediment and turbidity occur at lower, base-flow levels.

   Test a minimum instream flow of approximately 50, 40, and 30 cfs, and 20, 15, and 10 cfs for 3 days each at the Red Hollow U.S. Geological Survey (USGS) gage and Sixth Water above Syar USGS gage, respectively, in early October when flows are normally reduced. Once the flows have stabilized at the recommended level, perform repeat sediment samples at each flow at the following sample locations: Upper Sixth Water, Ray’s Crossing, Diamond Fork above Three Forks, Diamond Fork below Three Forks, Diamond Fork Campground, and Child’s Bridge monitoring sites.

2. Make flow recommendations for Sixth Water and Diamond Fork Creeks (similar to the lower Provo River) with focus on base flows, channel/floodplain dynamics, and riparian vegetation (including Ute Ladies’-tresses) maintenance and recruitment. The range of natural base flows for Utah streams should be determined using the same method (monthly flow duration curves) used for Provo River and Hobble Creek flow recommendations.

3. Measure seasonal changes in sedimentation and embeddedness to document habitat conditions during the fall spawning period and macroinvertebrate sampling period again in 2008. Repeat the measurements made in 2007 at three times only (late June/early July following spring runoff, September, and again late October/early November coinciding with the test flows).

4. Continue fall benthic macroinvertebrates for at least 1 more year to confirm trends seen over the past 3 years.

7.0 REFERENCES

7.0 REFERENCES

Barbour, M. T., J. Gerritsen, B. D. Snyder, and J. B. Stribling. 1999. Rapid bioassessment protocols for use in streams and wadeable rivers: periphyton, benthic macroinvertebrates and fish, Second edition. EPA 841-B-99-002. Washington (D.C.): U.S. Environmental Protection Agency, Office of Water.

[BIO-WEST] BIO-WEST, Inc. 2006. Sixth Water and Diamond Fork Creeks 2005 Monitoring Report. Salt Lake City: Utah Reclamation Mitigation and Conservation Commission.

[BIO-WEST] BIO-WEST, Inc. 2007. Sixth Water and Diamond Fork Creeks 2006 Monitoring Report. Salt Lake City: Utah Reclamation Mitigation and Conservation Commission. 93 p. plus appendices.

[BIO-WEST] BIO-WEST, Inc. 2008. Diamond Fork and Sixth Water Creeks Riparian Vegetation and Ute Ladies'-tresses 2007 Final Monitoring Report. Salt Lake City: Utah Reclamation Mitigation and Conservation Commission.

Bjornn, T. C., and Reiser, D. W. 1991. Habitat requirements of salmonids in streams. American Fisheries Society Special Publication 19, 83-138.

Chapman, D. W. 1988. Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society 117, 1-21.

[CUWCD] Central Utah Water Conservancy District. 2003. Upper Diamond Fork brochure. Salt Lake City: CUWCD. Location: http://www.mitigationcommission.gov/watershed/diamondfork/watershed_diamond.html.

Grafe, C. S. (ed.). 2002a. Idaho small stream ecological assessment framework: an integrated approach. Boise: Idaho Department of Environmental Quality. 74 p.

Grafe, C. S. (ed.). 2002b. Idaho river ecological assessment framework: an integrated approach. Boise: Idaho Department of Environmental Quality. 222 p.

Hilsenhoff, W. L. 1988. Rapid field assessment of organic pollution with a family level biotic index. The Journal of the North American Benthological Society 7:65-68.

Kondolf, G., and Wilcock, P. R. 1996. The flushing flow problem: defining and evaluating objectives. Water Resources Research 32, 2589-2599.

Lenat, D. R., Penrose, D. L., and Eagleson, K. W. 1981. Variable effects of sediment addition on stream benthos. Hydrobiologia 79, 187-194.

Lester, G. 2005. Biologist, EcoAnalysts, Inc. Personal communication with Mike Golden regarding percentages of communities made up of three most dominant taxa. 1/19/2005.

Merrit, R. W., and Cummins, K. W. 1984. An introduction to the aquatic insects of North America. Dubuque (IA): Kendall/Hunt Publishing Company.

[Mitigation Commission] Utah Reclamation Mitigation Conservation Commission. 2000. Diamond Fork area assessment: a cooperative project between the mitigation commission and U.S. Forest Service. 2000. Salt Lake City: Mitigation Commission. 146 p. plus appendices.

[Mitigation Commission] Utah Reclamation Mitigation Conservation Commission. 2005. More about Diamond Fork home page. Location: http://www.mitigationcommission.gov/watershed/diamondfork/watershed_diamond.html. 10/19/2005.

Moring, J. R. 1982. Decrease in stream gravel permeability after clear-cut logging: an indication of intragravel conditions for developing salmonid eggs and alevins. Hydrobiologia 88, 295-298.

[NAMC] National Aquatic Monitoring Center. 2006. BugLab interactive sample mapping routine. Location: http://129.123.16.30/buglabdotnet2/mapmain.aspx. 2/3/06.

Osmundson, D. B., and Scheer, B. K. 1998. Monitoring cobble-gravel embeddedness in the streambed of the upper Colorado River, 1996-1997. Final Report. Grand Junction (CO): U.S. Fish and Wildlife Service.

Platts, W. S., Torquemada, R. J., McHenry, M. L., and Grahm, C. K. 1989. Changes in salmon spawning and rearing habitat from increased delivery of fine sediment to the south Fork Salmon River, Idaho. Transactions of the American Fisheries Society 118, 274-283.

Power, M. E., W. E. Dietrich, and J. G. Finlay. 1996. Dams and aquatic diversity: potential food web consequences of hydrologic and geomorphic change. Environmental Management 20: 887-895.

Relyea, C. D., Minshall, G. W., and Danehy, R. J. 2000. Stream insects as bioindicators of fine sediment: Proceedings of Watershed 2000, Water Environment Specialty Conference, Vancouver, B.C. 19 p. plus appendices.

Rinne, J. N. 1990. The utility of stream habitat and biota for identifying potential conflicting forestland uses: montane riparian areas. Forest Ecology and Management 33/34, 363-383.

Snaddon, C. D. and B. R. Davies. 1998. A preliminary assessment of the effects of a small South African inter-basin water transfer on discharge and invertebrate community structure. Regulated Rivers: Research and Management 14(5):421-441.

Stanford, J. A. and J. V. Ward. 1979. Stream regulation in North America. *In*: Ward, J. V., Stanford, J. A., editors. The ecology of regulated streams. New York (NY): Plenum Press. pp. 215-236.

Sylte, T. L., and Fischenich, J. C. In press. An evaluation of embeddedness measurement techniques. Technical Report. Vicksburg (MS): U.S. Army Engineer Research and Development Center.

Tappel, P. D., and Bjornn, T. C. 1983. A new method of relating size of spawning gravel to salmonid embryo survival. North American Journal of Fisheries Management 3, 123-135.

[USBOR] U.S. Bureau of Reclamation. 2005. CUP-Bonneville Unit, Utah. Location: http://www.usbr.gov/dataweb/html/bonneville.html. 10/19/2005.

Vannote, R. L., B. W. Sweeney. 1980. Geographic analysis of thermal equilibria: a conceptual model for evaluating the effect of natural and modified thermal regimes on aquatic insect communities. The American Midland Naturalist 115: 666-695.

Vinson, M. R. 2006. Biologist, National Aquatic Monitoring Center. Personal communication with Michael Golden of BIO-WEST, Inc., Logan, Utah, regarding macroinvertebrate communities on the Diamond Fork. 2/3/2006.

Ward, J. V. 1974. A temperature -stressed stream ecosystem below a hypolimnetic release mountain reservoir. Archiv für Hydrobiologie 74:247-275.

Waters, T. F. 1995. Sediment in streams: sources, biological effects, and control. Bethesda (MD): American Fisheries Society Monograph 7. 251 p.

Wilcock, P. R. 1998. Two-fraction model of initial sediment motion in gravel-bed rivers. Science 280, 410-412.

[WILDCO] WILDCO, Inc. 2006. WILDCO Hess sampler. Location: http://www.wildco.com/ vw_prdct_mdl.asp? prdct_mdl_ cd=16. 2/15/06.

Wolman, M.G. 1954. A method of sampling coarse river-bed material. Transactions of the American Geophysics Union 35(6):951-956.

Young, M. K., Hubert, W. A., and Wesche, T. A. 1990. Effect of substrate composition and stock origin on the survival to emergence of brown trout: a laboratory study. Northwest Science 64, 224-231.

APPENDIX 2.1: CROSS-SECTION PHOTOS

Photos are labeled with date (year/month/day), site, cross section number, and direction.

Photo 1. 20071010SXW1US.JPG

Photo 2. 20071010SXW1RB.JPG

Photo 3. 20071010SXW1LB.JPG

Photo 4. 20071010SXW1DS.JPG

Photo 5. 20071010SXW2US.JPG

Photo 6. 20071010SXW2RB.JPG

Photo 7. 20071010SXW2LB.JPG

Photo 8. 20071010SXW2DS.JPG

Photo 9. 20071010SXW3US.JPG

Photo 10. 20071010SXW3RB.JPG

Photo 11. 20071010SXW3LB.JPG

Photo 12. 20071010SXW3DS.JPG

Photo 53. 20071010SXW4US.JPG

Photo 14. 20071010SXW4RB.JPG

Photo 15. 20071010SXW4LB.JPG

Photo 16. 20071010SXW4DS.JPG

Photo 17. 20071010SXW5US.JPG

Photo 18. 20071010SXW5RB.JPG

Photo 19. 20071010SXW5LB.JPG

Photo 20. 20071010SXW5DS.JPG

Photo 21. 20071010SXW6US.JPG

Photo 22. 20071010SXW6RB.JPG

Photo 23. 20071010SXW6LB.JPG

Photo 24. 20071010SXW6DS.JPG

Photo 25. 20071024DFC1US.JPG

Photo 26. 20071024DFC1RB.JPG

Photo 27. 20071024DFC1LB.JPG

Photo 28. 20071024DFC1DS.JPG

Photo 29. 20071024DFC2US.JPG

Photo 30. 20071024DFC2RB.JPG

Photo 31. 20071024DFC2LB.JPG

Photo 32. 20071024DFC2DS.JPG

Photo 33. 20071024DFC3US.JPG

Photo 34. 20071024DFC3RB.JPG

Photo 35. 20071024DFC3LB.JPG

Photo 36. 20071024DFC3DS.JPG

Photo 37. 20071024DFC4US.JPG

Photo 38. 20071024DFC4RB.JPG

Photo 39. 20071024DFC4LB.JPG

Photo 40. 20071024DFC4DS.JPG

Photo 41. 20071024DFC5US.JPG

Photo 42. 20071024DFC5RB.JPG

Photo 43. 20071024DFC5LB.JPG

Photo 44. 20071024DFC5DS.JPG

Photo 45. 20071024DFC6US.JPG

Photo 46. 20071024DFC6RB.JPG

Photo 47. 20071024DFC6LB.JPG

Photo 48. 20071024DFC6DS.JPG

Photo 49. 20071024DFC7US.JPG

Photo 50. 20071024DFC7RB.JPG

Photo 51. 20071024DFC7LB.JPG

Photo 52. 20071024DFC7DS.JPG

Photo 53. 20071026MO1US.JPG

Photo 54. 20071026MO1RB.JPG

Photo 55. 20071026MO1LB.JPG

Photo 56. 20071026MO1DS.JPG

Photo 57. 20071026MO2US.JPG

Photo 58. 20071026MO2RB.JPG

Photo 59. 20071026MO2LB.JPG

Photo 60. 20071026MO2DS.JPG

Photo 61. 20071026MO3US.JPG

Photo 62. 20071026MO3RB.JPG

Photo 63. 20071026MO3LB.JPG

Photo 64. 20071026MO3DS.JPG

Photo 65. 20071026MO4US.JPG

Photo 66. 20071026MO4RB.JPG

Photo 67. 20071026MO4LB.JPG

Photo 68. 20071026MO4DS.JPG

Photo 69. 20071026MO5US.JPG

Photo 70. 20071026MO5RB.JPG

Photo 71. 20071026MO5LB.JPG

Photo 72. 20071026MO5DS.JPG

Photo 73. 20071026MO6US.JPG

Photo 74. 20071026MO6RB.JPG

Photo 75. 20071026MO6LB.JPG

Photo 76. 20071026MO6DS.JPG

Photo 77. 20071025OX1US.jpg

Photo 78. 20071025OX1RB.jpg

Photo 79. 20071025OX1LB.jpg

Photo 80. 20071025OX1DS.jpg

Photo 81. 20071025OX2US.jpg

Photo 82. 20071025OX2RB.jpg

Photo 83. 20071025OX2LB.jpg

Photo 84. 20071025OX2DS.jpg

Photo 85. 20071025OX3US.jpg

Photo 86. 20071025OX3RB.jpg

Photo 87. 20071025OX3LB.jpg

Photo 88. 20071025OX3DS.jpg

Photo 89. 20071025OX4US.jpg

Photo 90. 20071025OX4RB.jpg

Photo 91. 20071025OX4LB.jpg

Photo 92. 20071025OX4DS.jpg

Photo 93. 20071025OX5US.jpg

Photo 94. 20071025OX5RB.jpg

Photo 95. 20071025OX5LB.jpg

Photo 96. 20071025OX5DS.jpg

Photo 97. 20071025OX6US.jpg

Photo 98. 20071025OX6RB.jpg

Photo 99. 20071025OX6LB.jpg

Photo 100. 20071025OX6DS.jpg

Photo 101. 20071025OX7US.jpg

Photo 102. 20071025OX7RB.jpg

Photo 103. 20071025OX7LB.jpg

Photo 104. 20071025OX7DS.jpg

Photo 105. 20071025OX8US.jpg

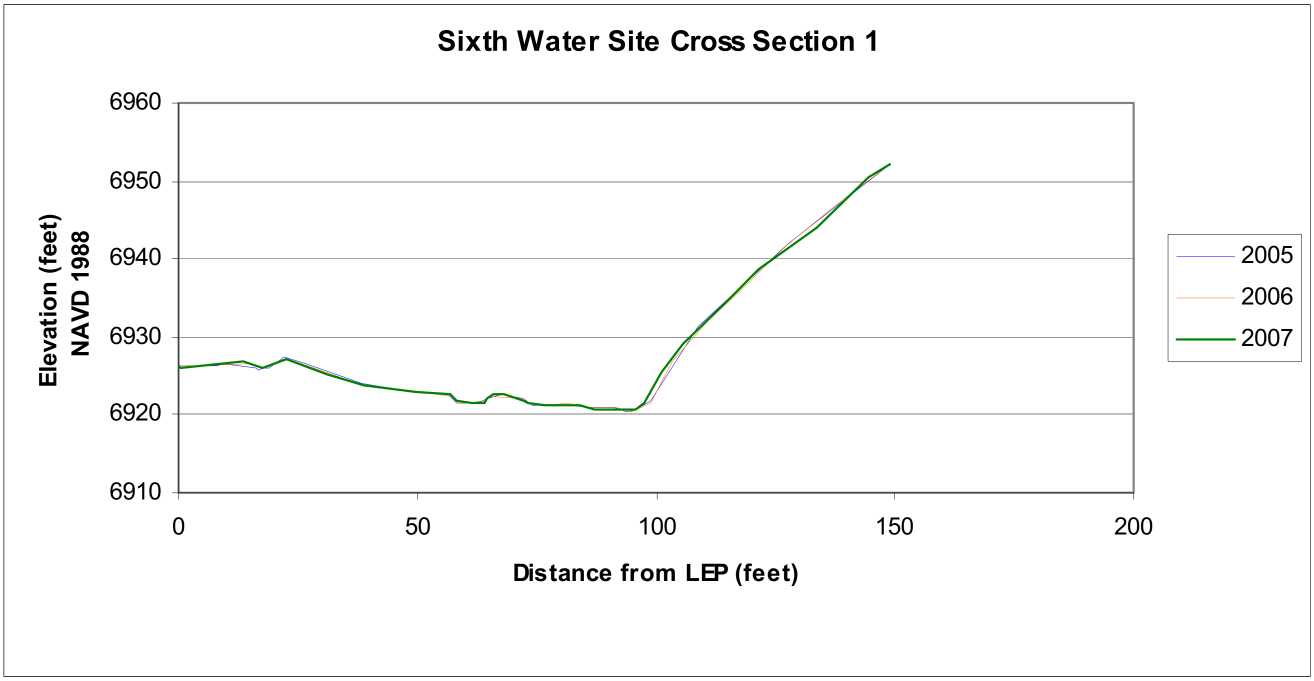
Photo 106. 20071025OX8RB.jpg

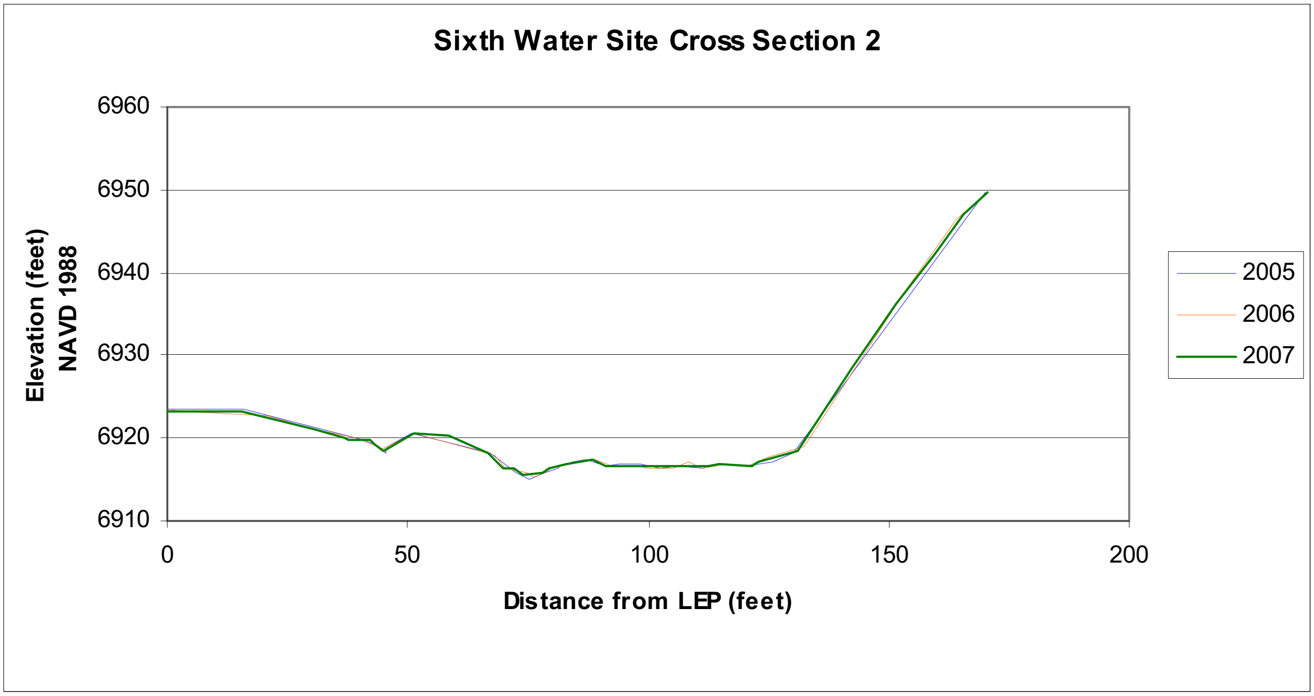
Photo 107. 20071025OX8LB.jpg

Photo 108. 20071025OX8DS.jpg

APPENDIX 2.2A: CROSS-SECTION PLOTS

Entire cross sections from end point to end point for all study sites, and close up plots of the channel at the Diamond Fork study sites.


Sixth Water Site Cross Section 1
Elevation (feet) NAVD 1988
6960
6950
6940
6930
6920
6910
0
50
100
150
200
Distance from LEP (feet)
2005
2006
2007


Sixth Water Site Cross Section 2
Elevation (feet) NAVD 1988
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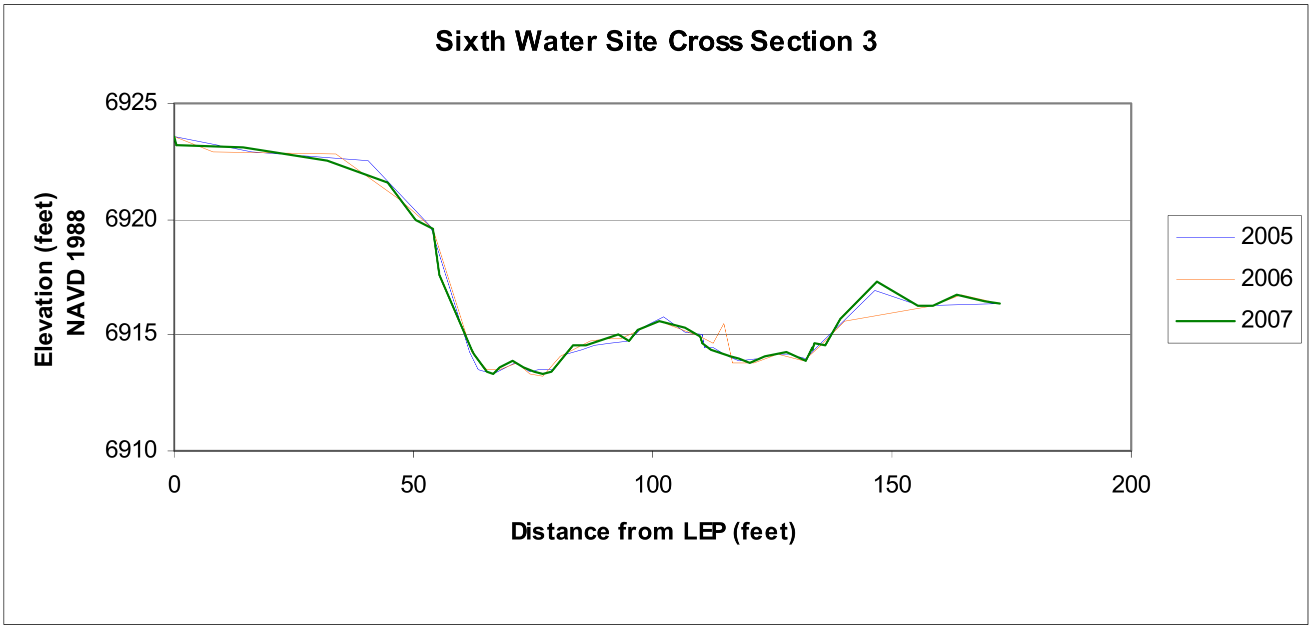
6950
6940
6930
6920
6910
0
50
100
150
200
Distance from LEP (feet)
2005
2006
2007



Sixth Water Site Cross Section 3
Elevation (feet) NAVD 1988
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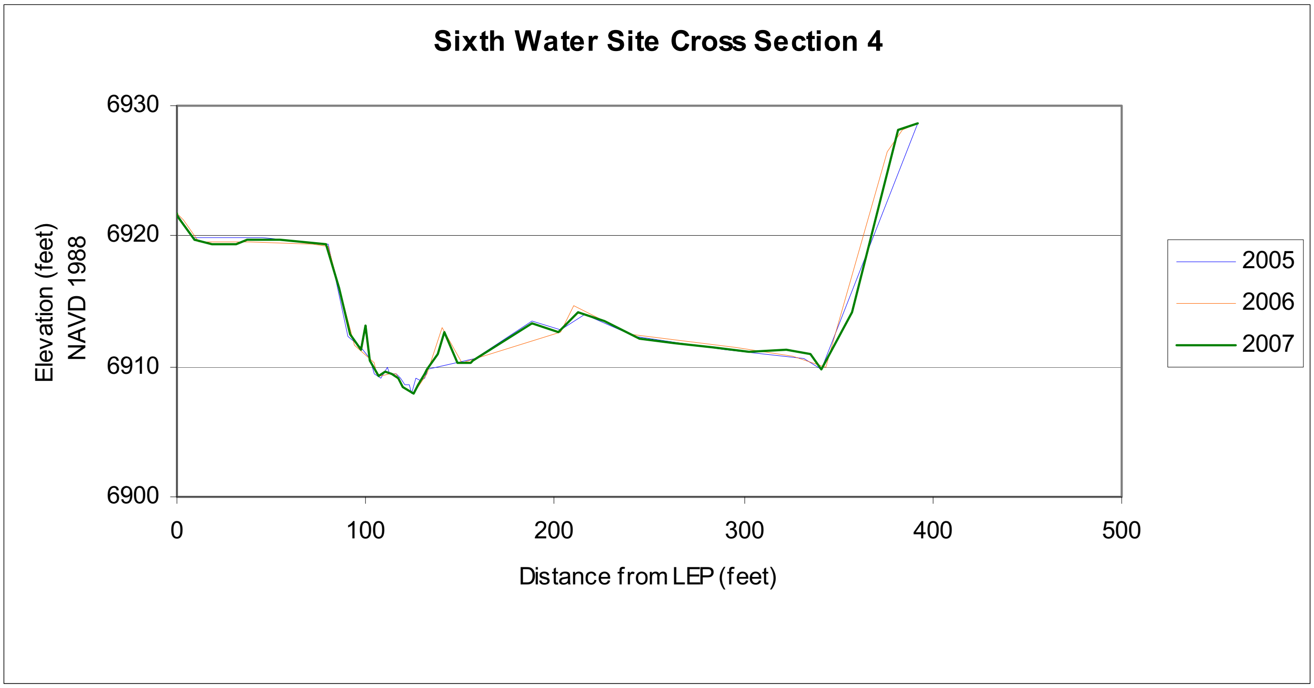
6920
6915
6910
0
50
100
150
200
Distance from LEP (feet)
2005
2006
2007



Sixth Water Site Cross Section 4
Elevation (feet) NAVD 1988
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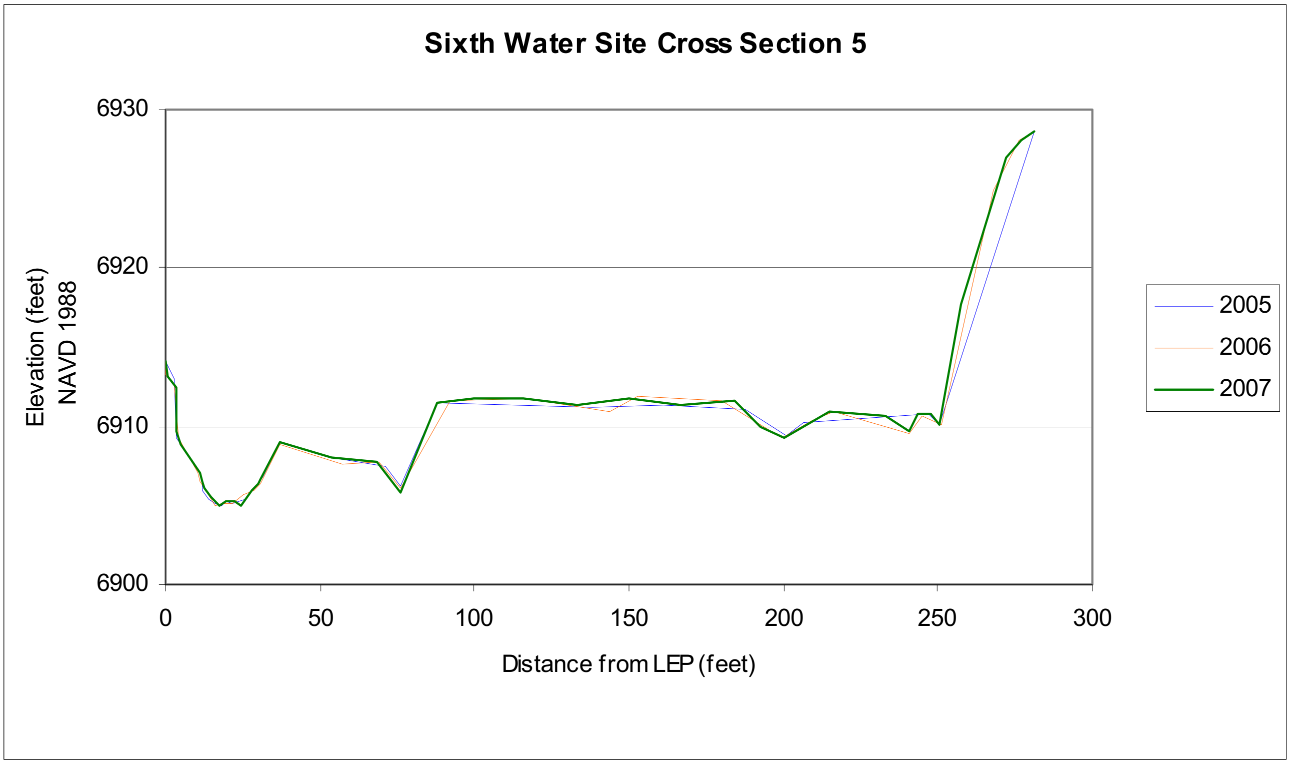
6920
6910
6900
0
100
200
300
400
500
Distance from LEP (feet)
2005
2006
2007


Sixth Water Site Cross Section 5
Elevation (feet) NAVD 1988
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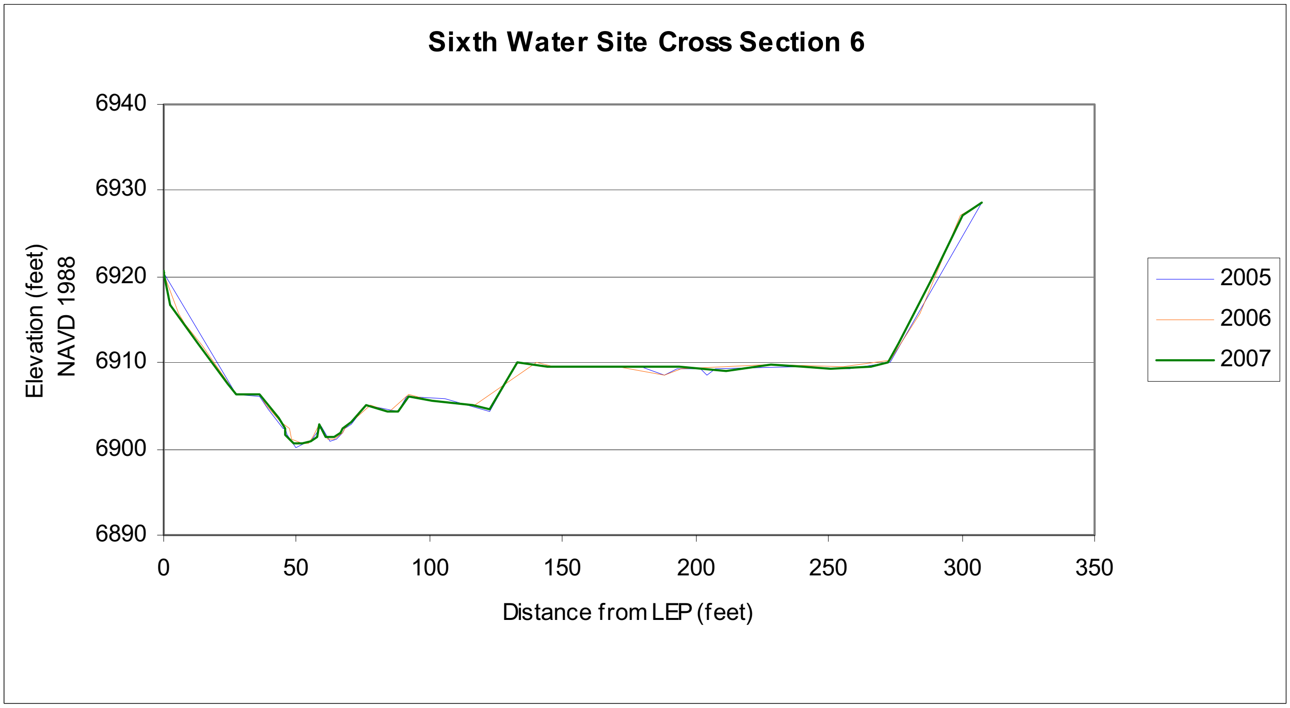
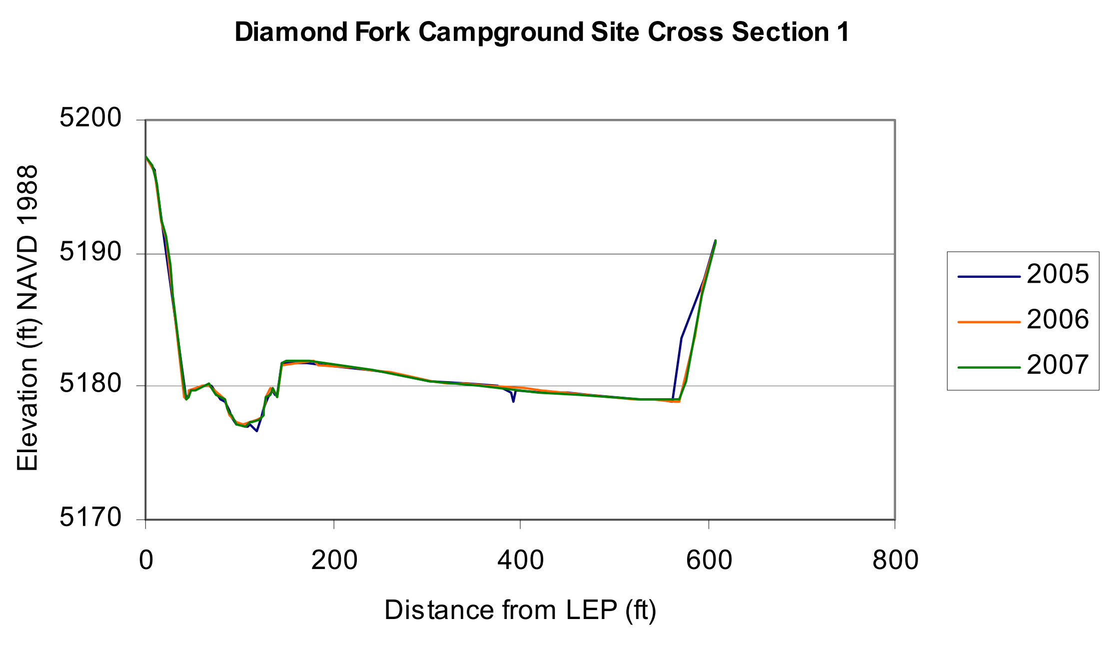
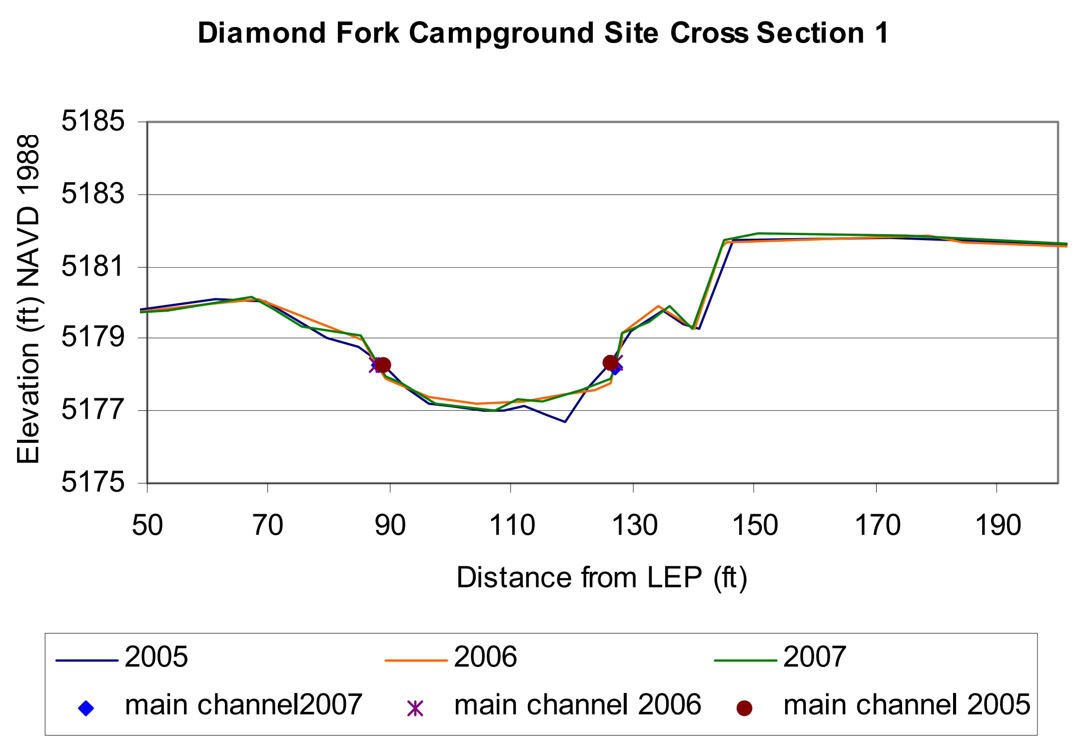
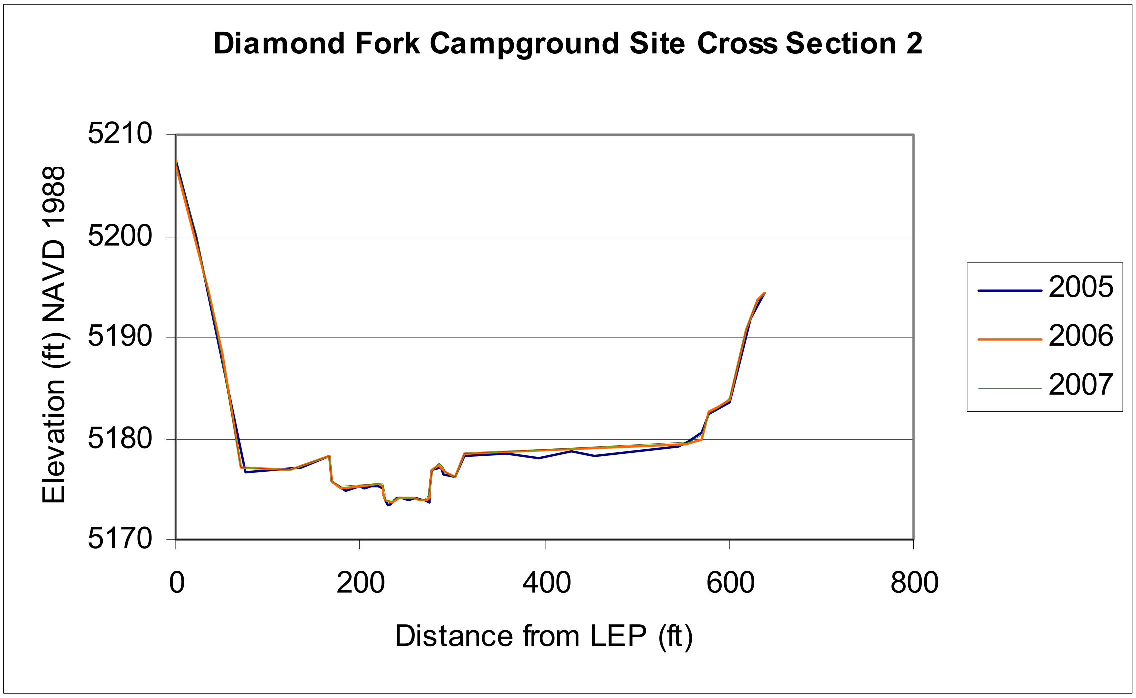
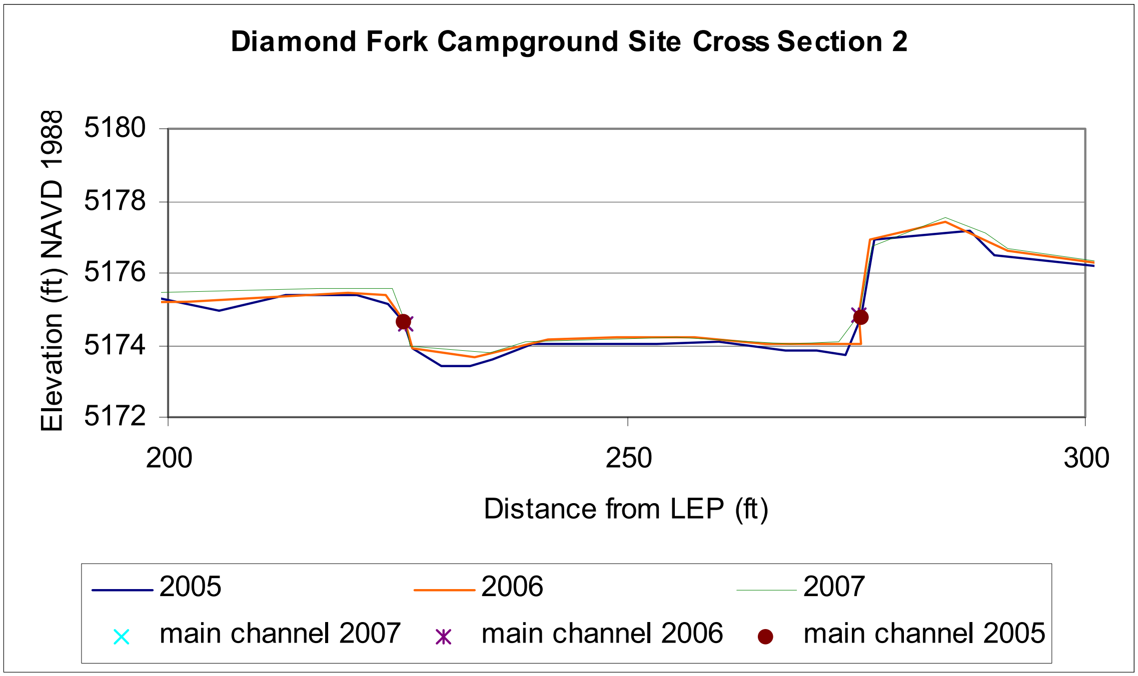
6920
6910
6900
0
50
100
150
200
250
300
Distance from LEP (feet)
2005
2006
2007

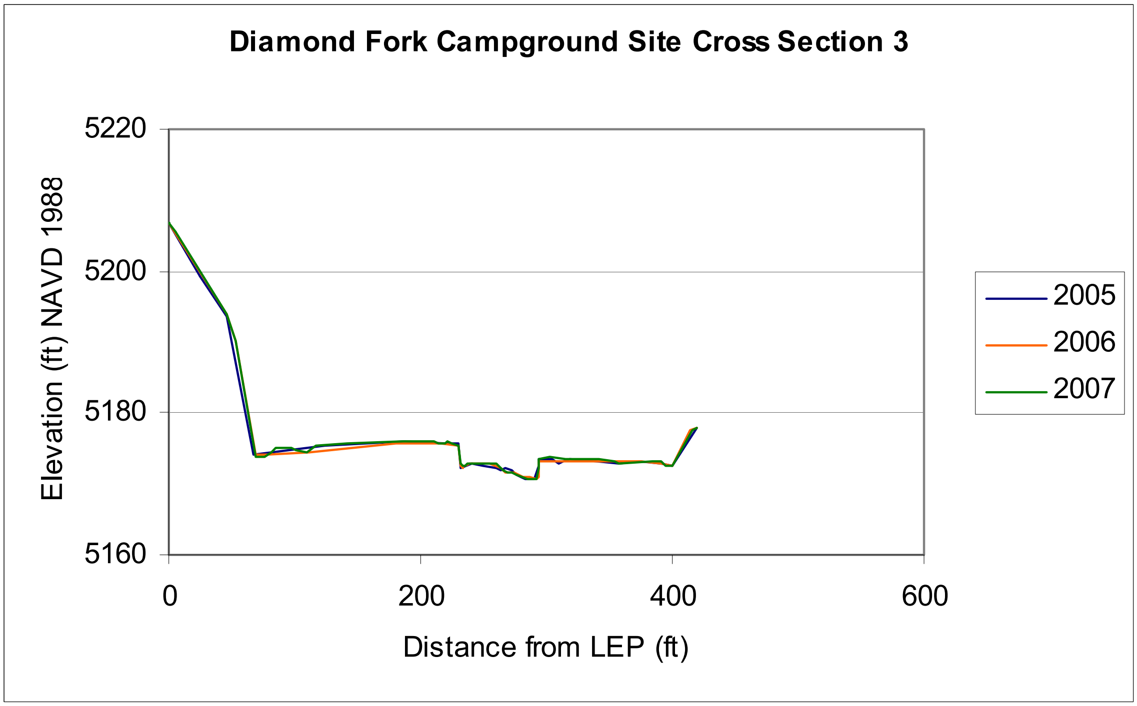

Sixth Water Site Cross Section 6
Elevation (feet) NAVD 1988
6940
6930
6920
6910
6900
6890
0
50
100
150
200
250
300
350
Distance from LEP (feet)
2005
2006
2007

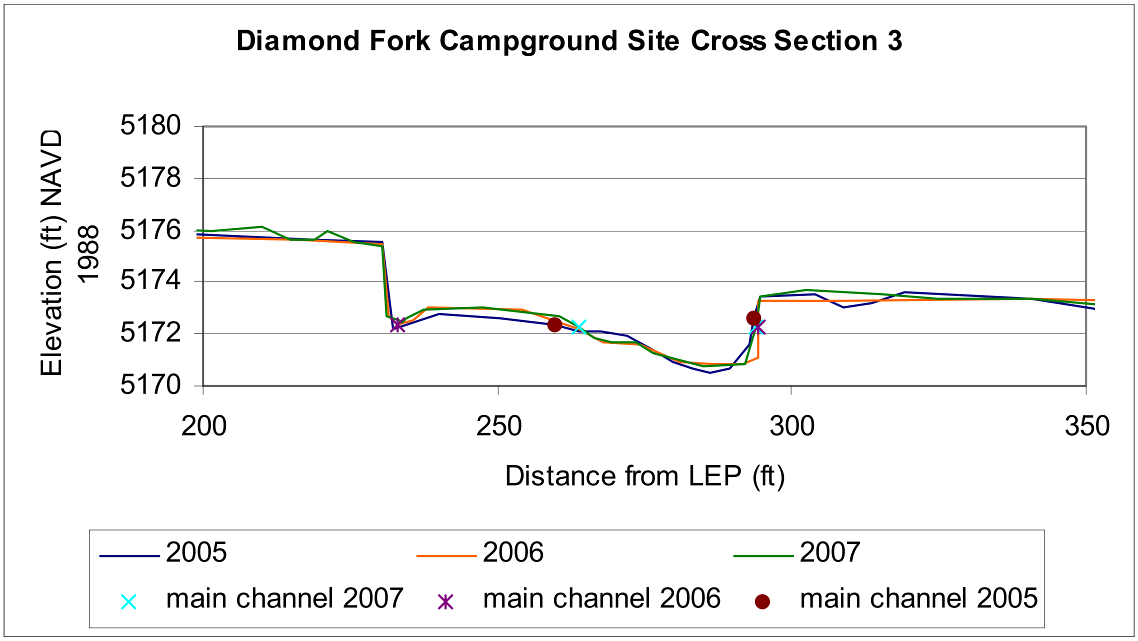

Diamond Fork Campground Site Cross Section 1
5200
5190
5180
5170
Elevation (ft) NAVD 1988
0
200
400
600
800
Distance from LEP (ft)
2005
2006
2007

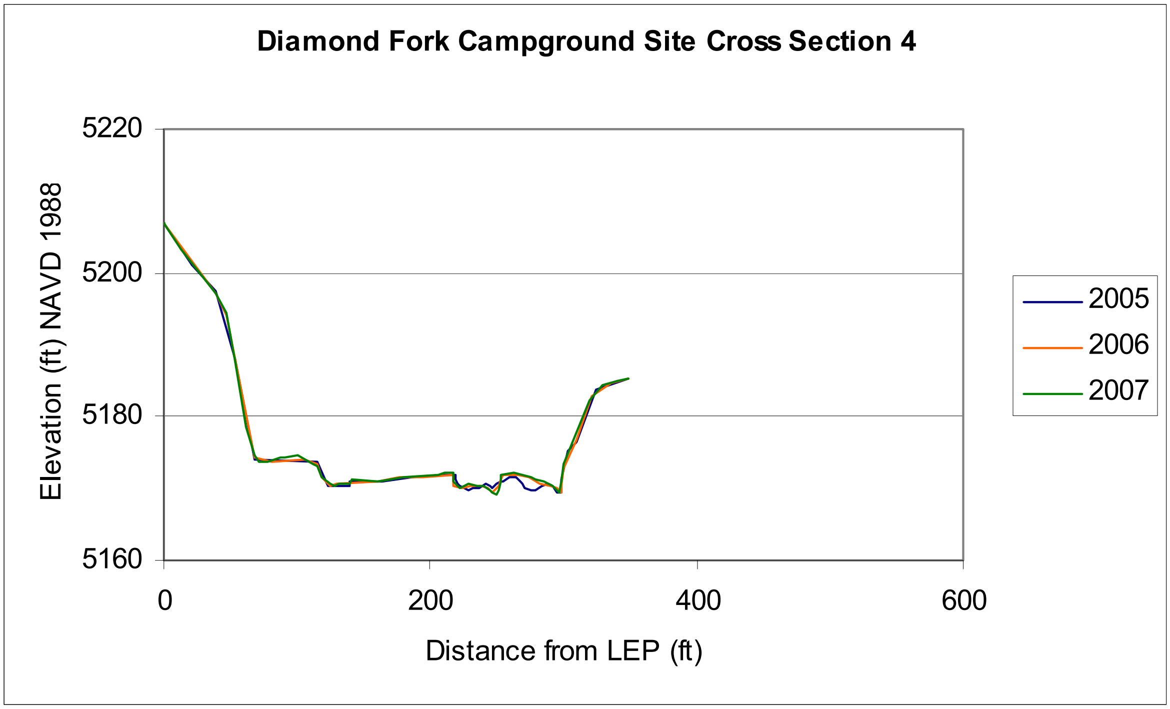

Diamond Fork Campground Site Cross Section 1
5185
5183
5181
5179
5177
5175
Elevation (ft) NAVD 1988
50
70
90
110
130
150
170
190
Distance from LEP (ft)
2005
2006
2007
main channel2007
main channel 2006
main channel 2005

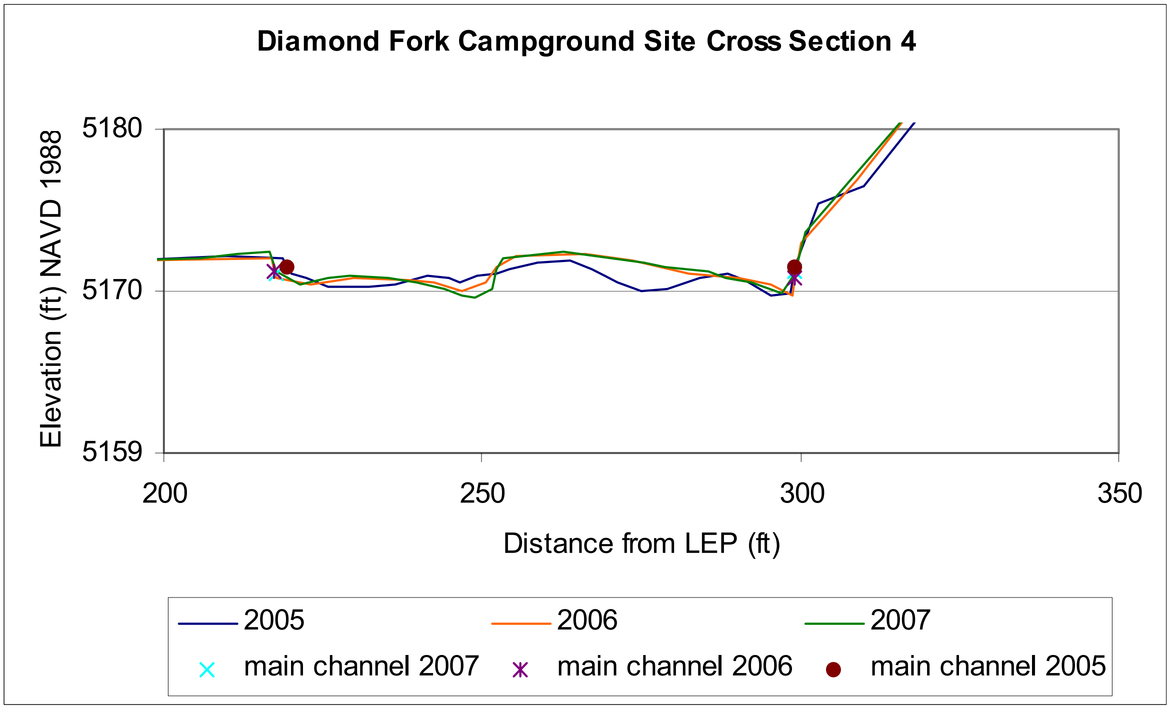

Diamond Fork Campground Site Cross Section 2
Elevation (ft) NAVD 1988
5210
5200
5190
5180
5170
0
200
400
600
800
Distance from LEP (ft)
2005
2006
2007

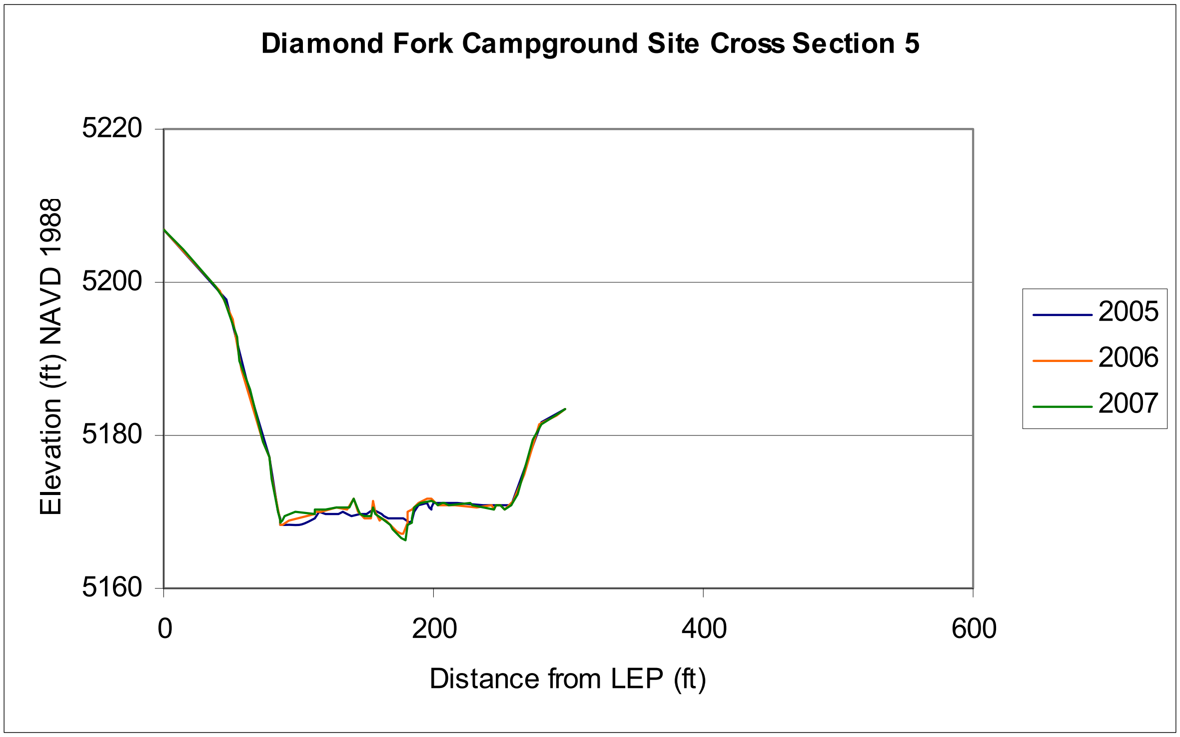

Diamond Fork Campground Site Cross Section 2
Elevation (ft) NAVD 1988
5180
5178
5176
5174
5172
200
250
300
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

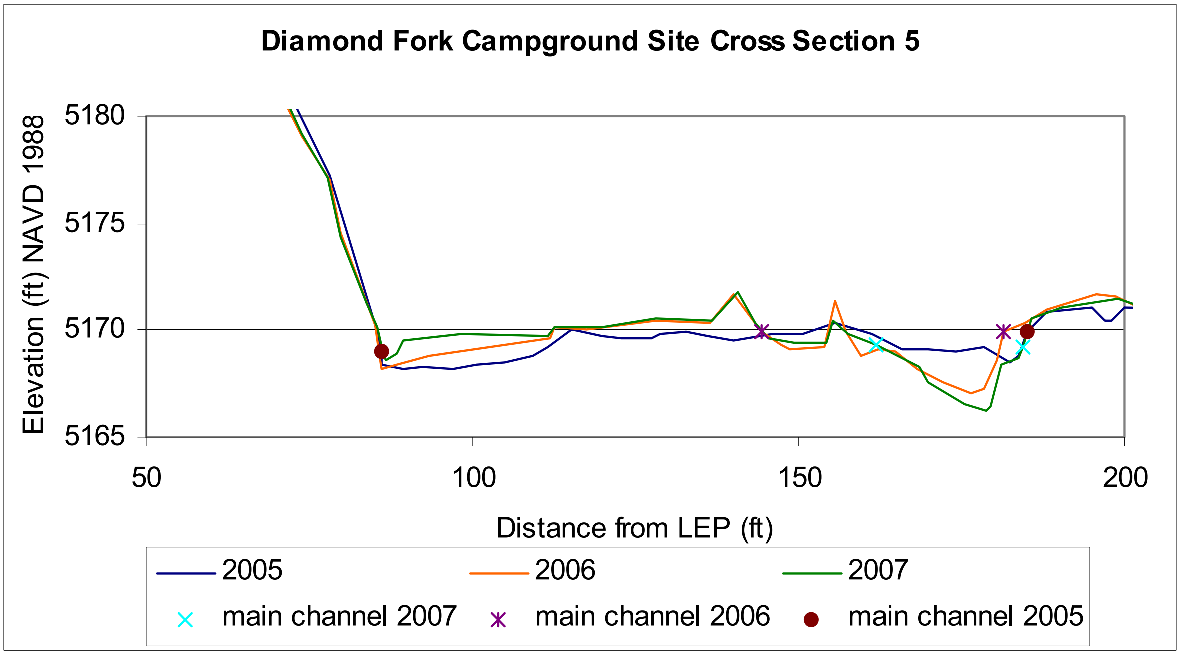

Diamond Fork Campground Site Cross Section 3
Elevation (ft) NAVD 1988
5220
5200
5180
5160
0
200
400
600
Distance from LEP (ft)
2005
2006
2007

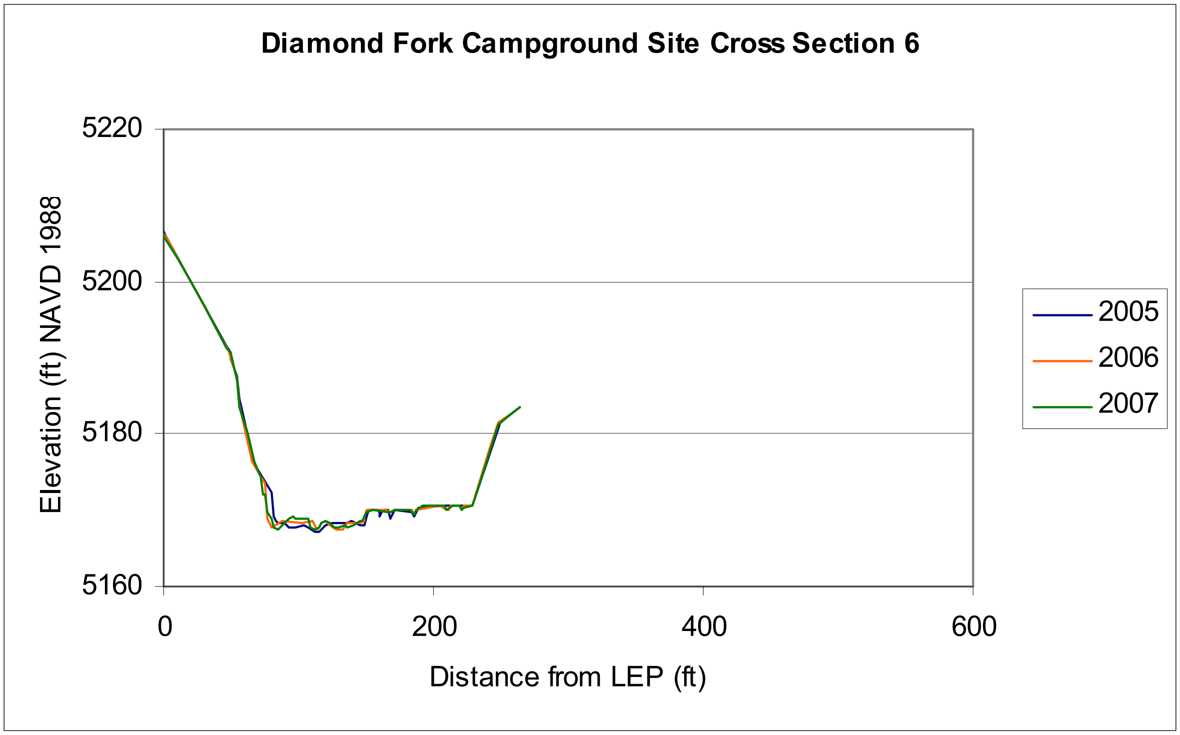

Diamond Fork Campground Site Cross Section 3
Elevation (ft) NAVD 1988
5180
5178
5176
5174
5172
5170
200
250
300
350
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

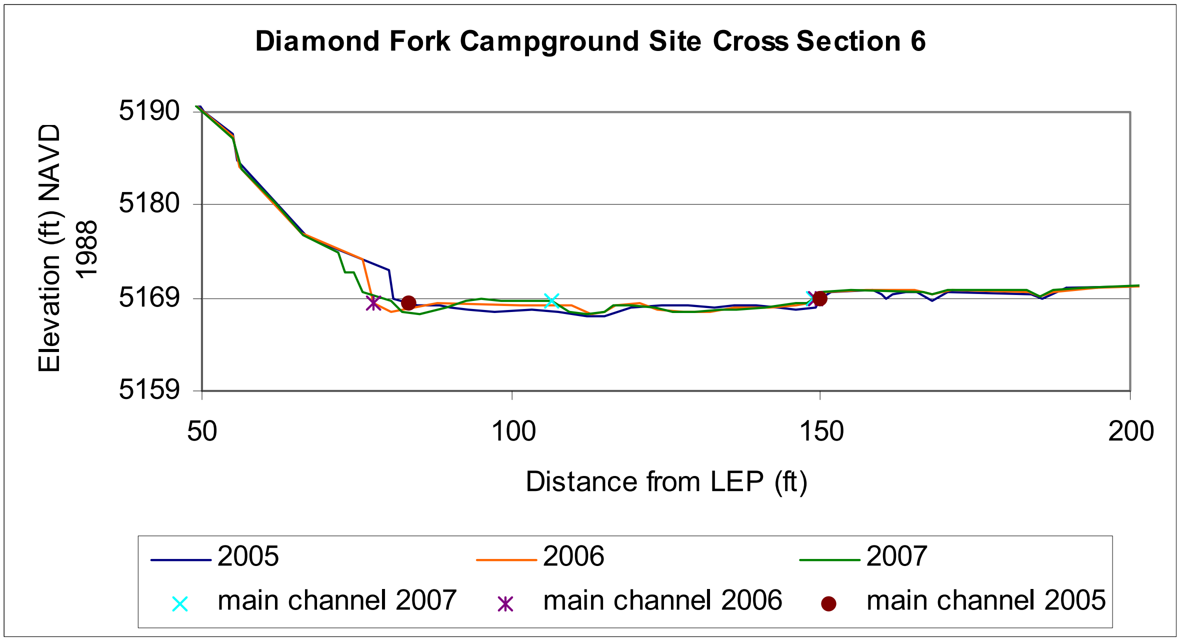

Diamond Fork Campground Site Cross Section 4
Elevation (ft) NAVD 1988
5220
5200
5180
5160
0
200
400
600
Distance from LEP (ft)
2005
2006
2007

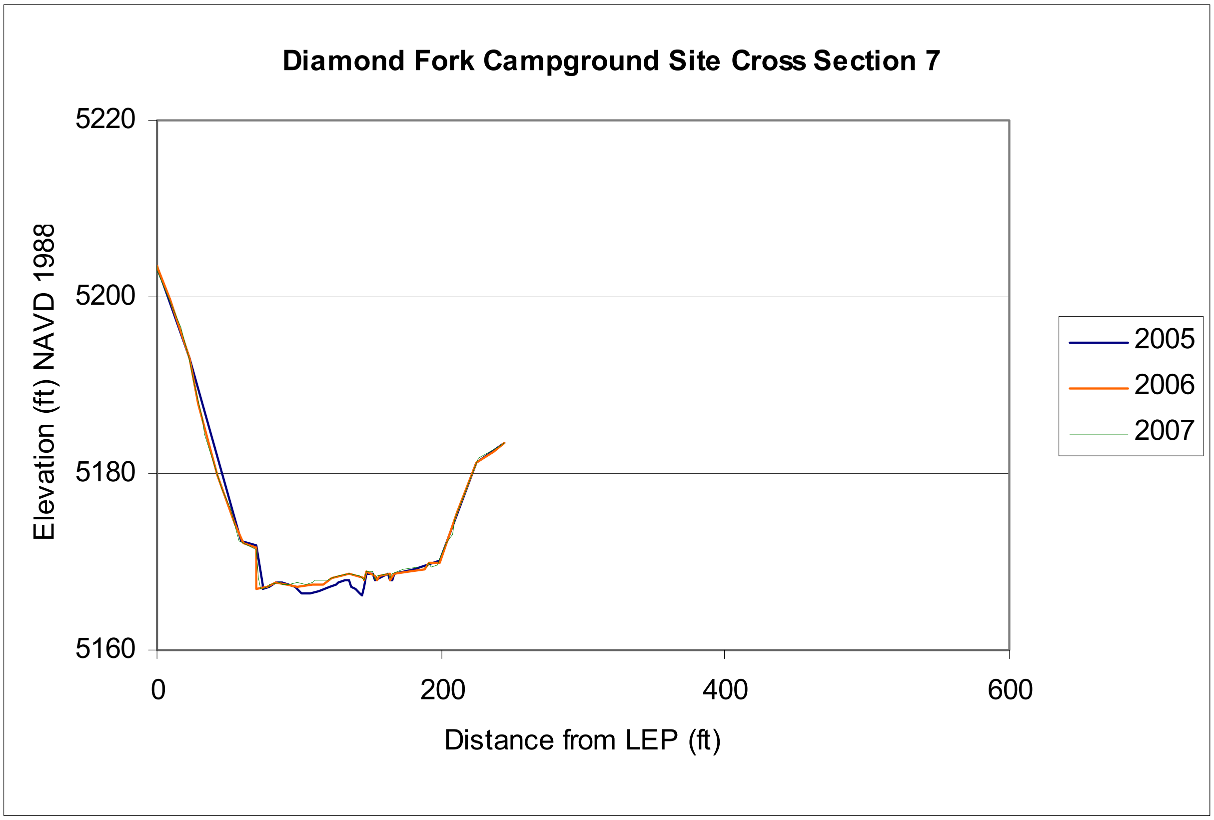

Diamond Fork Campground Site Cross Section 4
Elevation (ft) NAVD 1988
5180
5170
5159
200
250
300
350
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

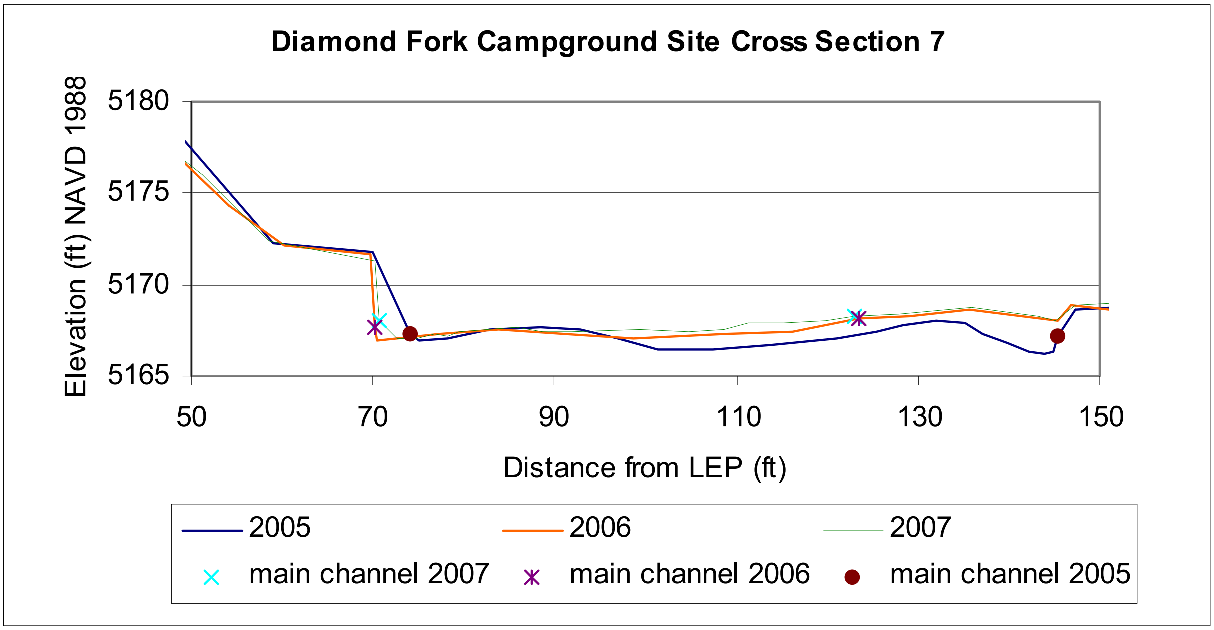

Diamond Fork Campground Site Cross Section 5
Elevation (ft) NAVD 1988
5220
5200
5180
5160
0
200
400
600
Distance from LEP (ft)
2005
2006
2007

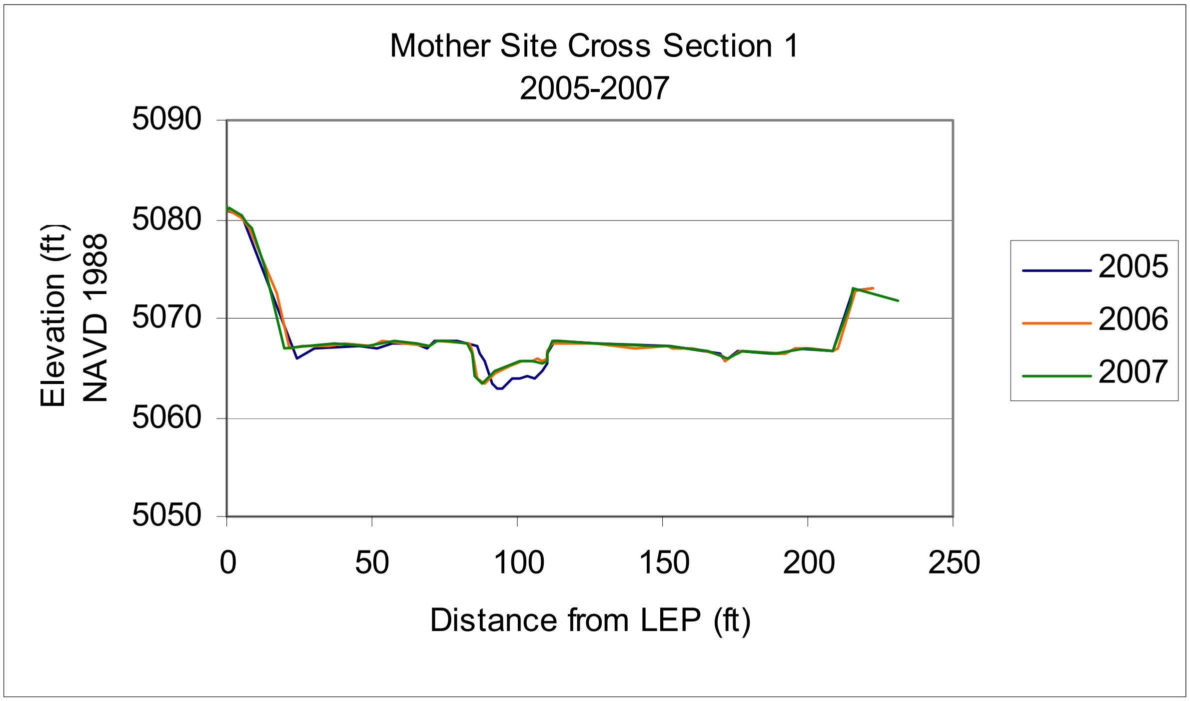

Diamond Fork Campground Site Cross Section 5
Elevation (ft) NAVD 1988
5180
5175
5170
5165
50
100
150
200
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

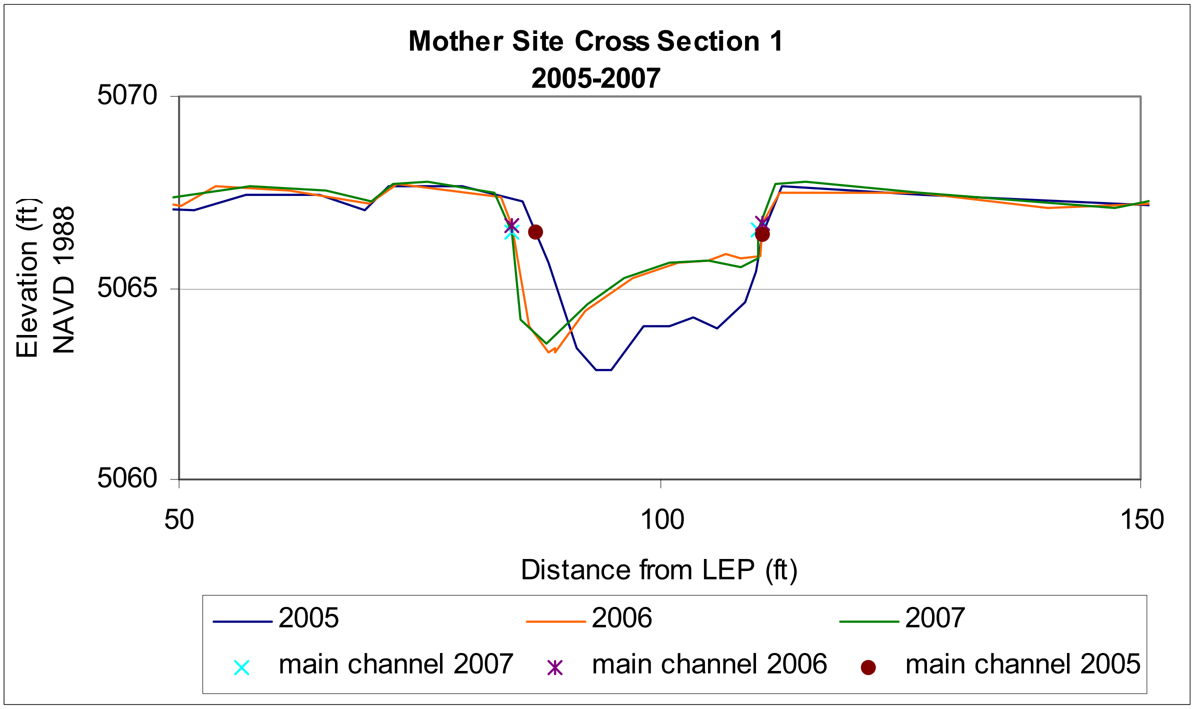

Diamond Fork Campground Site Cross Section 6
5220
5200
5180
5160
Elevation (ft) NAVD 1988
0
200
400
600
Distance from LEP (ft)
2005
2006
2007

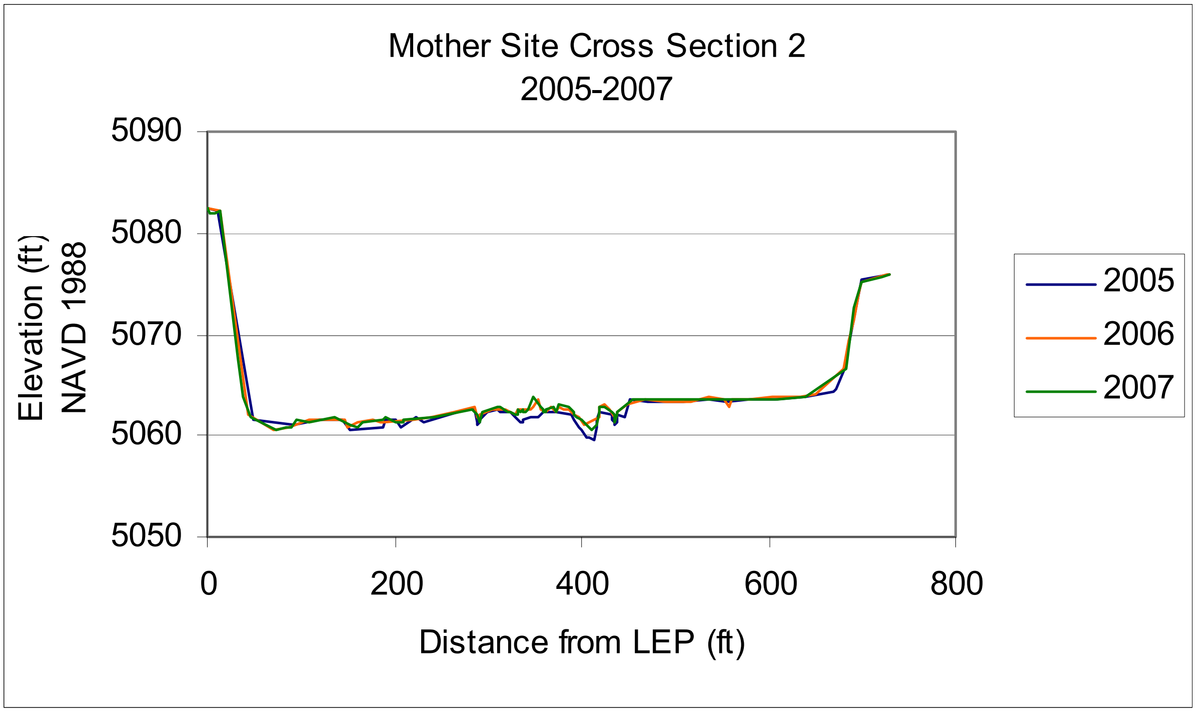

Diamond Fork Campground Site Cross Section 6
5190
5180
5169
5159
Elevation (ft) NAVD 1988
50
100
150
200
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005


Diamond Fork Campground Site Cross Section 7
5220
5200
5180
5160
Elevation (ft) NAVD 1988
0
200
400
600
Distance from LEP (ft)
2005
2006
2007

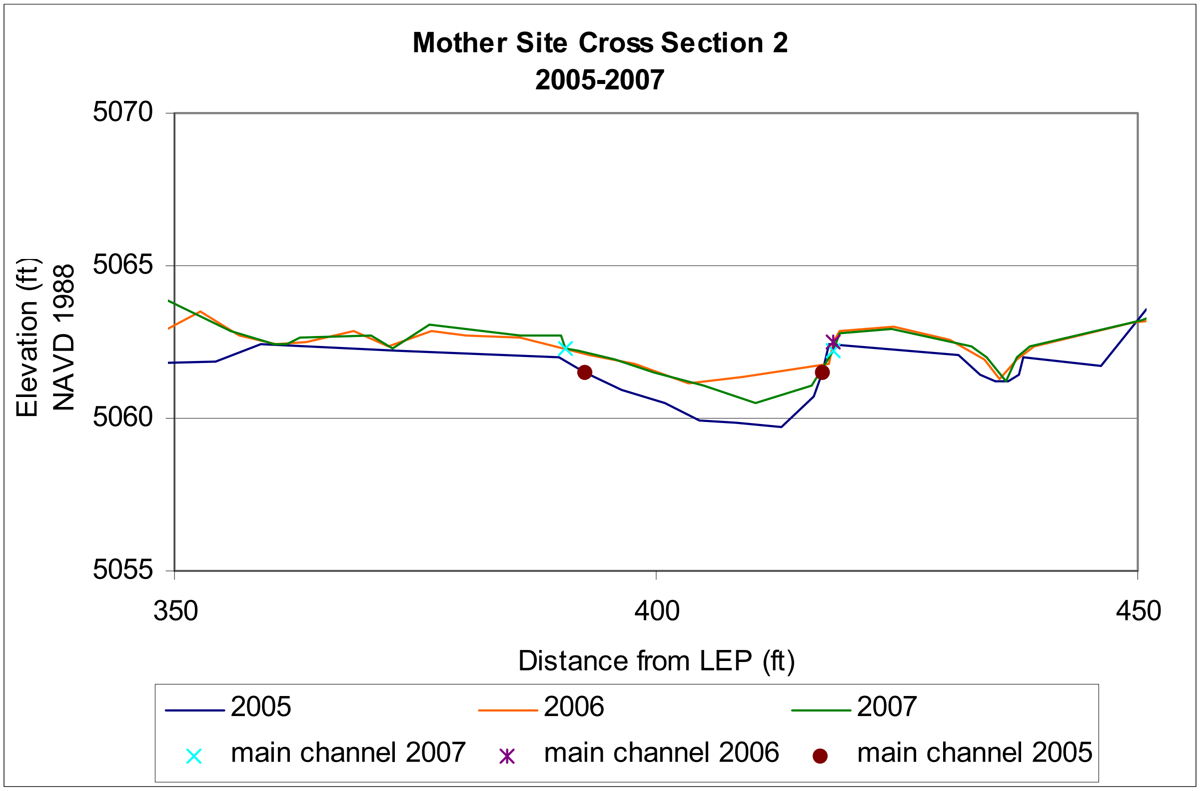

Diamond Fork Campground Site Cross Section 7
5180
5175
5170
5165
Elevation (ft) NAVD 1988
50
70
90
110
130
150
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005


Mother Site Cross Section 1
2005-2007
Elevation (ft)
NAVD 1988
5090
5080
5070
5060
5050
0
50
100
150
200
250
Distance from LEP (ft)
2005
2006
2007

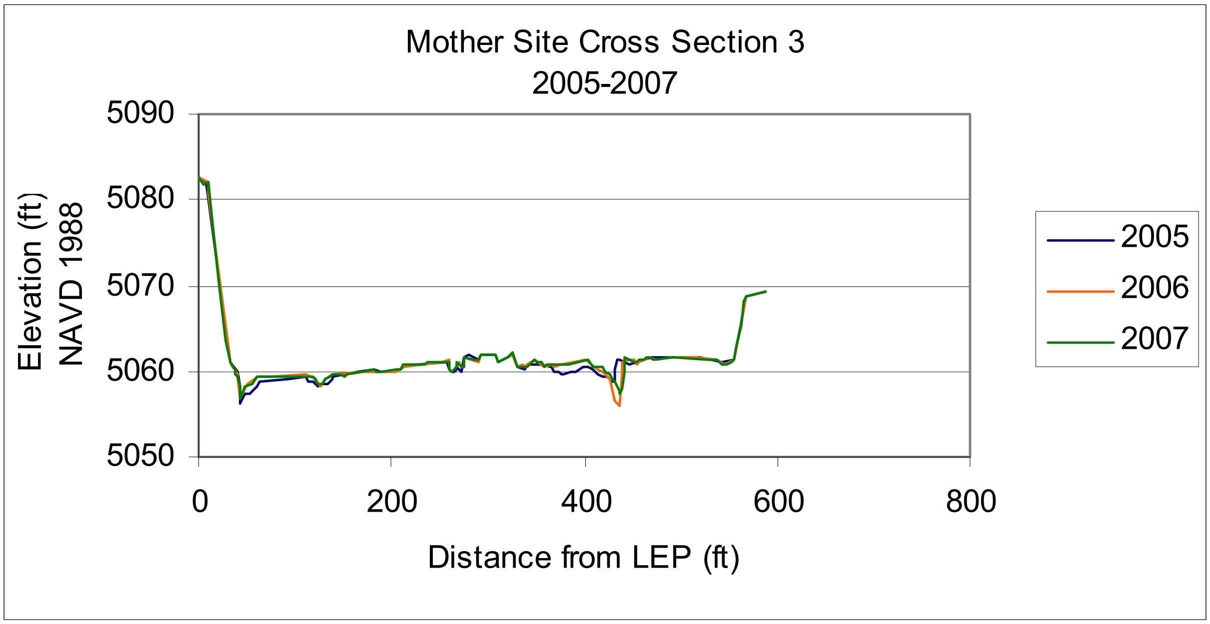

Mother Site Cross Section 1
2005-2007
Elevation (ft)
NAVD 1988
5070
5065
5060
50
100
150
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

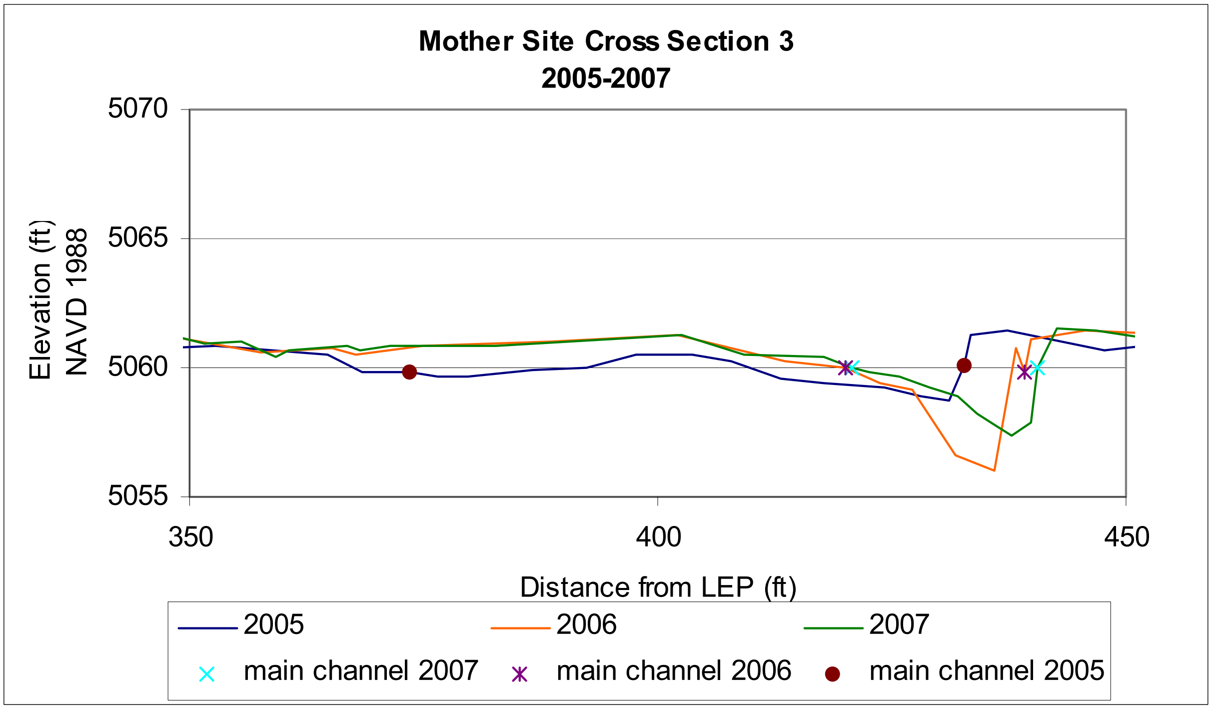


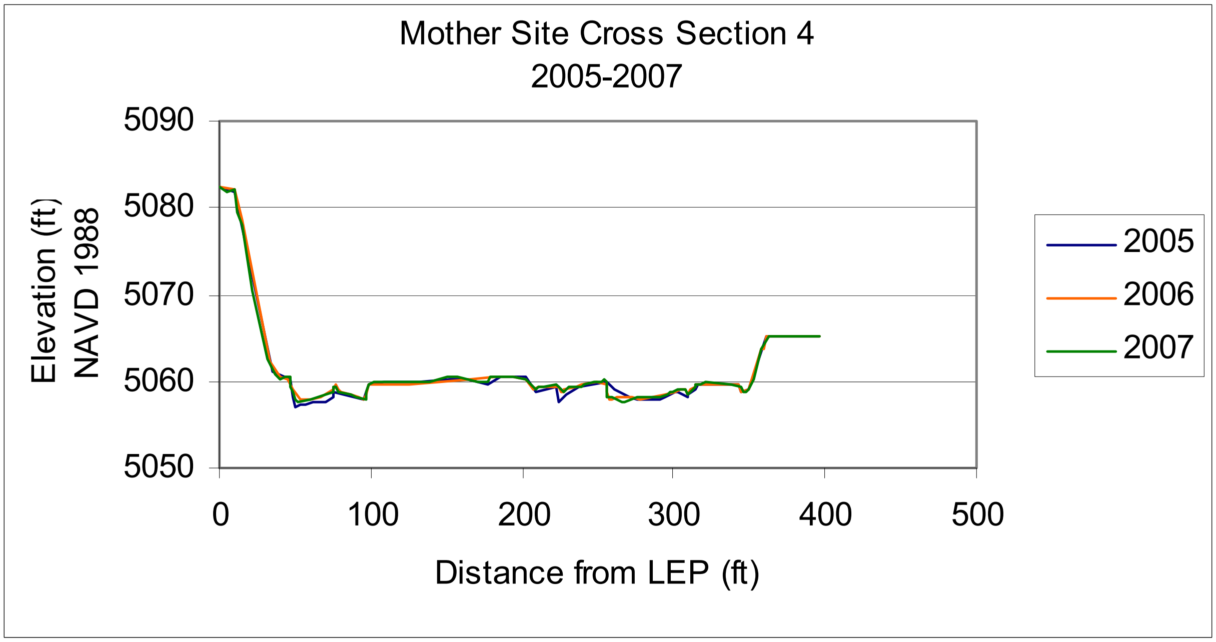
Mother Site Cross Section 2
2005-2007
Elevation (ft)
NAVD 1988
5090
5080
5070
5060
5050
0
200
400
600
800
Distance from LEP (ft)
2005
2006
2007

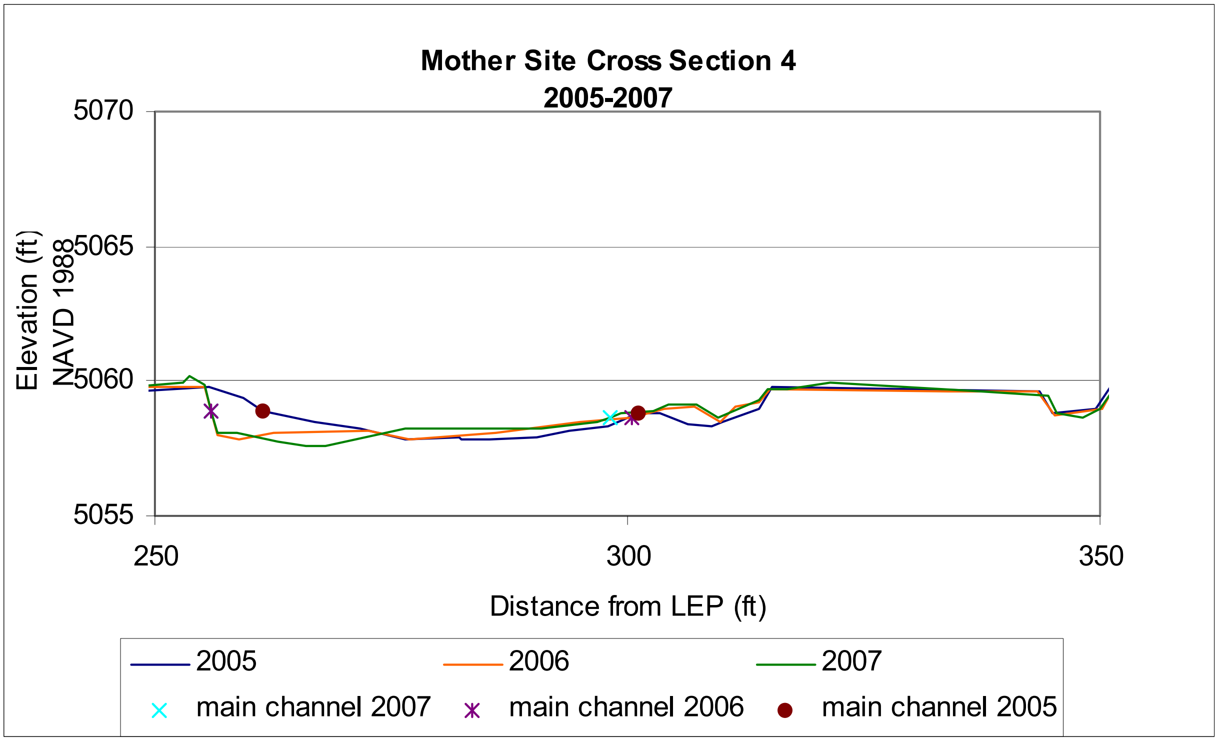


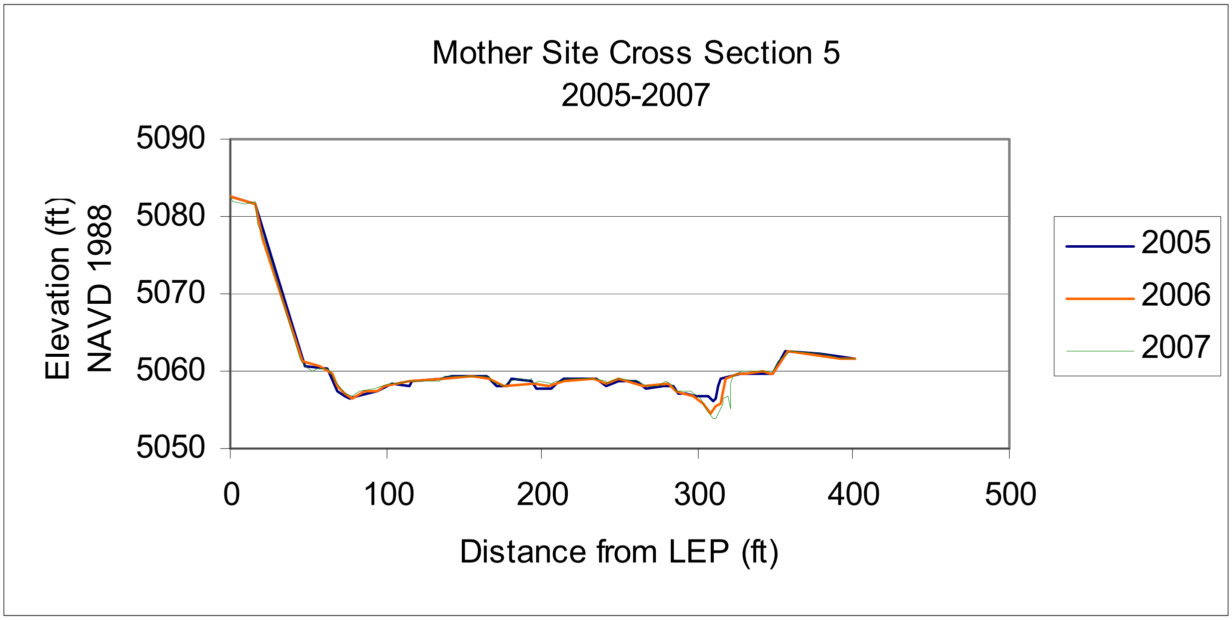
Mother Site Cross Section 2
2005-2007
Elevation (ft)
NAVD 1988
5070
5065
5060
5055
350
400
450
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

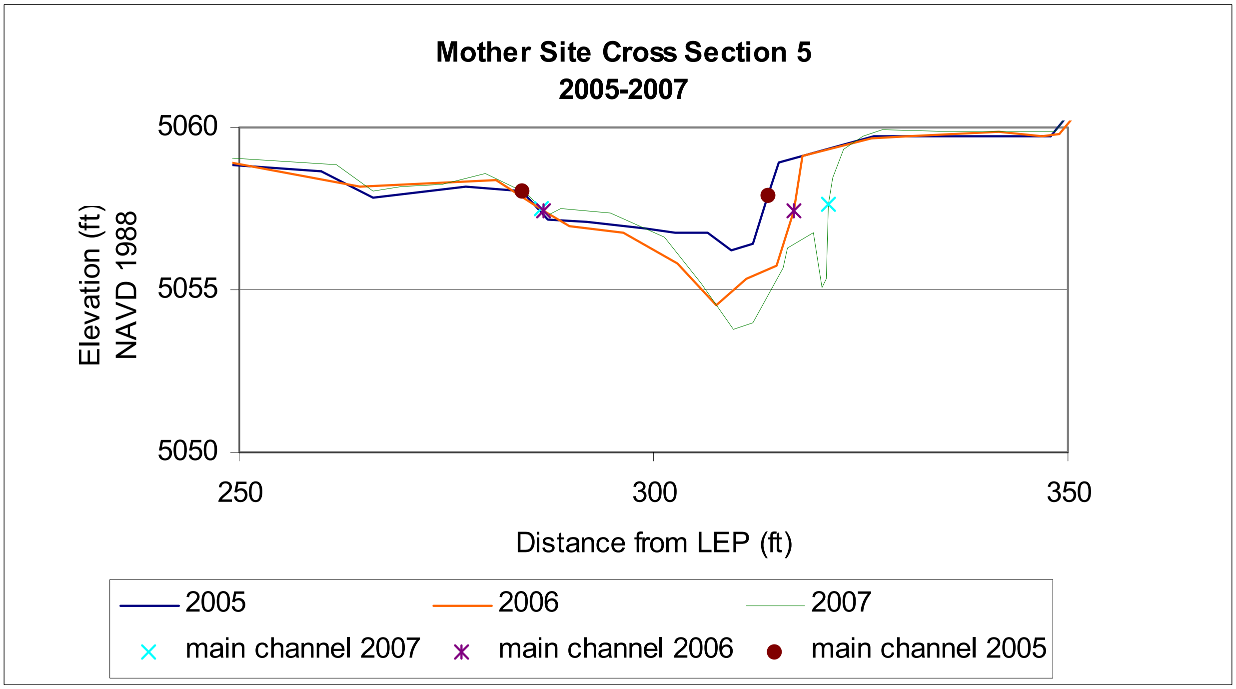

Mother Site Cross Section 3
2005-2007
Elevation (ft)
NAVD 1988
5090
5080
5070
5060
5050
0
200
400
600
800
Distance from LEP (ft)
2005
2006
2007

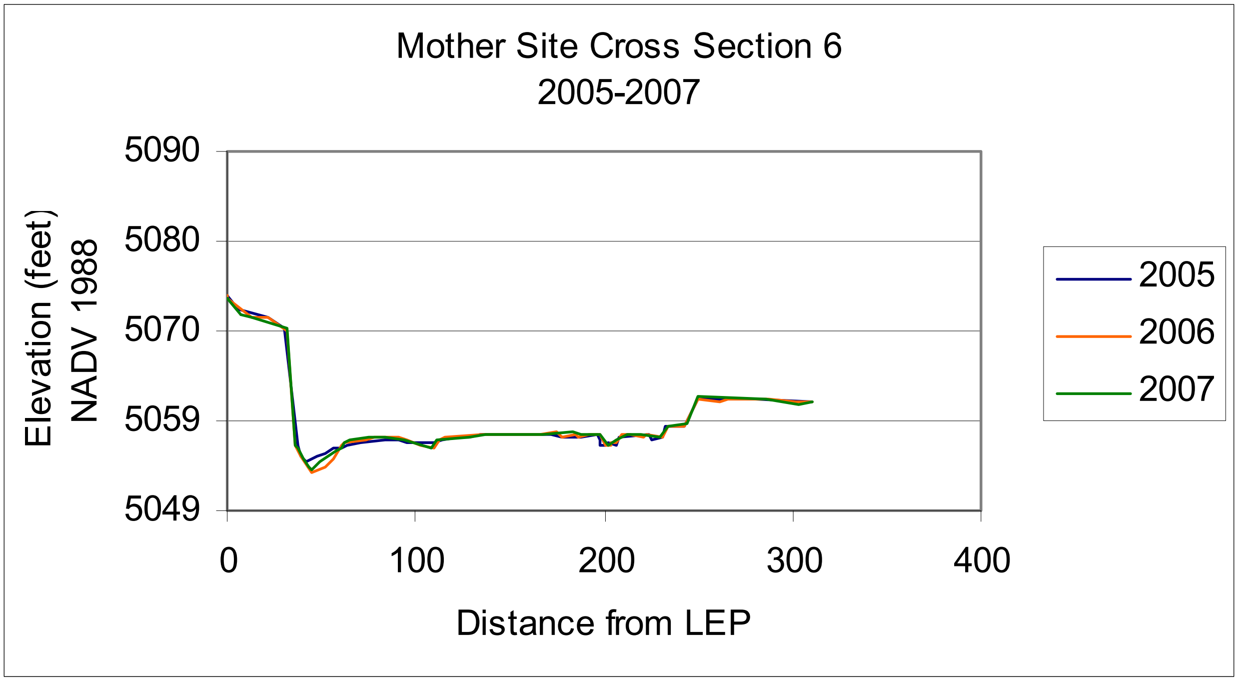

Mother Site Cross Section 3
2005-2007
Elevation (ft)
NAVD 1988
5070
5065
5060
5055
350
400
450
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

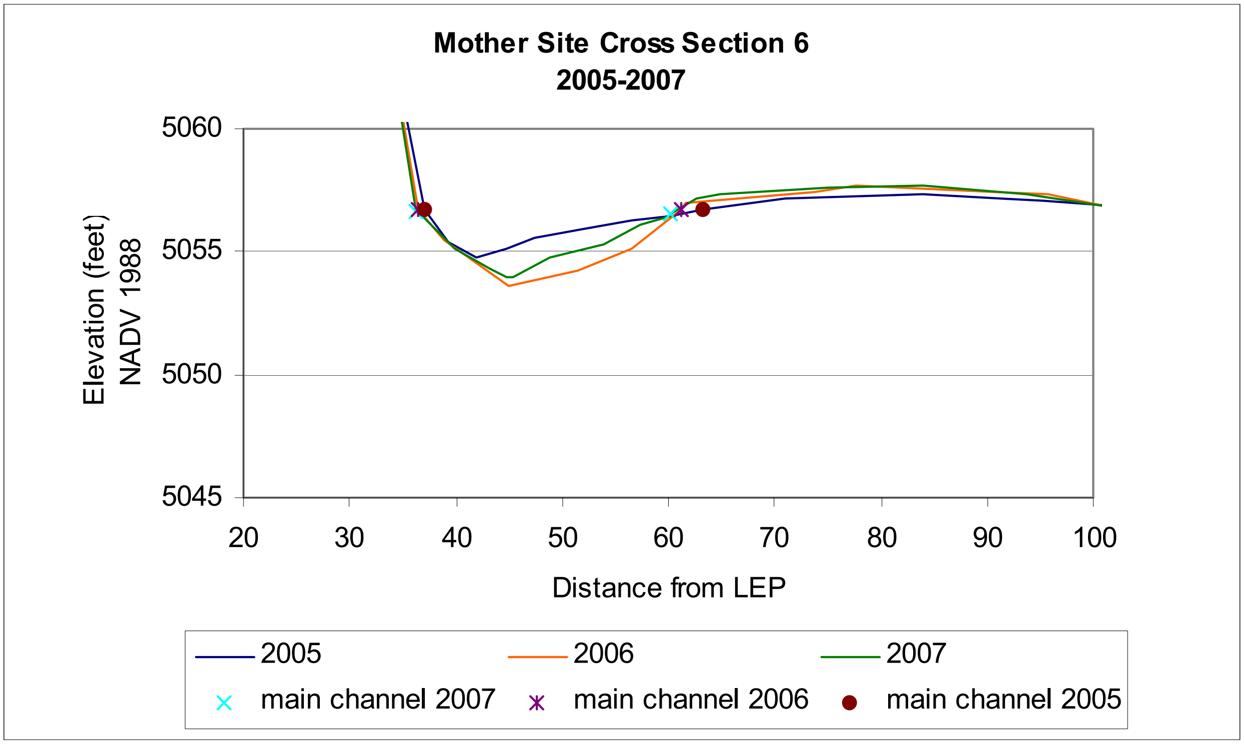

Mother Site Cross Section 4
2005-2007
Elevation (ft)
NAVD 1988
5090
5080
5070
5060
5050
0
100
200
300
400
500
Distance from LEP (ft)
2005
2006
2007

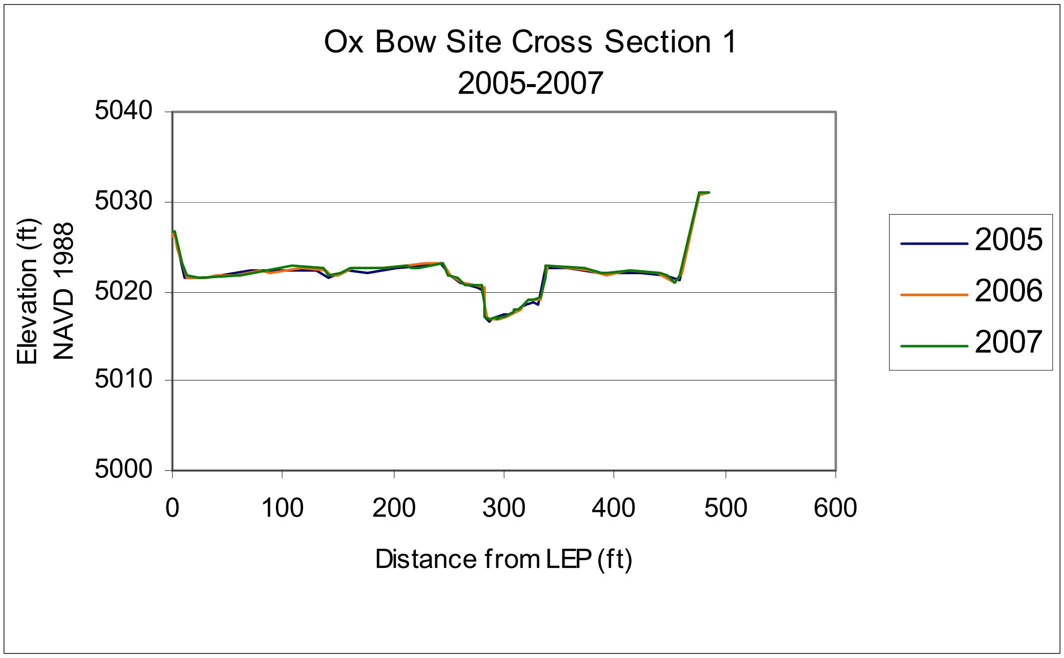

Mother Site Cross Section 4
2005-2007
Elevation (ft)
NAVD 1988
5070
5065
5060
5055
250
300
350
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

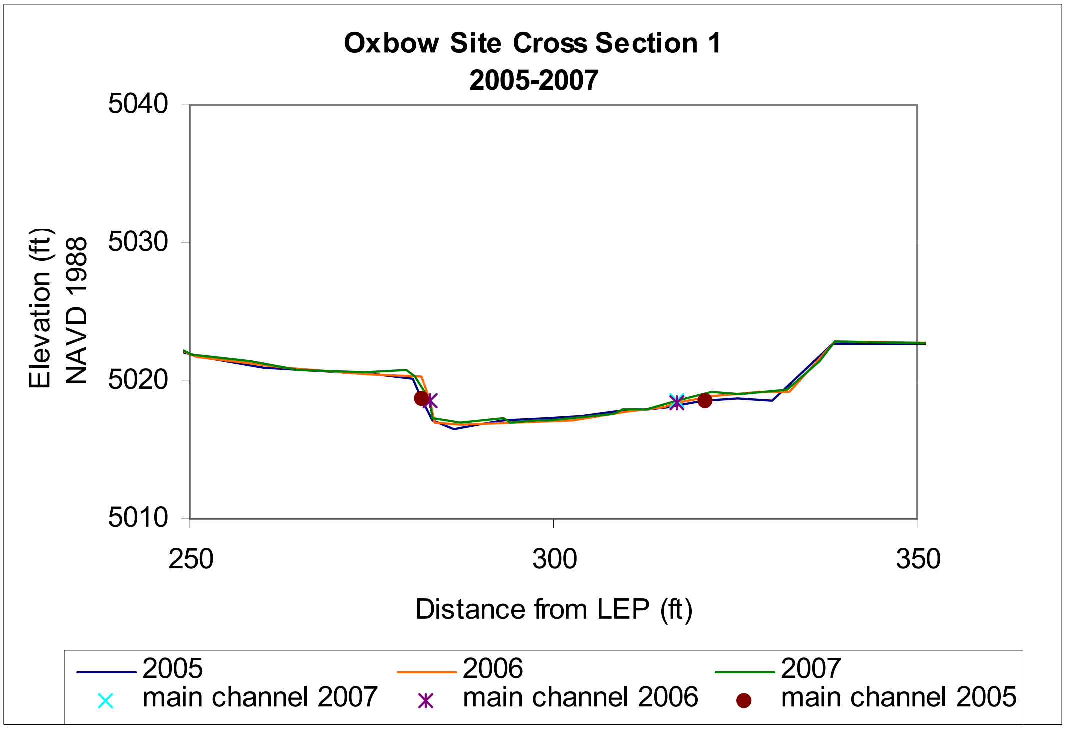

Mother Site Cross Section 5
2005-2007
Elevation (ft)
NAVD 1988
5090
5080
5070
5060
5050
0
100
200
300
400
500
Distance from LEP (ft)
2005
2006
2007

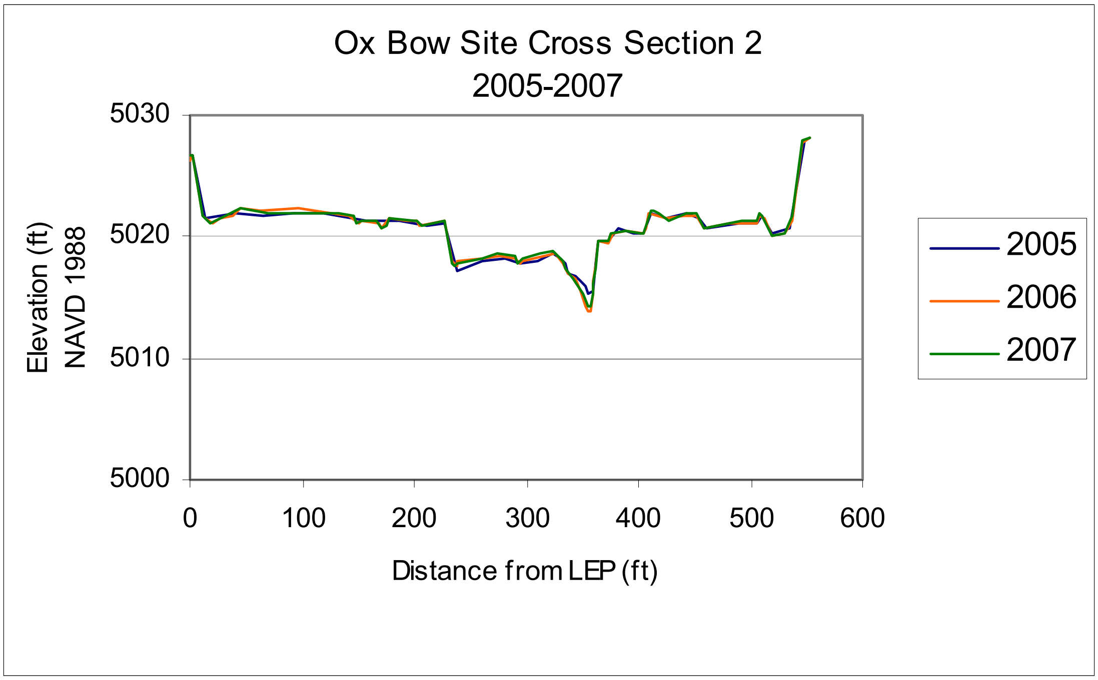

Mother Site Cross Section 5
2005-2007
Elevation (ft)
NAVD 1988
5060
5055
5050
250
300
350
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

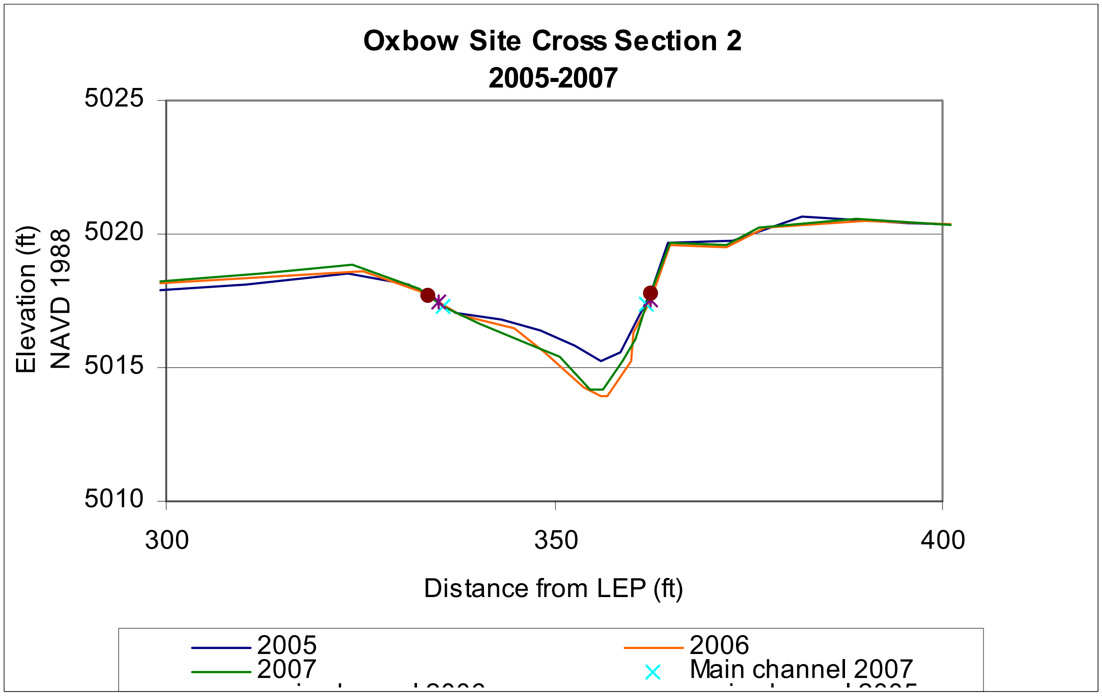

Mother Site Cross Section 6
2005-2007
Elevation (feet)
NADV 1988
5090
5080
5070
5059
5049
0
100
200
300
400
Distance from LEP
2005
2006
2007

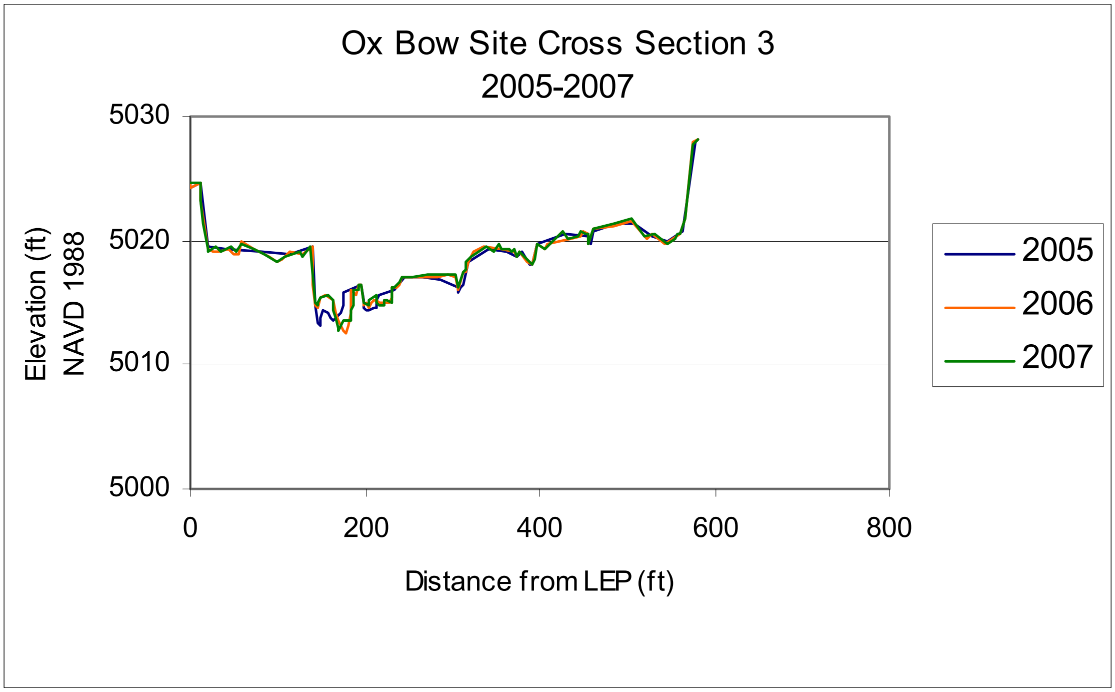

Mother Site Cross Section 6
2005-2007
Elevation (feet)
NADV 1988
5060
5055
5050
5045
20
30
40
50
60
70
80
90
100
Distance from LEP
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

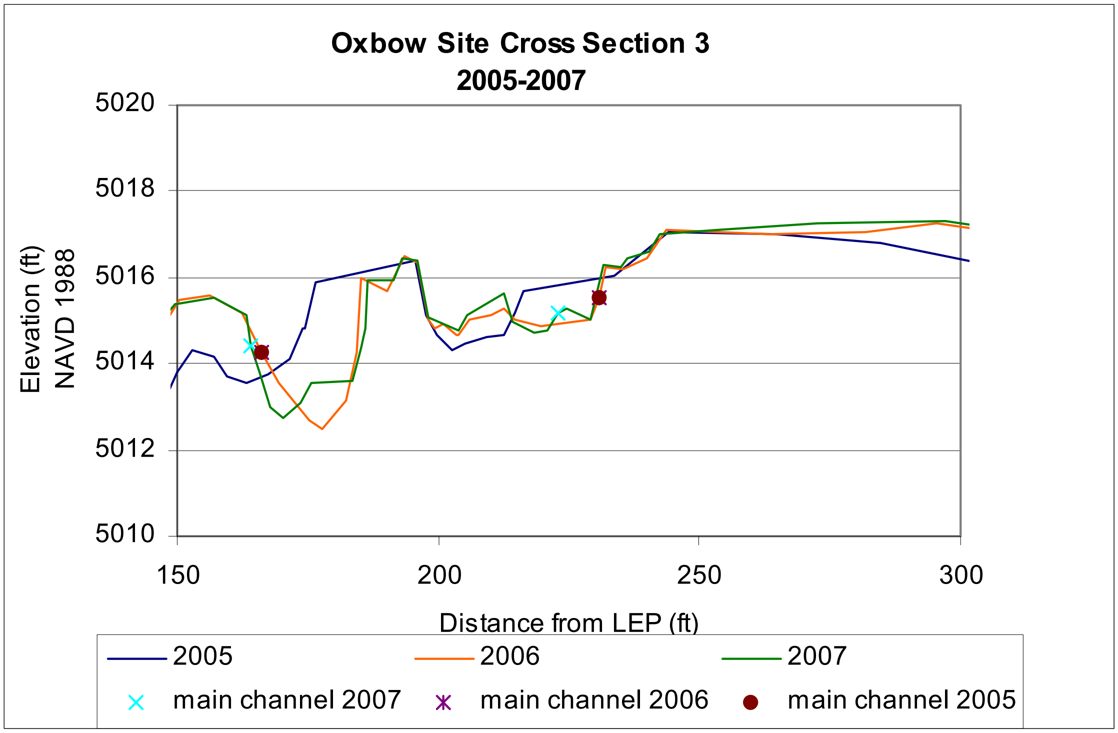

Ox Bow Site Cross Section 1
2005-2007
Elevation (ft) NAVD 1988
5040
5030
5020
5010
5000
0
100
200
300
400
500
600
Distance from LEP (ft)
2005
2006
2007

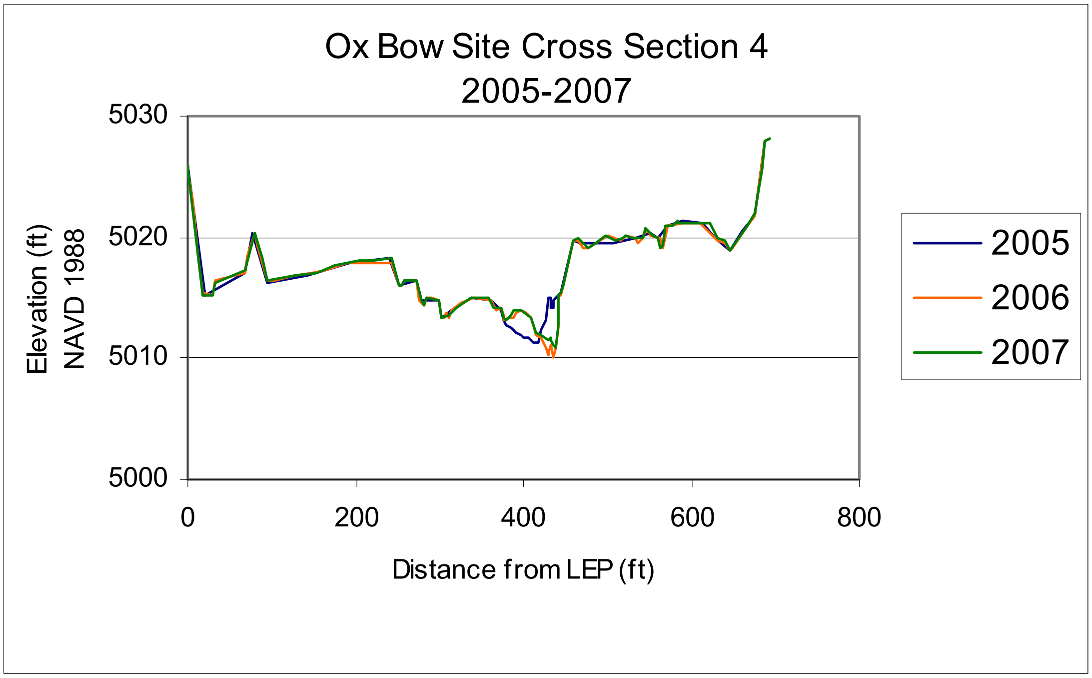

Oxbow Site Cross Section 1
2005-2007
Elevation (ft) NAVD 1988
5040
5030
5020
5010
250
300
350
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005


Ox Bow Site Cross Section 2
2005-2007
Elevation (ft) NAVD 1988
5030
5020
5010
5000
0
100
200
300
400
500
600
Distance from LEP (ft)
2005
2006
2007

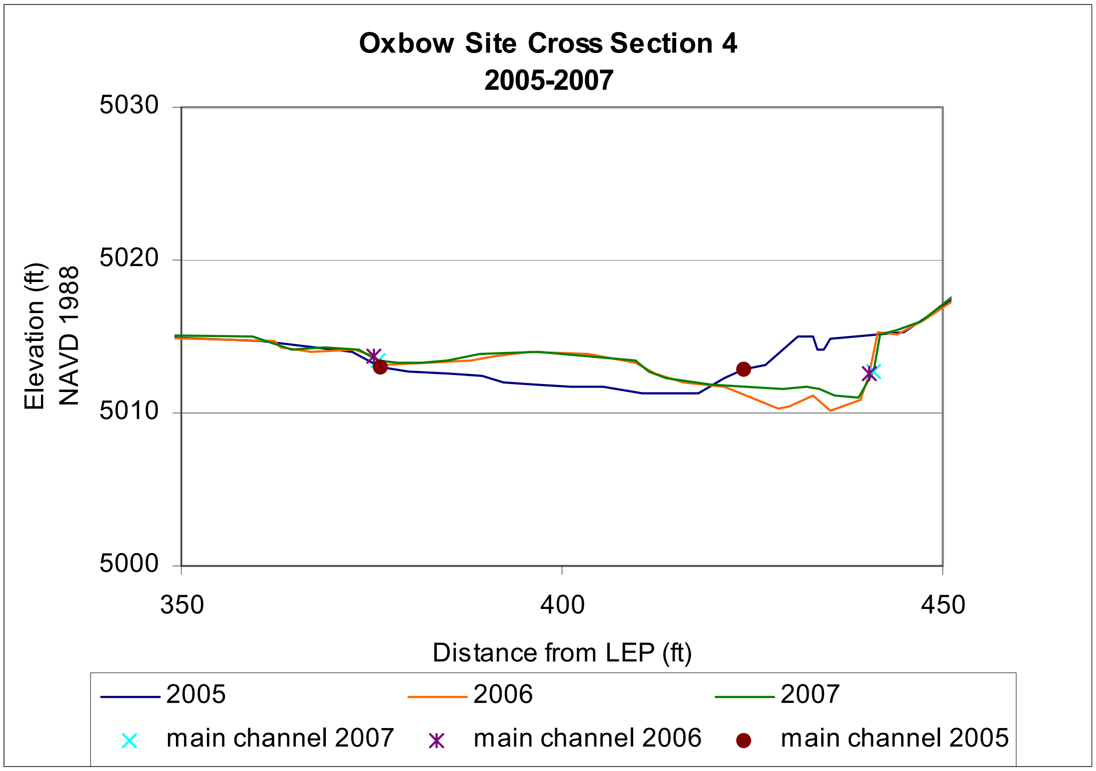

Oxbow Site Cross Section 2
2005-2007
Elevation (ft) NAVD 1988
5025
5020
5015
5010
300
350
400
Distance from LEP (ft)
2005
2006
2007
Main channel 2007


Ox Bow Site Cross Section 3
2005-2007
Elevation (ft) NAVD 1988
5030
5020
5010
5000
0
200
400
600
800
Distance from LEP (ft)
2005
2006
2007

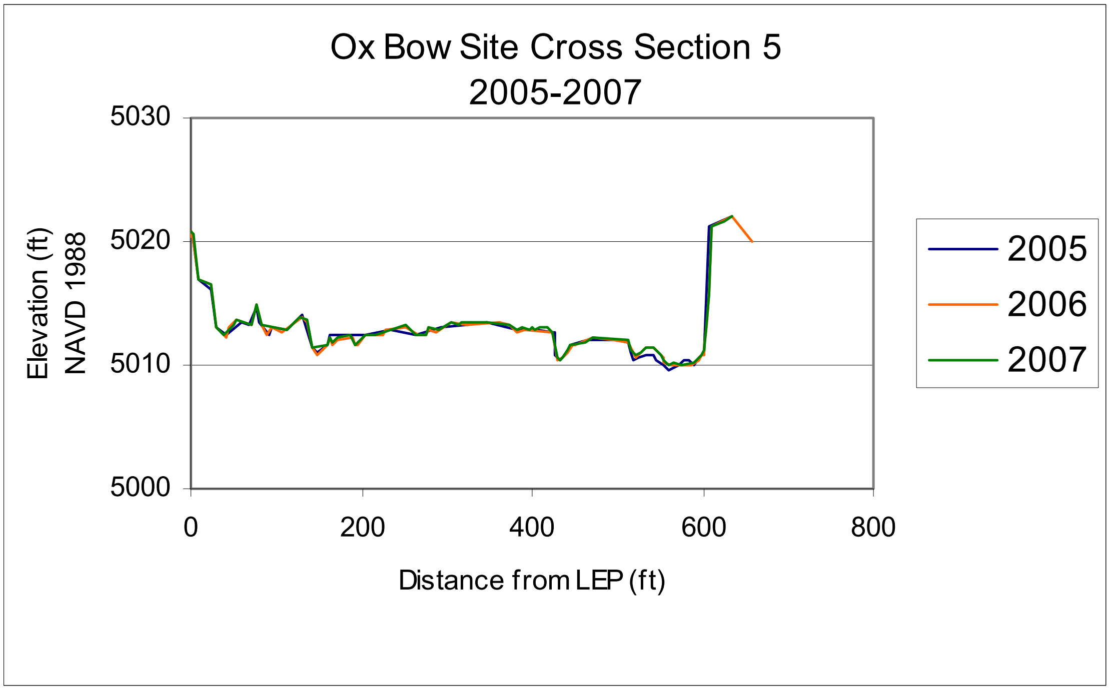

Oxbow Site Cross Section 3
2005-2007
Elevation (ft) NAVD 1988
5020
5018
5016
5014
5012
5010
150
200
250
300
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

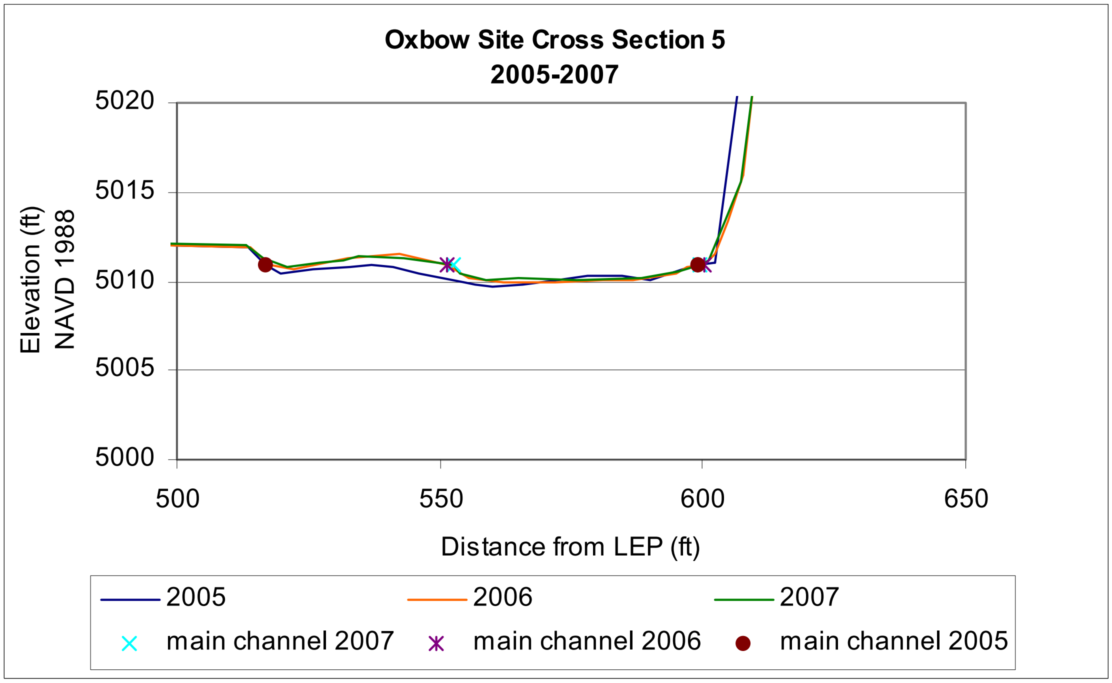


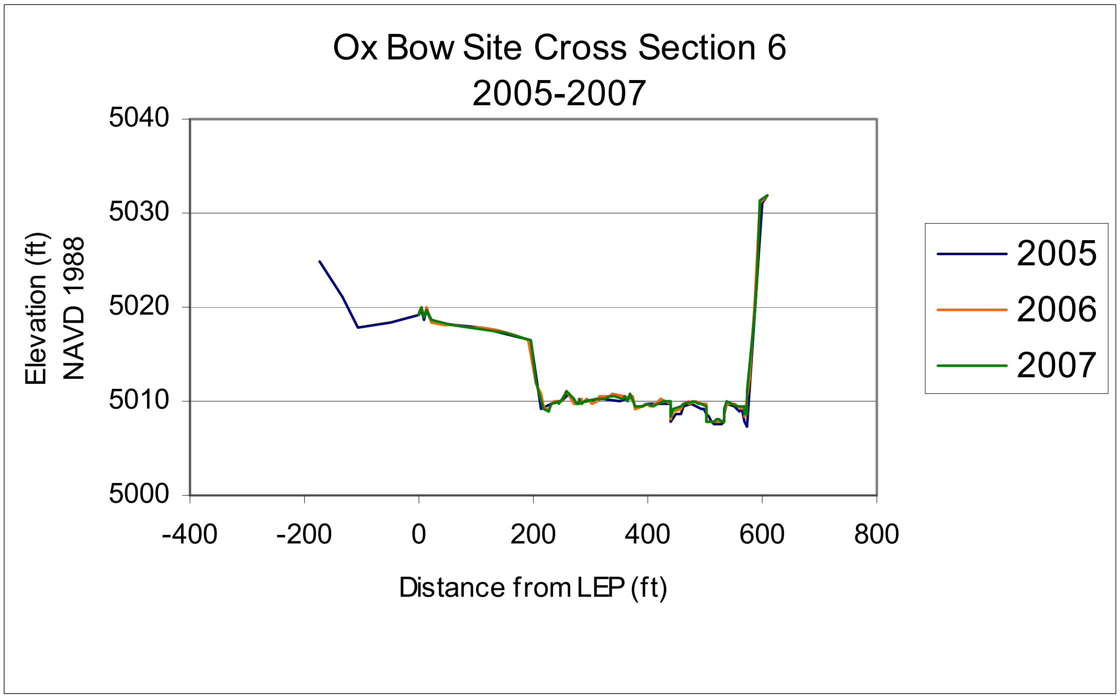
Ox Bow Site Cross Section 4
2005-2007
Elevation (ft)
NAVD 1988
5030
5020
5010
5000
0
200
400
600
800
Distance from LEP (ft)
2005
2006
2007

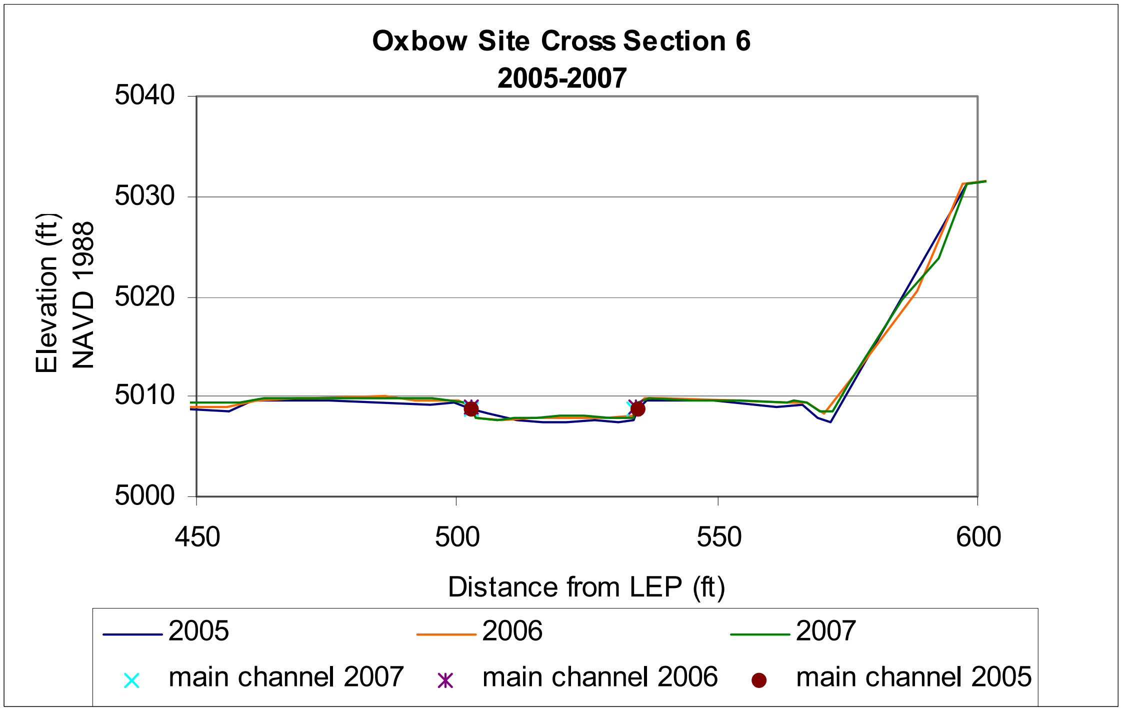


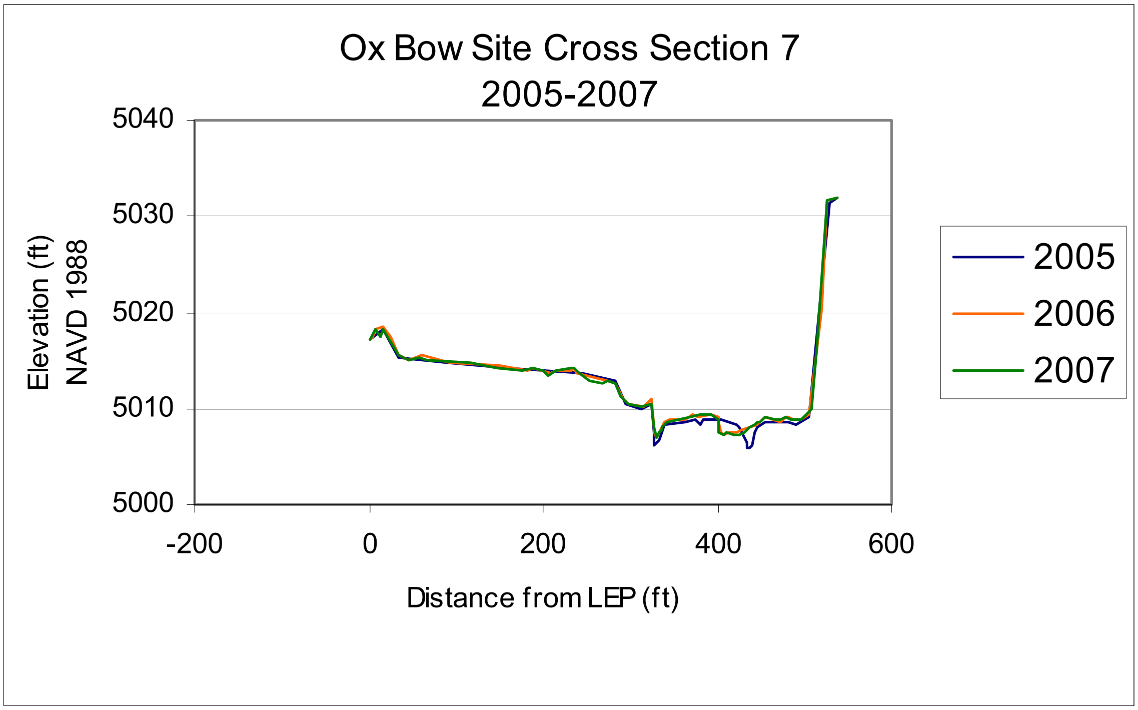
Oxbow Site Cross Section 4
2005-2007
Elevation (ft)
NAVD 1988
5030
5020
5010
5000
350
400
450
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

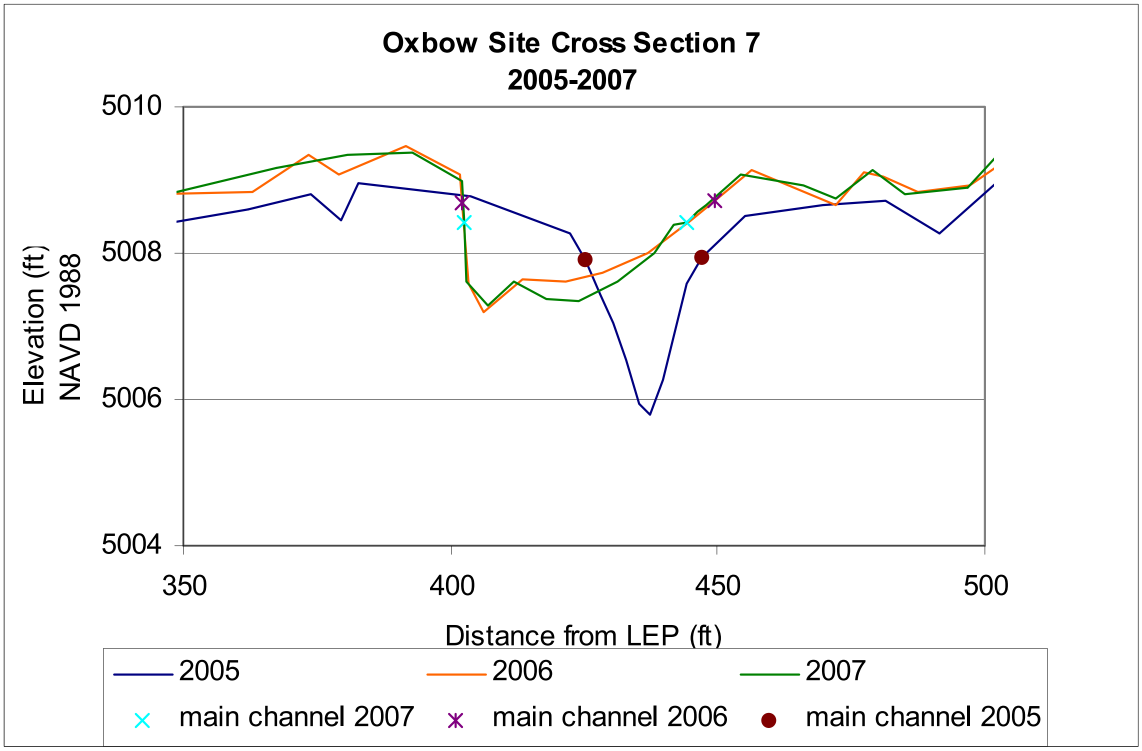

Ox Bow Site Cross Section 5
2005-2007
Elevation (ft)
NAVD 1988
5030
5020
5010
5000
0
200
400
600
800
Distance from LEP (ft)
2005
2006
2007

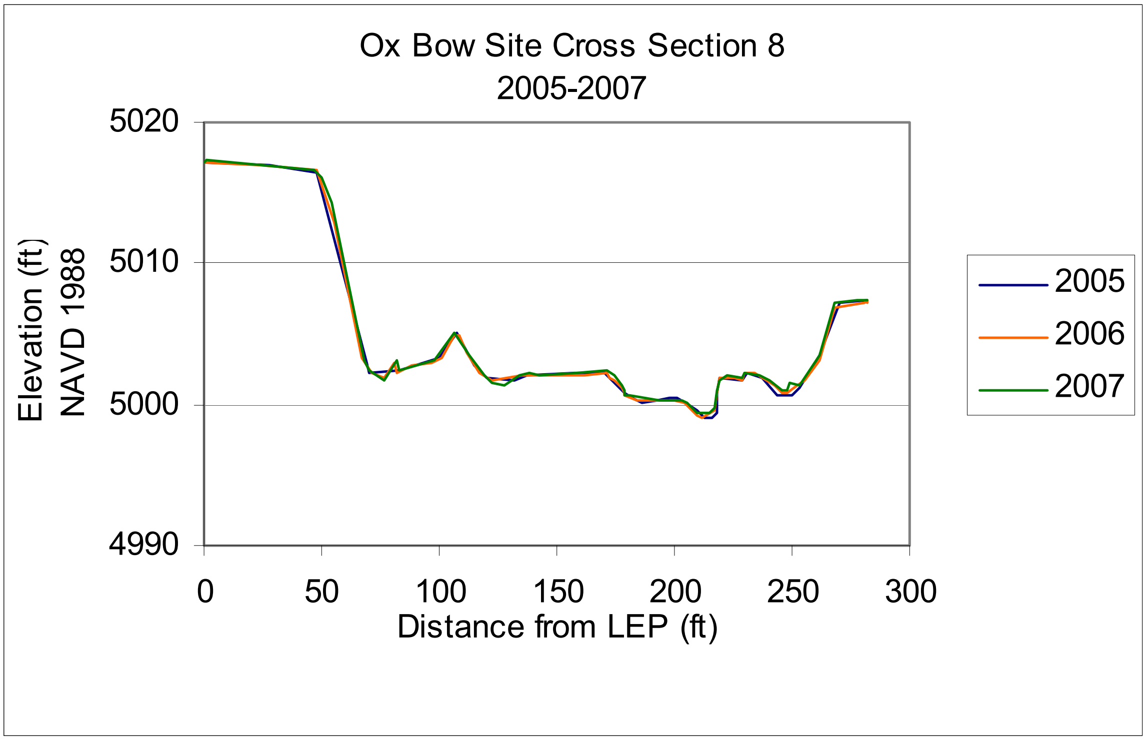

Oxbow Site Cross Section 5
2005-2007
Elevation (ft)
NAVD 1988
5020
5015
5010
5005
5000
500
550
600
650
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

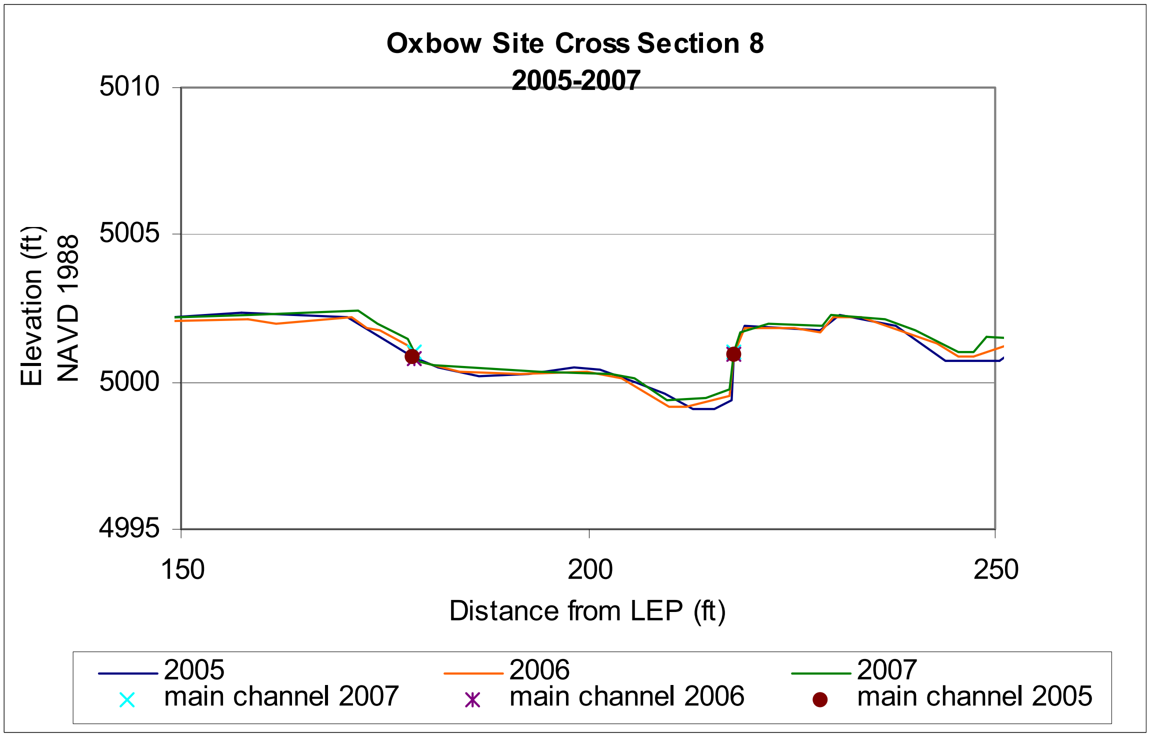

Ox Bow Site Cross Section 6
2005-2007
Elevation (ft)
NAVD 1988
5040
5030
5020
5010
5000
-400
-200
0
200
400
600
800
Distance from LEP (ft)
2005
2006
2007


Oxbow Site Cross Section 6
2005-2007
Elevation (ft)
NAVD 1988
5040
5030
5020
5010
5000
450
500
550
600
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005


Ox Bow Site Cross Section 7
2005-2007
Elevation (ft)
NAVD 1988
5040
5030
5020
5010
5000
-200
0
200
400
600
Distance from LEP (ft)
2005
2006
2007


Oxbow Site Cross Section 7
2005-2007
Elevation (ft)
NAVD 1988
5010
5008
5006
5004
350
400
450
500
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005


Ox Bow Site Cross Section 8
2005-2007
Elevation (ft)
NAVD 1988
5020
5010
5000
4990
0
50
100
150
200
250
300
Distance from LEP (ft)
2005
2006
2007


Oxbow Site Cross Section 8
2005-2007
Elevation (ft)
NAVD 1988
5010
5005
5000
4995
150
200
250
Distance from LEP (ft)
2005
2006
2007
main channel 2007
main channel 2006
main channel 2005

APPENDIX 2.2B: CROSS-SECTION DATA

SIXTH WATER SITE CROSS SECTION 1 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
3	0.00	6926.19	lep1check
6	0.41	6926.11	veg
7	13.62	6926.73	veg
8	17.65	6926.08	veg
9	22.57	6927.22	veg
10	30.96	6925.09	tbank veg
11	38.79	6923.88	bbank
12	49.64	6922.99	veg
13	57.00	6922.60	veg
14	57.65	6922.04	lew
15	58.17	6921.81	ic
16	61.38	6921.45	ic
17	64.22	6921.61	ic
18	64.43	6922.04	ws
19	66.01	6922.53	is
20	68.14	6922.73	is
21	72.43	6921.91	ws
22	73.01	6921.58	ic
23	76.97	6921.29	ic
24	81.38	6921.35	ic
25	83.75	6921.19	ic
26	87.17	6920.66	ic
27	89.76	6920.79	ic
28	93.01	6920.73	ic
29	95.59	6920.60	ic ohveg
31	97.73	6921.38	rew
32	101.31	6925.52	veg
33	105.64	6929.06	veg
34	115.41	6934.97	veg
35	121.66	6938.54	veg
36	133.59	6944.12	veg
37	144.30	6950.55	veg
1	148.86	6952.06	rep1

SIXTH WATER SITE CROSS SECTION 2 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
3	0.00	6923.59	lep2check
4	0.22	6923.13	veg
5	15.41	6923.32	veg
6	30.26	6921.06	veg
8	36.84	6920.14	lew sc
9	37.53	6919.88	ic sc
10	38.70	6919.88	rew sc
11	42.29	6919.81	veg
12	43.31	6919.22	lew sc
13	44.93	6918.53	ic sc
14	45.85	6918.76	rew sc
15	51.24	6920.54	veg
16	58.49	6920.40	veg
17	66.75	6918.27	veg
18	69.79	6916.27	veg
19	72.08	6916.37	veg
20	74.10	6915.68	lew
21	77.89	6915.84	ic
22	79.28	6916.24	ws
23	83.17	6916.99	is
24	88.29	6917.35	ws
25	91.29	6916.70	ic
26	96.08	6916.60	ic
27	102.45	6916.50	ic
28	107.17	6916.53	ic
29	112.59	6916.53	ic
30	114.96	6916.89	ic
31	121.44	6916.73	ic
32	122.82	6917.19	rew
33	131.17	6918.44	veg
34	142.34	6928.44	veg
35	151.63	6936.28	veg
36	159.52	6942.29	veg
37	165.46	6947.05	veg
1	170.38	6949.60	rep2

SIXTH WATER SITE CROSS SECTION 3 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
3	0.00	6923.59	lep23
5	0.23	6923.16	veg
6	14.51	6923.13	veg
7	32.13	6922.54	veg
8	44.41	6921.56	veg
9	50.43	6920.02	veg
10	54.09	6919.62	tob
11	55.23	6917.59	bank
13	61.94	6914.34	lew
14	62.48	6914.17	ic
15	65.27	6913.39	ic
16	66.68	6913.29	ic
17	68.24	6913.58	ic
18	70.79	6913.88	ic
19	73.12	6913.65	ic
20	75.16	6913.45	ic
21	76.91	6913.35	ic
22	78.99	6913.45	ic
23	81.08	6913.95	ic
24	83.41	6914.54	ws
25	86.07	6914.54	is
26	92.77	6915.06	is
27	95.09	6914.77	is
28	97.00	6915.26	is
29	101.37	6915.62	is
30	106.61	6915.32	is
31	109.99	6914.93	ws
32	110.53	6914.63	ic
33	110.57	6914.67	ic
34	112.18	6914.37	ic
36	116.29	6914.08	ic
37	117.88	6914.01	ic
38	120.42	6913.81	ic
39	123.61	6914.08	ic
40	127.84	6914.31	ic
41	131.99	6913.85	ic
43	133.22	6914.50	rew
42	133.22	6914.34	ic
44	133.93	6914.67	rock
45	136.11	6914.60	bnk
46	139.18	6915.65	tob
47	146.91	6917.32	veg
48	155.45	6916.31	veg
49	158.57	6916.24	veg
50	163.50	6916.70	veg
51	169.17	6916.47	veg
1	172.43	6916.37	rep3

SIXTH WATER SITE CROSS SECTION 4 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	6921.70	lep4
6	0.21	6921.60	veg
7	9.12	6919.80	veg
8	18.83	6919.30	veg
9	30.90	6919.44	veg
10	36.84	6919.73	veg
11	54.31	6919.76	veg
12	79.20	6919.44	tbank
13	85.56	6915.99	bank
14	91.20	6912.41	bbank
15	96.90	6911.33	sc dry
16	99.93	6913.10	veg
17	101.64	6910.45	lew ohveg
18	106.83	6909.33	ic
19	110.70	6909.66	ic
20	114.23	6909.46	ic
21	117.60	6909.17	ic
22	119.95	6908.41	ic
23	124.75	6907.99	ic
24	128.02	6908.58	ic
26	130.93	6909.46	rew
27	132.65	6909.79	veg
28	137.74	6911.00	veg
29	141.21	6912.61	veg
30	148.28	6910.25	veg
31	155.83	6910.25	veg
32	156.89	6910.38	veg
33	188.17	6913.40	veg
34	202.32	6912.68	veg
35	212.55	6914.09	veg
36	226.46	6913.50	veg
37	244.94	6912.15	veg
38	263.23	6911.73	veg
39	283.68	6911.46	veg
40	303.12	6911.20	veg
41	322.90	6911.30	veg
42	335.72	6911.04	veg
43	341.48	6909.79	bhill
44	356.78	6914.22	veg
45	381.82	6928.16	veg
1	391.62	6928.66	rep 4-5-6

SIXTH WATER SITE CROSS SECTION 5 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	6914.06	lep5
6	0.65	6913.18	veg
7	3.33	6912.42	veg
8	3.63	6909.70	veg
9	5.16	6908.85	veg
10	11.18	6907.08	veg
11	11.52	6906.55	lew
12	12.28	6906.12	ic
13	14.78	6905.50	ic
14	17.36	6904.91	ic
15	19.66	6905.21	ic
16	22.13	6905.21	ic
17	24.41	6905.04	ic
18	27.57	6905.96	ic
19	29.69	6906.32	ic
20	30.67	6906.58	rew
21	36.70	6908.95	tbank
22	53.59	6907.96	veg
23	68.44	6907.80	veg
24	76.04	6905.86	veg
25	87.74	6911.51	veg
26	100.01	6911.77	veg
27	115.72	6911.77	veg
28	133.23	6911.34	veg
29	149.74	6911.77	veg
30	166.82	6911.28	veg
31	184.34	6911.64	veg
32	192.47	6909.93	veg
33	200.11	6909.27	veg
34	214.64	6910.98	veg
35	232.78	6910.68	veg
36	240.71	6909.73	veg
37	243.75	6910.78	veg
38	247.54	6910.78	veg
39	250.38	6910.16	veg
40	257.60	6917.71	veg
41	271.95	6926.89	veg
42	276.68	6928.07	veg
1	280.99	6928.66	rep 4-5-6

SIXTH WATER SITE CROSS SECTION 6 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
2	0.00	6920.59	lep6
3	0.05	6920.53	veg
5	0.35	6920.53	veg
6	2.76	6916.75	veg
7	13.07	6912.23	veg
8	24.11	6907.57	veg
9	27.16	6906.35	veg
10	36.24	6906.45	veg
11	43.31	6903.60	veg
12	45.37	6902.42	lew
13	46.05	6901.60	ic
14	48.51	6900.65	ic
15	52.11	6900.61	ic
16	55.11	6900.78	ic
17	57.65	6901.37	ic
18	58.44	6902.84	ic rock
19	60.59	6901.27	ic
20	64.27	6901.30	ic
21	66.61	6901.86	ic
22	67.15	6902.38	rew
23	70.21	6903.04	veg
24	76.08	6905.11	tbank
25	84.34	6904.32	veg
26	87.82	6904.42	veg
27	92.08	6906.09	veg
28	100.74	6905.57	veg
29	116.24	6905.21	veg
30	122.69	6904.55	veg
24	133.00	6910.01	willow*
31	144.37	6909.44	veg
32	158.14	6909.44	veg
33	173.94	6909.67	veg
34	193.52	6909.47	veg
35	211.20	6909.01	veg
36	228.42	6909.83	veg
37	240.28	6909.67	veg
38	250.73	6909.27	veg
39	266.04	6909.67	veg
40	272.34	6910.09	veg
41	276.50	6912.29	veg
42	289.25	6919.87	veg
43	300.42	6927.22	veg
1	307.19	6928.66	rep 4-5-6

*point added to fill in survey

DIAMOND FORK CAMPGROUND SITE CROSS SECTION 1 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0	5197.23524	DFCLEP1
47	6.769177082	5196.64466	veg
46	11.45422824	5195.26664	veg
45	17.88076931	5192.44498	veg
44	22.6789697	5191.29663	veg
43	25.66267913	5189.16398	veg
42	29.83956509	5186.90009	veg
41	40.5603471	5179.87875	veg
40	43.26068597	5178.96007	veg
39	46.28881455	5179.22255	veg
38	47.50920624	5179.74751	veg
37	53.44856761	5179.78032	veg
36	67.10971612	5180.17404	veg
35	70.5253108	5179.84594	veg
34	75.43672675	5179.35379	veg
33	85.02975391	5179.0585	veg
32	88.23858627	5178.27106	lew
31	89.3197254	5177.97577	ic
30	91.86562996	5177.77891	ic
29	97.40973713	5177.22114	ic
28	107.3662887	5176.99147	ic
27	111.1084392	5177.35238	ic
26	115.0296073	5177.25395	ic
25	121.632537	5177.54924	ic
24	126.3279029	5177.91015	ic
23	126.9751585	5178.23825	rew
22	128.2058686	5179.15693	veg
21	132.7126723	5179.45222	veg
20	136.2209239	5179.91156	veg
19	139.9121609	5179.28817	veg
18	144.91134	5181.71611	veg
17	150.7622397	5181.91297	veg
16	174.8199749	5181.84735	veg
15	242.2112841	5181.28958	veg
14	303.9917018	5180.40371	veg
13	357.4474911	5180.14123	veg
12	418.6815303	5179.61627	veg
11	462.646333	5179.45222	veg
10	528.5947904	5178.96007	veg
9	570.771461	5179.02569	veg
8	576.8236374	5180.3709	veg
7	593.2424876	5186.83447	veg
6	608.8395773	5190.77167	veg
5	609.3128009	5190.96853	DFCREP1

DIAMOND FORK CAMPGROUND SITE CROSS SECTION 2 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
3	0.00	5207.50	lep2
5	0.45	5207.18	veg
6	21.65	5200.06	veg
7	35.04	5194.41	veg
8	46.28	5190.05	veg
10	70.41	5177.15	veg
11	124.87	5176.86	veg
12	166.50	5178.37	veg
13	168.83	5175.84	veg
9	178.26	5175.35	veg
10	216.50	5175.55	veg
11	224.54	5175.58	veg
12	225.93	5174.56	lew
13	226.42	5173.94	ic
14	235.07	5173.81	ic
15	238.88	5174.07	ic
16	247.15	5174.17	ic
17	255.44	5174.24	ic
18	267.89	5174.01	ic
19	273.01	5174.10	ic
20	275.24	5174.83	rew
21	276.77	5176.76	tbank
22	284.77	5177.52	veg
23	289.15	5177.12	veg
24	291.58	5176.70	veg
25	303.41	5176.24	bslope
26	313.16	5178.40	tslope
28	557.28	5179.68	veg
29	570.91	5180.24	veg
30	577.12	5182.41	veg
31	589.67	5183.19	veg
32	600.65	5183.91	veg
33	618.49	5190.61	veg
34	629.42	5193.27	veg
1	637.94	5194.35	DFCREP2

red points are inserted into the data from 2006 to complete the topo

DIAMOND FORK CAMPGROUND SITE CROSS SECTION 3 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	5206.88	lep 3
6	0.05	5206.88	veg
7	4.89	5205.40	veg
8	45.72	5193.79	veg
9	52.81	5190.05	veg
10	68.40	5173.97	veg
11	76.82	5173.97	veg
12	81.16	5174.30	veg
13	84.50	5174.99	veg
14	97.87	5175.15	veg
15	100.35	5174.66	veg
16	110.56	5174.50	veg
17	116.80	5175.42	veg
18	142.34	5175.78	veg
19	186.05	5176.11	veg
20	201.45	5176.01	veg
21	210.03	5176.17	veg
22	214.89	5175.61	veg
23	219.08	5175.65	veg
24	221.20	5175.94	veg
25	225.64	5175.58	veg
26	230.62	5175.35	tbank
27	231.05	5172.73	bbank
28	233.32	5172.56	lew sc
29	233.78	5172.46	sc
30	234.65	5172.63	rew sc
31	237.63	5172.96	veg
32	247.55	5173.02	veg
33	260.50	5172.73	veg
34	264.03	5172.23	lew
35	266.37	5171.81	ic
36	269.33	5171.64	ic
37	273.36	5171.68	ic
38	276.63	5171.28	ic
39	285.14	5170.79	ic
40	292.24	5170.82	ic
41	294.01	5172.30	rew cutbank
42	294.64	5173.45	tbank
43	302.66	5173.68	veg
44	315.46	5173.55	veg
45	324.75	5173.38	veg
46	340.74	5173.38	veg
47	353.35	5173.09	veg
48	357.51	5172.76	veg
49	384.33	5173.32	veg
50	391.60	5173.05	veg
51	394.58	5172.63	veg
52	399.64	5172.56	veg
53	415.10	5177.68	veg
	419.69	5178.01	DFCREP3

DIAMOND FORK CAMPGROUND SITE CROSS SECTION 4 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	5206.88	dfclep4
6	0.23	5206.78	veg
7	12.59	5203.24	veg
8	38.24	5197.27	veg
9	46.41	5194.32	veg
10	53.97	5187.79	veg
11	62.32	5178.73	veg
12	67.91	5174.53	veg
13	71.59	5173.78	veg
14	77.82	5173.61	veg
15	87.38	5174.20	veg
16	91.15	5174.43	veg
17	100.70	5174.56	veg
18	112.56	5173.35	veg
19	115.81	5172.99	veg
20	118.54	5171.48	veg
21	124.84	5170.56	veg
22	127.31	5170.46	ponded wtr
23	130.95	5170.76	veg
24	139.07	5170.79	veg
25	140.75	5171.15	veg
26	160.48	5171.05	veg
27	179.91	5171.51	veg
28	205.63	5171.81	veg
29	211.48	5172.04	veg
30	216.73	5172.10	top bnk
31	217.51	5170.86	lew
33	221.45	5170.04	ic
34	225.88	5170.50	ic
35	229.19	5170.63	ic
36	235.23	5170.43	ic
37	239.82	5170.27	ic
38	244.07	5169.84	ic
39	246.90	5169.35	ic
40	249.03	5169.22	ic
41	251.56	5169.77	ic
42	252.37	5171.09	rew
43	253.39	5171.77	is
44	262.88	5172.10	is
45	275.49	5171.45	is
46	278.57	5171.22	is
47	285.53	5170.92	bw ws
48	288.27	5170.53	bw
49	292.20	5170.27	bw
50	297.21	5169.51	bw
52	299.14	5170.82	bw ws
53	300.76	5173.42	veg
54	319.64	5182.34	veg
55	328.80	5184.24	veg
56	340.89	5185.10	veg
2	348.33	5185.33	DFCREP4

DIAMOND FORK CAMPGROUND SITE CROSS SECTION 5 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	5206.95	lep567
6	1.39	5206.55	veg
7	14.19	5204.22	veg
8	38.77	5199.47	veg
9	45.57	5197.69	veg
10	54.92	5192.87	veg
11	56.30	5189.72	veg
12	63.62	5185.95	veg
13	73.71	5179.22	veg
14	77.95	5177.16	veg
15	79.78	5174.37	veg
16	83.85	5171.32	veg
17	85.37	5170.10	veg
18	86.32	5168.79	poded ws
19	86.82	5168.56	ponded
20	88.35	5168.89	ponded ws
21	89.31	5169.51	veg
22	98.27	5169.87	veg
23	111.72	5169.74	veg
24	112.70	5170.17	veg
25	119.71	5170.17	veg
26	128.19	5170.53	veg
27	136.86	5170.43	veg woodydebris
28	140.61	5171.81	woodydebris
29	143.29	5170.30	veg woodydebris
30	145.27	5169.64	veg
31	149.24	5169.41	veg
32	154.38	5169.45	veg woodydebris
33	155.28	5170.46	woodydebris
34	157.49	5169.84	veg
35	161.78	5169.28	lew
36	168.38	5168.33	ic
37	169.72	5167.58	ic
38	175.45	5166.56	ic
39	178.84	5166.23	ic
40	179.60	5166.39	ic
41	181.15	5168.43	ic lwd
42	183.901248	5168.69054	ic
43	184.51	5169.18	rew
44	185.79	5170.53	tbank
45	190.39	5171.09	veg
46	199.13	5171.51	veg
47	200.88	5171.28	veg
48	203.68	5170.92	veg
49	205.89	5171.18	veg
50	207.82	5171.02	veg
51	210.48	5170.95	veg
52	226.83	5171.09	veg
53	229.03	5170.89	veg
54	244.82	5170.36	veg
55	246.62	5170.76	veg
56	249.97	5170.79	veg
57	252.94	5170.30	veg
58	258.19	5170.95	veg bslope
59	261.76	5172.30	veg
60	274.11	5179.39	veg tslope
61	279.35	5181.42	veg tslope
62	292.09	5182.86	veg
2	297.75	5183.52	DFCREP567

DIAMOND FORK CAMPGROUND SITE CROSS SECTION 6 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	5206.36	lep6
6	0.63	5206.06	veg
7	11.55	5202.71	veg
8	30.50	5196.74	veg
9	46.16	5191.36	veg
10	48.93	5190.71	veg
11	54.96	5187.10	veg
12	56.47	5183.55	veg
13	61.61	5180.04	veg
14	66.46	5176.27	veg
15	72.15	5174.37	veg
16	73.19	5172.10	veg
17	74.55	5172.17	veg
18	76.10	5169.81	bank
19	80.60	5168.92	bank
20	82.38	5167.61	ws backwater
21	85.27	5167.38	backwater
22	89.45	5168.23	backwater
23	92.74	5168.92	ws backwater
24	95.24	5169.05	is
25	98.31	5168.95	ws is
26	99.80	5168.85	ws
27	101.37	5168.92	ws veg
28	103.66	5168.99	veg
29	106.65	5168.95	lew
30	109.19	5167.71	ic
31	112.13	5167.41	ic
32	115.01	5167.71	ic
33	116.57	5168.43	ic
34	119.43	5168.53	ic
35	123.39	5168.23	ic
36	126.06	5167.74	ic
37	129.70	5167.74	ic
38	133.74	5168.00	ic
39	136.53	5167.84	ic
40	141.17	5168.07	ic
41	146.15	5168.62	ic
42	147.91	5168.66	ic
43	148.71	5169.05	rew
44	150.03	5169.77	tbank
45	154.86	5170.04	veg
46	166.48	5169.84	veg
47	168.14	5169.64	veg
48	170.59	5170.07	veg
49	183.12	5170.04	veg
50	185.43	5169.51	veg
51	187.65	5170.13	veg
52	192.47	5170.50	veg
53	201.56	5170.69	veg
54	208.11	5170.63	veg
55	210.20	5170.17	veg
56	213.74	5170.69	veg
57	219.01	5170.56	veg
58	220.67	5170.04	veg
59	223.04	5170.46	veg
60	228.50	5170.69	veg
61	233.01	5173.32	veg
62	248.37	5181.36	veg
63	258.21	5182.70	veg
2	264.33	5183.52	DFCREP567

DIAMOND FORK CAMPGROUND SITE CROSS SECTION 7 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
1	0.00	5203.44	DFCLEP7
4	0.06	5203.37	lep7
6	0.72	5203.08	veg
7	16.07	5196.55	veg
8	23.20	5192.74	veg
9	25.38	5190.41	veg
10	31.53	5186.11	veg
11	33.37	5184.50	veg
12	45.62	5178.21	veg
13	51.17	5175.97	veg
14	58.47	5172.40	veg
15	70.13	5171.32	tbank
16	70.63	5168.07	lew
17	72.57	5167.02	ic
18	74.77	5167.02	ic
19	76.77	5167.28	ic
20	78.24	5167.21	ic
21	79.46	5167.41	ic
22	85.83	5167.61	ic
23	88.66	5167.41	ic
24	91.95	5167.48	ic
25	99.43	5167.58	ic
26	104.80	5167.48	ic
27	108.70	5167.54	ic
28	111.35	5167.87	ic
29	115.18	5167.87	ic
30	119.80	5168.00	rew
31	123.08	5168.26	veg
32	127.77	5168.36	veg
33	135.92	5168.72	veg
34	143.27	5168.30	veg
35	145.17	5168.00	veg
36	147.21	5168.89	veg
37	151.97	5168.99	veg
38	153.95	5168.00	veg
39	155.66	5168.40	veg
40	162.99	5168.66	veg
41	164.65	5168.07	veg
42	165.88	5168.59	veg
43	173.92	5169.05	veg
44	184.32	5169.35	veg
45	189.20	5169.45	veg
46	191.51	5169.84	veg
47	192.48	5169.48	veg
48	196.83	5169.64	veg
49	199.40	5170.30	veg
50	204.15	5172.20	veg
51	207.73	5173.15	veg
52	210.13	5174.86	veg
53	222.83	5180.50	veg
54	226.91	5181.62	veg
55	239.61	5182.93	veg
2	245.22	5183.52	DFCREP567

MOTHER SITE CROSS SECTION 1 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
1	0.00	5081.35	MOLEP1
4	0.30	5080.99	mo1lep
6	0.53	5081.02	dirt
7	4.79	5080.50	dirt
8	6.81	5079.74	veg
9	8.45	5079.05	veg
10	11.14	5076.72	veg
11	12.55	5075.21	veg
12	19.92	5066.98	veg
13	27.86	5067.27	veg
14	37.15	5067.50	fence
15	47.95	5067.34	veg
16	57.39	5067.64	veg
17	65.37	5067.54	veg
18	70.01	5067.27	veg
19	72.35	5067.73	veg
20	75.84	5067.80	veg
21	82.86	5067.47	top bnk
22	84.50	5066.45	lew
23	85.40	5064.19	ic
24	88.18	5063.53	ic
25	92.43	5064.58	ic
26	96.32	5065.27	ic
27	100.93	5065.63	ic
28	104.96	5065.73	ic
29	108.45	5065.57	ic
30	110.20	5065.80	ic
31	110.27	5066.49	rew
32	112.05	5067.70	top bnk
33	115.07	5067.80	veg
34	127.12	5067.50	veg
35	147.41	5067.11	veg
36	151.73	5067.31	veg
37	165.26	5066.65	veg
38	172.05	5065.93	veg
39	174.30	5066.22	veg
40	177.76	5066.82	veg
41	188.61	5066.42	veg
42	199.08	5067.01	veg
43	208.75	5066.65	veg
44	214.26	5071.41	veg
45	215.76	5072.92	veg
46	230.94	5071.74	veg
5	230.94	5071.74	mo1lep

13	62.70	5060.98	veg
14	73.62	5060.58	veg
16	83.01	5060.78	veg
17	89.00	5060.94	veg
18	95.96	5061.47	veg
19	107.92	5061.43	veg
22	136.09	5061.76	veg
23	152.72	5061.11	ws pond
24	161.08	5060.88	pond
25	165.66	5061.43	ws pond veg
26	188.27	5061.66	saturat veg
27	190.58	5061.73	veg
28	201.45	5061.37	saturat veg
29	205.59	5061.34	saturat veg
30	209.04	5061.30	veg
31	210.02	5061.57	veg
32	243.42	5061.83	veg
33	283.55	5062.68	veg
34	289.28	5062.19	ws sc
35	290.00	5061.40	sc
36	293.90	5062.25	ws sc
37	309.23	5062.88	veg
38	312.62	5062.85	saturat veg
39	321.43	5062.32	saturat veg
40	324.86	5062.32	ws sc
41	328.38	5062.09	sc
42	331.01	5062.16	ws sc
43	332.85	5062.48	grass bunch ws
44	334.95	5062.45	sc
45	336.62	5062.58	grass bunch
46	336.88	5062.35	ws sc
47	339.15	5062.25	sc
48	342.79	5062.52	sc
49	349.24	5063.86	lwd
50	355.81	5062.85	veg
51	359.63	5062.48	ws
52	360.39	5062.42	trickle sc
53	361.60	5062.45	ws
54	363.08	5062.65	veg
55	370.36	5062.75	veg
56	372.68	5062.32	veg
57	376.46	5063.04	veg
58	385.81	5062.75	veg
59	390.22	5062.68	veg
60	390.63	5062.32	lew
61	391.88	5062.19	ic
62	395.73	5061.93	ic
63	399.77	5061.47	ic
64	404.95	5061.11	ic
65	410.41	5060.52	ic
66	416.16	5061.07	ic
68	418.29	5062.22	rew
69	419.11	5062.81	top bnk
70	424.48	5062.94	veg
71	432.65	5062.39	veg
72	434.21	5061.99	ws sc
73	436.25	5061.24	sc
74	437.39	5062.03	ws sc
75	438.70	5062.39	veg
76	450.39	5063.24	veg
77	453.76	5063.67	veg
78	468.92	5063.67	veg
79	496.24	5063.53	veg
80	527.29	5063.47	veg

101	43.63	5056.78	pondopenwater
100	48.52	5058.25	pondopenwater
99	55.54	5058.65	pondopenwater
98	60.71	5059.33	wetveg
97	80.45	5059.24	wetveg
96	91.22	5059.24	wetveg
95	98.05	5059.40	wspond
93	118.21	5059.43	ws sc
92	120.48	5059.14	sc
91	121.92	5058.88	sc
90	124.76	5058.45	sc
89	127.81	5058.55	sc
88	131.85	5059.20	sc
87	136.21	5059.40	ws sc
86	139.21	5059.73	veg
85	143.09	5059.53	veg
94	145.76	5059.59	veg*
84	147.56	5059.56	veg
83	150.99	5059.50	veg
82	153.94	5059.73	veg
81	168.89	5060.02	veg
80	182.01	5060.22	veg
79	184.11	5060.02	veg
78	189.40	5060.06	veg
77	204.34	5060.09	veg
76	209.60	5060.29	veg
75	211.47	5060.68	veg
74	234.79	5060.68	veg
73	236.10	5061.01	veg
72	255.91	5061.20	veg
71	259.11	5061.20	veg
70	260.77	5060.35	ws sc
69	261.48	5059.93	sc
68	263.10	5060.06	sc
67	264.14	5060.19	sc
66	265.85	5060.29	ws sc
65	266.43	5060.42	veg
64	268.63	5061.01	veg
63	270.75	5060.78	veg
62	271.57	5060.58	veg
61	275.05	5060.58	veg
60	275.90	5061.73	veg
59	285.84	5061.47	veg
58	290.89	5061.34	veg
57	293.00	5061.89	veg
56	308.41	5061.89	veg
55	309.97	5061.14	veg
54	316.41	5061.30	veg
53	319.38	5061.76	veg
52	326.24	5062.12	veg
51	330.54	5060.61	veg
50	336.81	5060.61	veg
49	340.16	5060.45	veg
48	342.26	5060.88	veg
47	348.00	5061.24	veg
46	351.58	5060.94	veg
45	355.47	5061.01	veg
44	359.15	5060.42	veg
43	360.63	5060.71	veg
42	366.91	5060.81	veg
41	368.27	5060.65	veg
40	371.54	5060.84	grvl
39	382.77	5060.84	veg
38	402.63	5061.27	veg
37	409.17	5060.52	veg
36	417.81	5060.42	veg
35	420.79	5059.99	lew
34	422.58	5059.79	ic
33	425.91	5059.63	ic
32	428.95	5059.20	ic
31	432.08	5058.91	ic
30	434.10	5058.25	ic
29	435.96	5057.76	ic
28	437.74	5057.33	ic
27	439.80	5057.86	ic
26	440.54	5059.99	rew
25	442.72	5061.50	veg
24	446.71	5061.43	veg
23	452.90	5061.07	veg
22	454.77	5061.01	veg
21	456.32	5061.24	veg

78	31.98	5062.58	veg
77	36.66	5060.91	veg
76	40.29	5060.25	veg
75	42.83	5060.55	veg
74	46.01	5060.48	bank
73	47.47	5059.40	ws pond
72	48.78	5058.78	pond
71	49.94	5057.99	pond
70	52.62	5057.73	pond
69	60.69	5057.83	pond
68	74.60	5058.88	pond
67	75.59	5059.43	ws sc
66	77.51	5059.37	bdam
65	78.88	5058.81	pond
64	86.16	5058.38	pond
63	90.64	5058.19	pond
62	96.44	5057.96	pond
61	97.39	5058.88	ws pond
60	98.33	5059.56	veg
59	101.31	5059.83	veg
58	104.91	5059.89	veg
57	124.91	5059.96	veg
56	137.04	5060.02	veg
55	139.60	5059.99	veg
54	149.79	5060.48	veg
53	156.83	5060.38	veg
52	171.36	5060.02	veg
51	177.47	5059.86	veg
50	179.45	5060.45	veg
49	194.13	5060.55	veg
48	203.07	5060.35	veg
47	205.91	5059.76	veg
46	209.08	5059.14	veg
45	209.78	5059.11	veg
44	210.98	5059.37	veg
43	214.49	5059.47	veg
42	221.91	5059.66	veg
41	224.21	5059.24	veg
40	226.94	5058.84	veg
39	230.36	5059.20	veg
38	238.32	5059.47	veg
37	240.01	5059.63	veg
36	247.50	5059.79	veg
35	252.92	5059.93	veg
34	253.70	5060.22	veg log
33	255.33	5059.86	tbank
32	255.90	5058.88	lew
31	256.55	5058.06	ic
30	258.64	5058.12	ic
29	262.97	5057.79	ic
28	266.07	5057.60	ic
27	268.07	5057.63	ic
26	276.43	5058.22	ic
25	290.82	5058.25	ic
24	296.70	5058.45	ic
23	298.19	5058.68	rew
22	299.35	5058.81	veg
21	302.85	5058.91	veg
20	304.34	5059.11	veg
19	307.42	5059.11	veg
18	309.52	5058.61	veg
17	313.98	5059.27	veg
16	314.81	5059.70	veg

10	45.25	5061.60	veg
11	48.64	5060.55	veg
12	53.42	5060.16	veg
13	55.82	5060.42	veg
14	62.21	5060.42	veg
15	63.82	5059.89	veg
17	67.60	5058.61	ws sc
18	68.11	5058.28	pond
19	72.71	5057.23	pond
20	72.77	5057.20	pond
21	78.36	5056.78	pond
22	83.11	5057.43	pond
23	93.18	5057.63	pond
24	97.66	5058.12	pond
25	102.77	5058.28	pond
26	104.77	5058.55	pond
27	115.57	5058.61	pond ws
28	116.88	5058.78	veg
29	133.93	5058.71	veg
30	137.70	5059.27	veg
31	156.69	5059.33	veg
32	166.80	5059.30	veg
33	167.82	5058.61	ws pond
34	171.42	5058.35	pond
35	175.95	5058.19	pond
36	178.25	5058.58	ws pond
37	179.41	5058.84	veg
38	186.51	5059.04	veg
39	190.28	5058.68	veg
40	193.36	5058.97	veg
41	195.26	5058.48	veg
42	198.61	5058.58	veg
43	206.34	5058.48	veg
44	209.35	5058.84	veg
45	212.99	5058.78	veg
46	215.18	5059.01	veg
47	222.58	5059.17	veg
48	233.59	5059.01	veg
49	240.58	5058.84	veg
50	241.78	5058.35	veg
51	244.38	5058.65	veg
52	249.12	5059.04	veg
53	261.63	5058.84	veg
54	266.24	5058.02	veg
55	269.66	5058.19	veg
56	274.48	5058.22	veg
57	279.61	5058.58	veg
58	284.52	5057.96	veg
59	286.52	5057.53	lew
60	287.21	5057.27	ic
61	288.89	5057.50	ic
62	294.89	5057.37	ic
63	301.27	5056.61	ic
64	305.64	5055.23	ic
65	309.54	5053.79	ic
66	312.03	5054.02	ic
67	315.67	5055.66	ic
68	316.15	5056.32	ic sodchunk
69	319.29	5056.74	ic sodchunk
70	320.36	5055.04	ic
71	320.96	5055.33	ic
72	321.01	5057.66	rew
73	321.71	5058.42	bank
74	323.03	5059.33	tbank

MOTHER SITE CROSS SECTION 6 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	5073.48	mo6lep
6	0.45	5073.38	veg
7	7.92	5071.57	veg
8	13.51	5071.24	veg
9	31.29	5069.93	veg
10	36.15	5056.61	lew
11	36.88	5056.45	ic
12	39.82	5055.14	ic
13	43.12	5054.28	ic
14	44.70	5053.92	ic
15	45.28	5053.99	ic
16	48.88	5054.77	ic
17	53.96	5055.33	ic
18	57.44	5056.09	ic
19	60.16	5056.48	ic
20	60.29	5056.51	rew
21	62.56	5057.14	top bnk
22	64.83	5057.30	veg
23	75.11	5057.60	veg
24	83.92	5057.73	veg
25	93.79	5057.33	veg cob
26	108.44	5056.38	cob
27	111.66	5057.17	veg
28	128.25	5057.73	veg
29	128.31	5057.73	veg
30	137.16	5057.86	veg
31	167.30	5057.83	veg
32	183.76	5058.19	lwd
33	188.21	5057.86	veg
34	198.39	5057.96	veg
35	201.57	5056.71	wet veg
36	206.54	5057.17	veg
37	211.94	5058.02	veg
38	219.13	5057.89	veg
39	230.14	5057.46	veg
40	234.00	5058.97	veg
41	243.83	5059.14	veg
42	250.03	5062.12	veg
43	285.29	5061.83	veg
44	303.41	5061.43	veg
1	310.20	5061.63	MOREP56

OXBOW SITE CROSS SECTION 1 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	5026.66	lep3
6	1.49	5026.59	veg
7	8.40	5023.08	veg
8	13.52	5021.77	veg
9	24.97	5021.41	veg
10	62.27	5021.87	veg
11	109.02	5022.82	veg
12	137.50	5022.52	veg
13	142.20	5021.77	veg
14	153.31	5022.06	veg
15	162.02	5022.65	veg
16	191.09	5022.49	veg
17	211.12	5022.95	veg
18	215.76	5022.52	veg
19	221.89	5022.72	veg
20	245.20	5023.15	veg
21	250.34	5021.90	veg
22	258.37	5021.41	veg
23	264.78	5020.78	veg
24	274.02	5020.68	veg
25	279.78	5020.82	veg
26	280.85	5020.36	tbank
27	283.01	5018.58	lew
28	283.36	5017.24	ic
29	287.31	5016.94	ic
30	293.29	5017.24	ic
31	294.06	5016.94	ic
32	297.63	5017.14	ic
33	299.29	5017.17	ic
34	308.37	5017.60	ic
35	309.57	5017.93	ic
36	312.90	5017.99	ic
37	316.91	5018.55	rew
38	321.75	5019.14	veg
39	325.70	5019.11	veg
40	332.02	5019.34	veg
41	336.58	5021.37	veg
42	338.60	5022.82	veg
43	372.57	5022.52	veg
44	388.27	5021.96	veg
45	393.04	5022.13	veg
46	414.21	5022.33	veg
47	440.23	5022.13	veg
48	447.87	5021.77	veg
49	454.32	5021.01	veg
50	459.47	5021.67	veg
51	467.77	5026.43	veg
52	476.00	5030.92	veg
2	485.41	5031.05	OXREP1

OXBOW SITE CROSS SECTION 2 DATA

POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	5026.79	lep2
6	1.34	5026.69	veg
7	10.71	5021.67	veg
8	18.64	5021.11	veg
9	30.67	5021.64	veg
10	44.10	5022.26	veg
11	70.33	5021.96	veg
12	92.60	5022.00	veg
13	92.68	5021.96	veg
14	131.76	5021.87	veg
15	144.95	5021.70	veg
16	148.20	5021.11	veg
17	152.86	5021.28	veg
18	166.73	5021.28	veg
19	170.49	5020.78	veg
20	174.57	5020.82	veg
21	178.01	5021.54	veg
22	200.62	5021.41	veg
23	202.72	5021.31	veg
24	206.07	5020.82	veg
25	226.08	5021.31	veg
26	233.84	5017.90	veg
27	236.47	5017.50	veg
28	238.46	5017.90	veg
29	260.98	5018.22	veg
30	275.23	5018.55	veg
31	289.54	5018.32	veg
32	292.88	5017.86	veg
33	297.75	5018.16	veg
34	312.21	5018.52	veg
35	324.00	5018.81	veg
36	332.66	5017.93	veg
37	335.78	5017.31	lew
38	340.49	5016.62	ic
39	346.59	5015.86	ic
40	350.72	5015.40	ic
41	354.65	5014.22	ic
42	356.30	5014.19	ic
43	358.78	5015.27	ic
44	360.54	5016.06	ic
45	361.86	5017.40	rew
46	364.95	5019.70	tbank
47	372.12	5019.60	veg
48	376.35	5020.26	veg
49	388.85	5020.59	veg
50	401.93	5020.36	veg
51	405.40	5020.36	veg
52	411.09	5022.16	veg
53	414.17	5022.10	veg
54	418.17	5021.83	veg
55	425.92	5021.37	veg
56	441.76	5021.87	veg
57	451.30	5021.83	veg
58	458.91	5020.72	veg
59	492.16	5021.24	veg
60	505.20	5021.21	veg
61	507.58	5021.83	veg
62	510.49	5021.80	veg
63	519.30	5020.13	veg
64	531.42	5020.29	veg
65	537.75	5021.67	veg
66	546.72	5027.84	veg
1	552.25	5028.13	OXREP234

15	47.72	5019.47	veg
16	52.11	5019.01	veg
17	57.15	5019.70	veg
18	71.75	5019.34	veg
19	84.47	5018.95	veg
20	99.29	5018.36	veg
21	106.79	5018.62	veg
22	124.76	5019.14	veg
23	129.60	5018.75	veg
24	137.93	5019.50	veg
25	143.35	5015.07	veg
26	144.70	5014.81	veg
27	146.76	5014.98	veg
28	149.46	5015.40	veg
29	156.95	5015.53	veg
30	163.08	5015.11	veg
31	164.01	5014.42	lew
32	165.71	5013.83	ic
33	168.00	5012.97	ic
34	170.30	5012.74	ic
35	173.67	5013.11	ic
36	175.50	5013.53	ic
37	183.66	5013.60	ic
38	185.22	5014.35	ws is
39	186.05	5014.81	is
40	186.39	5015.96	tbank is
41	191.44	5015.96	is
42	193.12	5016.45	is
43	195.89	5016.42	is
44	198.03	5015.07	is
45	203.74	5014.78	is
46	205.52	5015.11	is
47	212.40	5015.63	is lwd
48	214.09	5014.98	ws is
49	215.86	5014.88	ic
50	218.30	5014.75	ic
51	220.87	5014.78	ic
52	222.77	5015.17	rew
53	224.57	5015.27	veg
54	229.23	5015.04	bbank
55	231.55	5016.29	tbank
56	234.97	5016.26	veg
57	236.31	5016.45	veg
58	240.48	5016.62	veg
59	242.43	5017.01	veg
60	253.52	5017.11	veg
61	272.47	5017.24	veg
62	297.04	5017.31	veg
63	302.97	5017.21	veg
64	307.24	5016.19	veg
65	309.44	5016.81	veg
66	311.73	5017.37	veg
67	315.01	5017.67	veg
68	316.58	5018.26	veg
69	320.03	5018.65	veg
70	338.15	5019.44	veg
71	348.30	5019.14	veg
72	352.65	5019.67	veg
73	356.97	5019.27	veg
74	363.93	5019.24	veg
75	366.63	5019.01	veg
76	371.74	5019.27	veg
77	374.60	5018.68	veg
78	377.84	5019.11	veg
79	390.77	5018.06	veg
80	394.18	5018.49	veg
81	398.17	5019.73	veg
82	404.91	5019.41	veg
83	414.59	5019.93	veg
84	426.13	5020.75	veg
85	432.47	5020.13	veg
86	444.84	5020.29	veg

12	87.45	5018.19	veg
13	94.28	5016.39	veg
14	128.24	5016.81	veg
15	154.28	5017.01	veg
16	175.53	5017.63	veg
17	204.02	5018.09	veg
18	222.33	5018.09	veg
19	241.71	5018.26	veg
20	252.11	5016.06	veg
21	254.70	5015.96	veg
22	259.23	5016.48	veg
23	273.95	5016.35	veg
24	277.69	5014.84	veg
25	281.96	5014.45	veg
26	284.91	5014.94	veg
27	298.46	5014.81	veg
28	302.39	5013.27	veg
29	312.00	5013.56	veg
30	319.13	5014.25	veg
31	338.44	5015.07	veg
32	359.36	5015.01	veg
33	364.49	5014.12	veg
34	368.79	5014.22	veg
35	373.19	5014.09	veg
36	375.84	5013.40	lew
37	378.31	5013.24	ic
38	381.48	5013.27	ic
39	385.03	5013.47	ws is
40	389.07	5013.93	is
41	396.94	5013.99	is
42	409.76	5013.43	is
43	411.48	5012.74	ws is
44	413.76	5012.22	ic
45	419.74	5011.92	ic
46	428.97	5011.53	ic
47	432.08	5011.76	ic
48	433.84	5011.53	ic
49	435.86	5011.10	ic
50	438.88	5010.97	ic
51	440.79	5012.71	rew
52	441.75	5015.14	tbank
53	444.00	5015.37	veg
54	447.13	5016.03	veg
55	452.22	5017.93	veg
56	458.06	5019.67	veg
57	465.66	5019.90	veg
58	475.76	5019.11	veg
59	485.61	5019.54	veg
60	498.66	5020.13	veg
61	508.52	5019.63	veg
62	517.31	5019.86	veg
63	520.13	5020.16	veg
64	529.98	5020.00	veg
65	542.29	5020.00	veg
66	545.62	5020.72	veg
67	553.11	5020.16	veg
68	561.35	5019.96	veg
69	564.24	5019.21	veg
70	565.74	5019.41	veg
71	570.17	5020.88	veg
72	578.64	5020.91	veg
73	582.36	5021.47	veg
74	584.25	5021.21	veg
75	621.28	5021.08	veg

7	[illegible]	[illegible]	veg
8	23.17	5016.55	veg
9	29.14	5012.97	veg
10	36.12	5012.65	veg
11	39.98	5012.35	veg
12	43.59	5012.94	veg
13	49.88	5013.24	veg
14	53.34	5013.63	veg
15	70.75	5013.27	veg
16	76.17	5014.84	veg
17	81.97	5013.34	veg
18	112.94	5012.81	veg
19	128.78	5013.89	veg
20	135.31	5013.76	veg
21	143.03	5011.37	veg
22	159.09	5011.60	veg
23	161.93	5012.32	veg
24	164.38	5012.32	veg
25	166.38	5011.79	veg
26	171.17	5012.15	veg
27	187.27	5012.35	veg
28	191.49	5011.63	veg
29	203.25	5012.48	veg
30	217.30	5012.35	veg
31	251.04	5013.20	veg
32	264.77	5012.45	veg
33	274.82	5012.55	veg
34	278.06	5013.01	veg
35	290.77	5012.91	veg
36	305.45	5013.50	veg
37	313.48	5013.27	veg
38	316.69	5013.50	veg
39	347.82	5013.47	veg
40	373.19	5013.30	veg
41	382.49	5012.78	veg
42	387.22	5013.04	veg
43	396.49	5012.84	veg
44	400.03	5013.01	veg
45	403.81	5012.94	veg
46	408.65	5013.01	veg
47	416.40	5013.01	veg
48	425.04	5012.65	veg
49	429.23	5010.51	veg
50	431.29	5010.48	veg pondedwter
51	435.18	5010.71	ws veg
52	442.70	5011.14	veg
53	444.96	5011.63	veg
54	461.03	5011.83	veg
55	469.88	5012.22	veg
56	513.15	5012.06	veg
57	516.39	5011.27	ws ponded
58	520.88	5010.78	ponded wat
59	527.26	5011.01	ponded wat
60	531.75	5011.20	wsponded wat
61	534.57	5011.43	veg
62	542.98	5011.33	veg
63	552.43	5010.91	lew
64	554.00	5010.48	ic
65	558.85	5010.02	ic
66	565.00	5010.15	ic
67	576.21	5010.09	ic
68	588.21	5010.19	ic
69	595.25	5010.58	ic
70	599.33	5010.91	rew

11	23.45	5018.52	veg
12	56.06	5018.06	veg
13	88.25	5017.80	veg
14	152.69	5017.40	veg
15	193.86	5016.62	veg
16	203.12	5012.22	veg
17	210.60	5011.07	veg
18	216.22	5009.27	veg
19	225.49	5009.04	veg
20	230.53	5009.66	veg
21	242.77	5009.92	veg
22	246.25	5009.76	veg
23	251.46	5010.48	veg
24	259.07	5011.01	veg
25	269.82	5010.25	veg
26	274.25	5009.69	veg
27	278.99	5009.66	veg
28	282.01	5010.19	veg
29	286.40	5009.63	veg
30	290.52	5010.09	veg
31	311.23	5010.15	veg
32	323.03	5010.32	veg
33	331.16	5010.48	veg
34	342.18	5010.61	veg
35	356.03	5010.32	veg
36	360.66	5010.58	veg
37	366.27	5010.12	veg
38	371.08	5010.74	veg
39	376.32	5009.37	veg
40	392.62	5009.50	veg
41	398.23	5009.82	veg
42	407.08	5009.46	veg
43	428.57	5010.09	veg
44	437.82	5009.99	veg
45	442.09	5008.48	veg
46	446.08	5009.30	veg
47	458.32	5009.37	veg
48	462.83	5009.76	veg
49	478.02	5009.89	veg
50	489.28	5009.86	veg
51	495.42	5009.79	veg
52	501.58	5009.43	top bnk
53	502.82	5008.84	lew
54	503.40	5007.92	ic
55	507.87	5007.76	ic
56	511.19	5007.82	ic
57	515.12	5007.82	ic
58	519.73	5008.02	ic
59	524.25	5008.05	ic
60	529.27	5007.95	ic
61	532.30	5007.79	ic
62	533.88	5007.86	ic
63	534.12	5008.84	rew
64	534.86	5009.30	top bnk
65	536.78	5009.89	veg
66	545.10	5009.73	veg
67	554.32	5009.56	veg
68	563.36	5009.37	veg
69	564.67	5009.53	veg
70	567.08	5009.40	veg
71	569.54	5008.61	veg
72	572.25	5008.61	veg
73	575.20	5011.17	veg
74	585.55	5019.57	veg

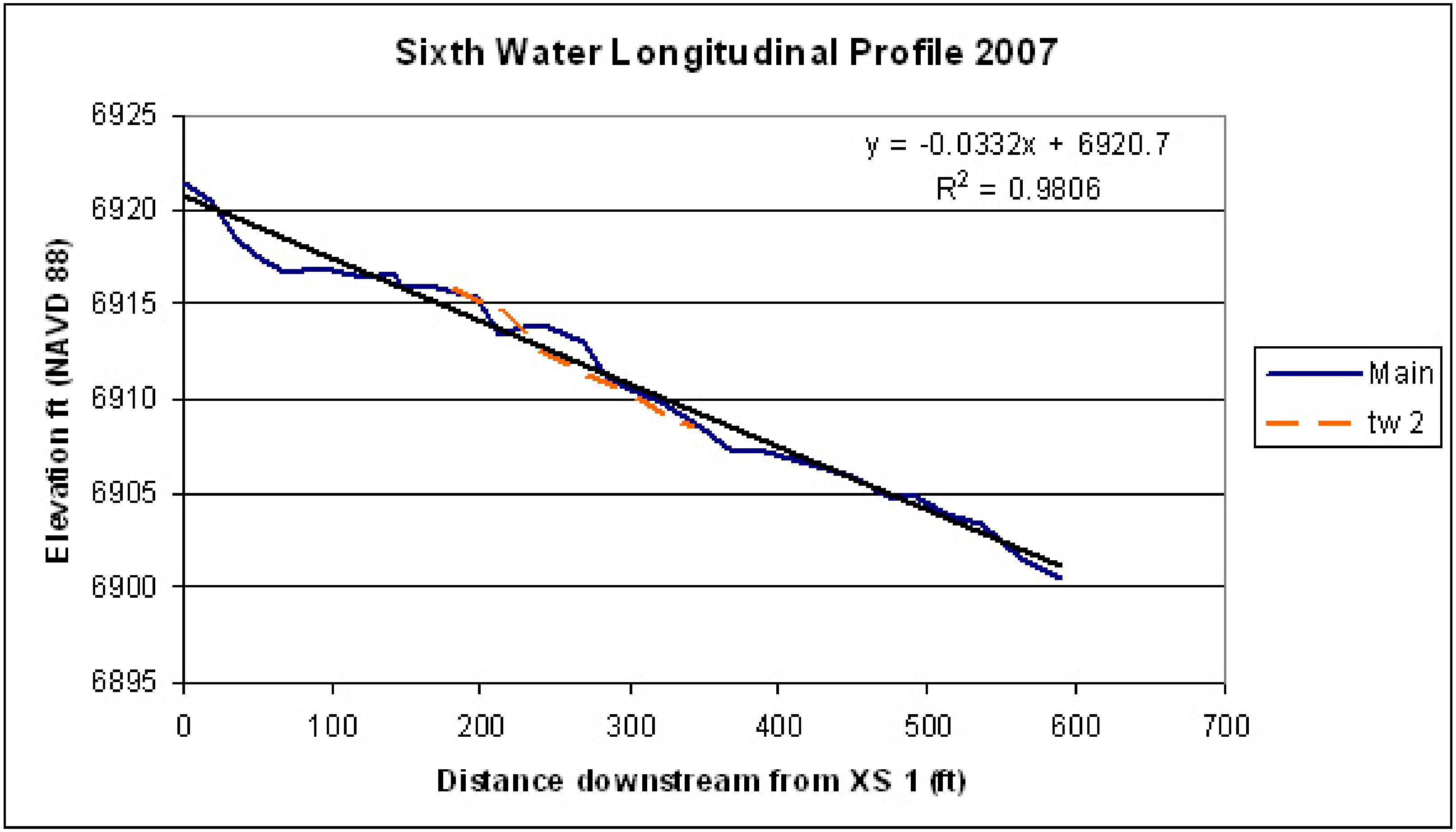
OXBOW SITE CROSS SECTION 7 DATA

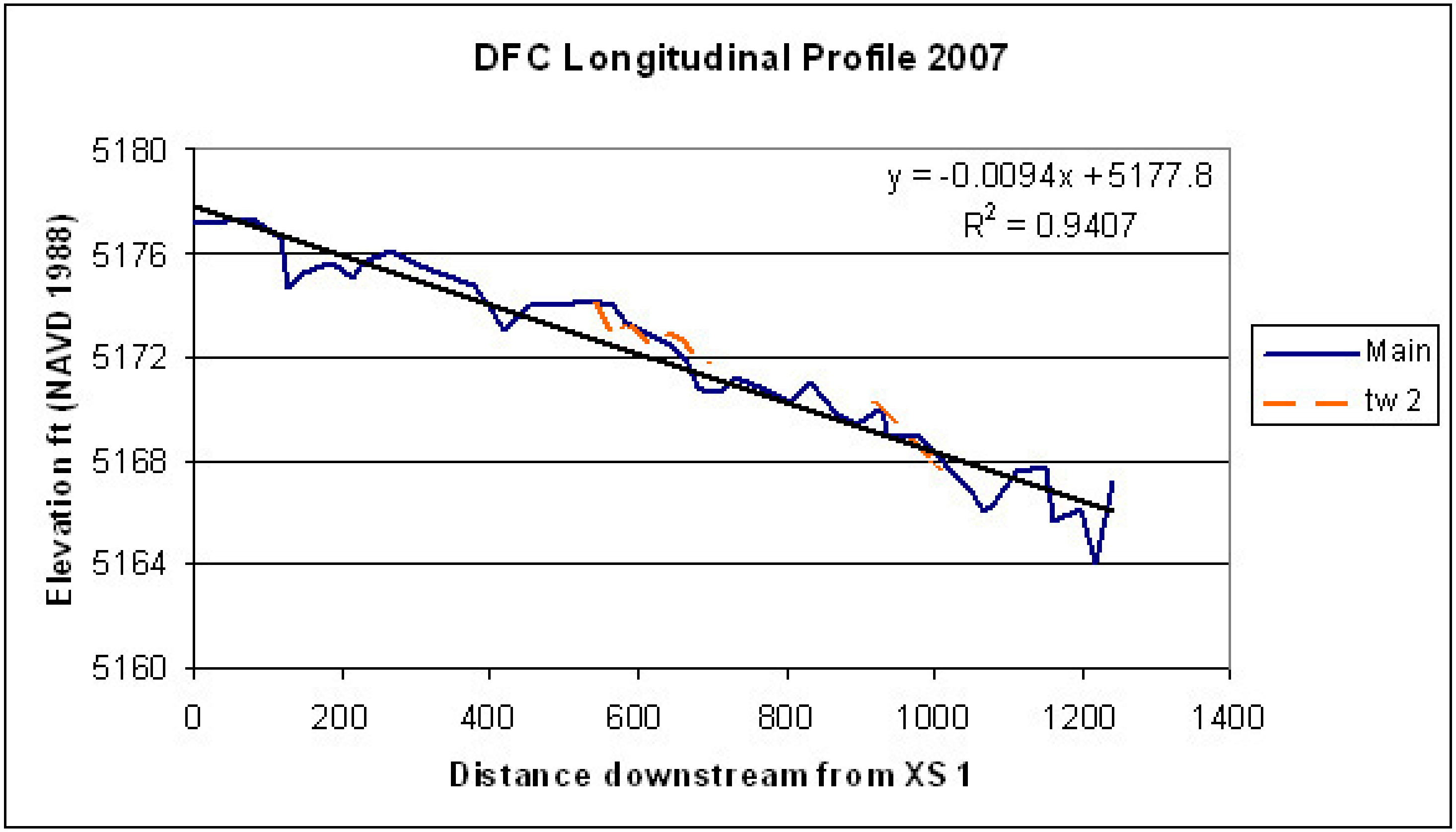
POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
4	0.00	5017.17	oxlep7
6	8.00	5018.26	veg
7	11.96	5017.34	veg
8	16.51	5018.22	veg
9	34.05	5015.57	veg
10	46.55	5015.04	veg
11	57.96	5015.21	veg
12	67.50	5015.07	veg
13	118.19	5014.81	veg
14	146.99	5014.32	veg
15	177.30	5013.93	veg
16	188.82	5014.16	veg
17	200.13	5013.96	veg
18	205.78	5013.50	veg
19	215.38	5014.09	veg
20	233.32	5014.12	veg
21	235.98	5014.32	veg
22	240.41	5013.79	veg
23	254.53	5012.97	veg
24	268.47	5012.58	veg
25	272.89	5012.94	veg
26	283.47	5012.68	veg
27	289.68	5011.40	veg
28	299.04	5010.51	veg
29	313.14	5010.32	veg
30	324.81	5010.58	top bnk
31	326.03	5007.99	bkwtr ws
32	329.47	5007.00	bkwtr
33	333.82	5007.53	bkwtr
34	336.00	5007.89	bkwtr ws
35	336.43	5008.12	veg
36	341.80	5008.71	veg
37	367.44	5009.17	veg
38	380.54	5009.33	veg
39	393.05	5009.37	veg
40	401.96	5008.97	top bnk
41	402.43	5008.41	lew
42	402.87	5007.63	ic
43	406.93	5007.30	ic
44	411.82	5007.63	ic
45	418.08	5007.36	ic
46	424.08	5007.33	ic
47	431.41	5007.63	ic
48	438.31	5007.99	ic
49	441.72	5008.38	ic
50	444.15	5008.41	rew
51	446.16	5008.58	deposit
52	447.79	5008.64	veg
53	454.27	5009.07	veg
54	466.13	5008.94	veg
55	472.24	5008.74	veg
56	478.83	5009.14	veg
57	484.88	5008.81	veg
58	496.88	5008.91	veg
59	502.40	5009.33	veg
60	506.83	5009.92	veg
61	514.50	5016.22	veg
62	527.33	5031.58	veg
2	537.19	5031.94	OXREP67

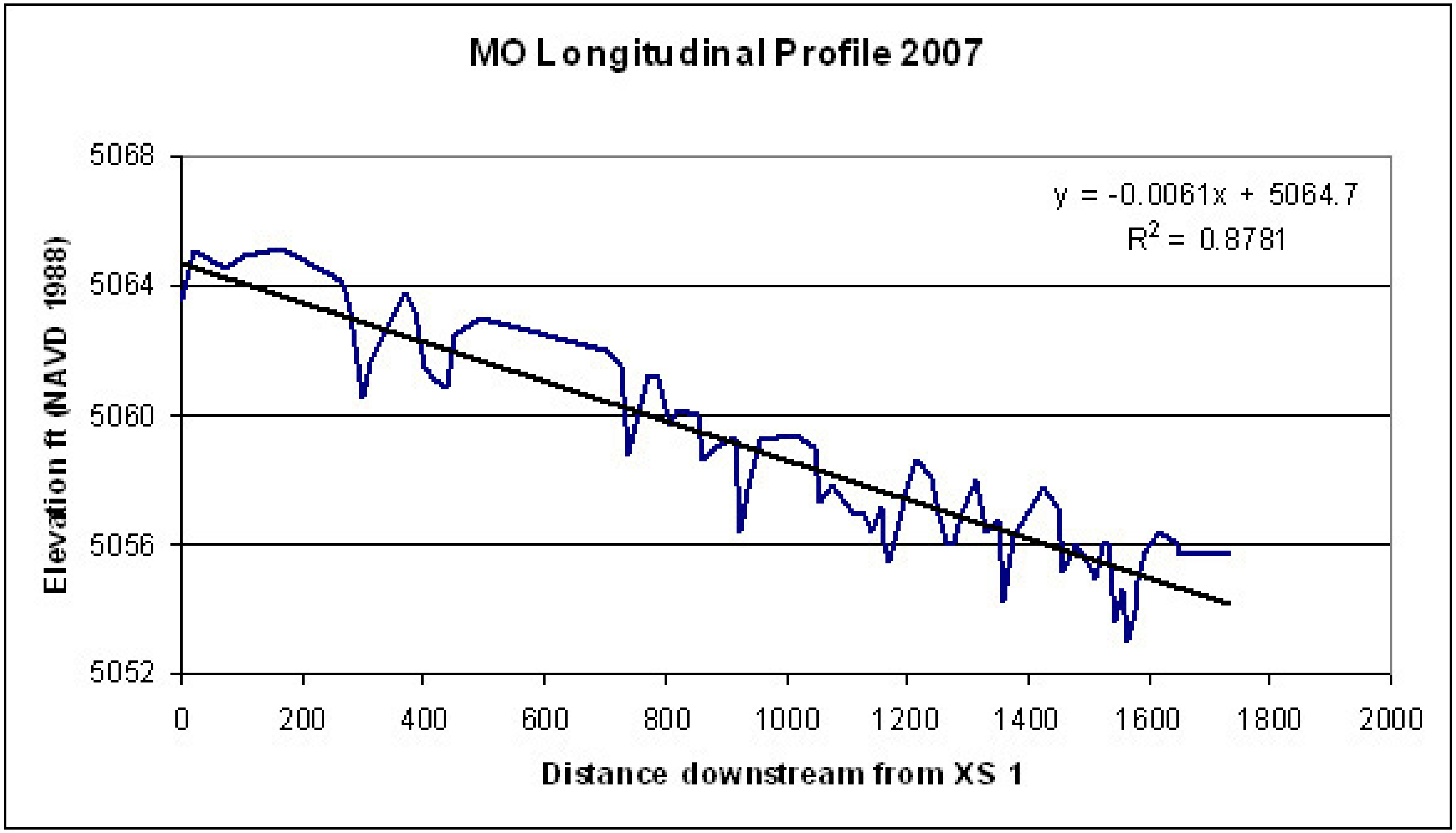
OXBOW SITE CROSS SECTION 8 DATA

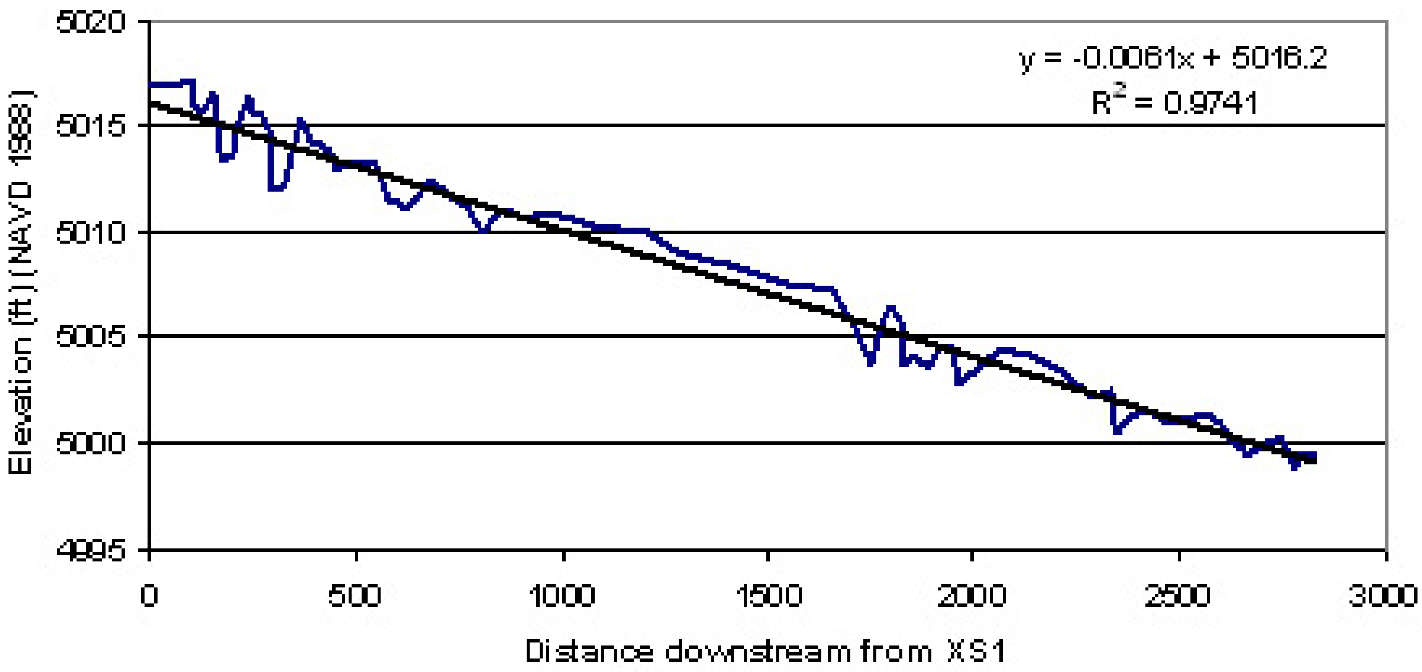
POINT	DISTANCE FROM LEP (FT)	ELEVATION (NAVD 1988 FT)	DESCRIPTION
3	0.00	5017.21	lep8
5	0.72	5017.31	veg
6	46.78	5016.65	veg
7	49.62	5016.03	veg
8	54.43	5014.39	veg
9	67.95	5003.07	veg
10	70.20	5002.41	ws pond
11	76.18	5001.79	wspond
12	81.72	5003.20	bdam
13	83.00	5002.38	veg
14	98.29	5003.13	veg
15	106.42	5005.17	veg
16	112.93	5003.46	veg
17	118.81	5002.11	ws pond
18	122.60	5001.62	pond wtr
19	128.08	5001.39	pond wtr
20	133.79	5002.05	ws pond
21	138.62	5002.25	veg
22	142.03	5002.15	veg
23	158.59	5002.28	veg
24	171.68	5002.44	veg
25	174.09	5001.98	veg
26	177.79	5001.43	veg
27	178.56	5001.00	lew
28	178.97	5000.74	ic
29	180.98	5000.57	ic
30	193.99	5000.31	ic spawnred
31	202.87	5000.28	ic
32	205.63	5000.15	ic
33	209.72	4999.39	ic
34	214.48	4999.42	ic
35	217.44	4999.75	ic
36	217.92	5001.00	rew
37	218.72	5001.69	tbank
38	222.14	5001.98	veg
39	228.67	5001.88	veg
40	229.74	5002.28	veg
41	236.57	5002.11	veg
42	240.16	5001.72	veg
43	245.51	5001.00	veg sat
44	247.44	5001.03	veg sat
45	249.01	5001.52	veg
46	253.57	5001.43	veg
47	261.37	5003.49	veg
48	268.59	5007.13	veg
49	277.23	5007.33	veg
2	281.94	5007.36	OXREP8

APPENDIX 2.3A: LONGITUDINAL PROFILES


Sixth Water Longitudinal Profile 2007


DFC Longitudinal Profile 2007
y = -0.0094x + 5177.8
$R^2 = 0.9407$
Elevation ft (NAVD 1988)
5180
5176
5172
5168
5164
5160
0
200
400
600
800
1000
1200
1400
Distance downstream from XS 1
Main
tw 2


MO Longitudinal Profile 2007


OX Longitudinal Profile 2007

APPENDIX 2.3B: LONGITUDINAL PROFILE DATA

Sixth Water Site Longitudinal Profile Data 2007

thalweg 1

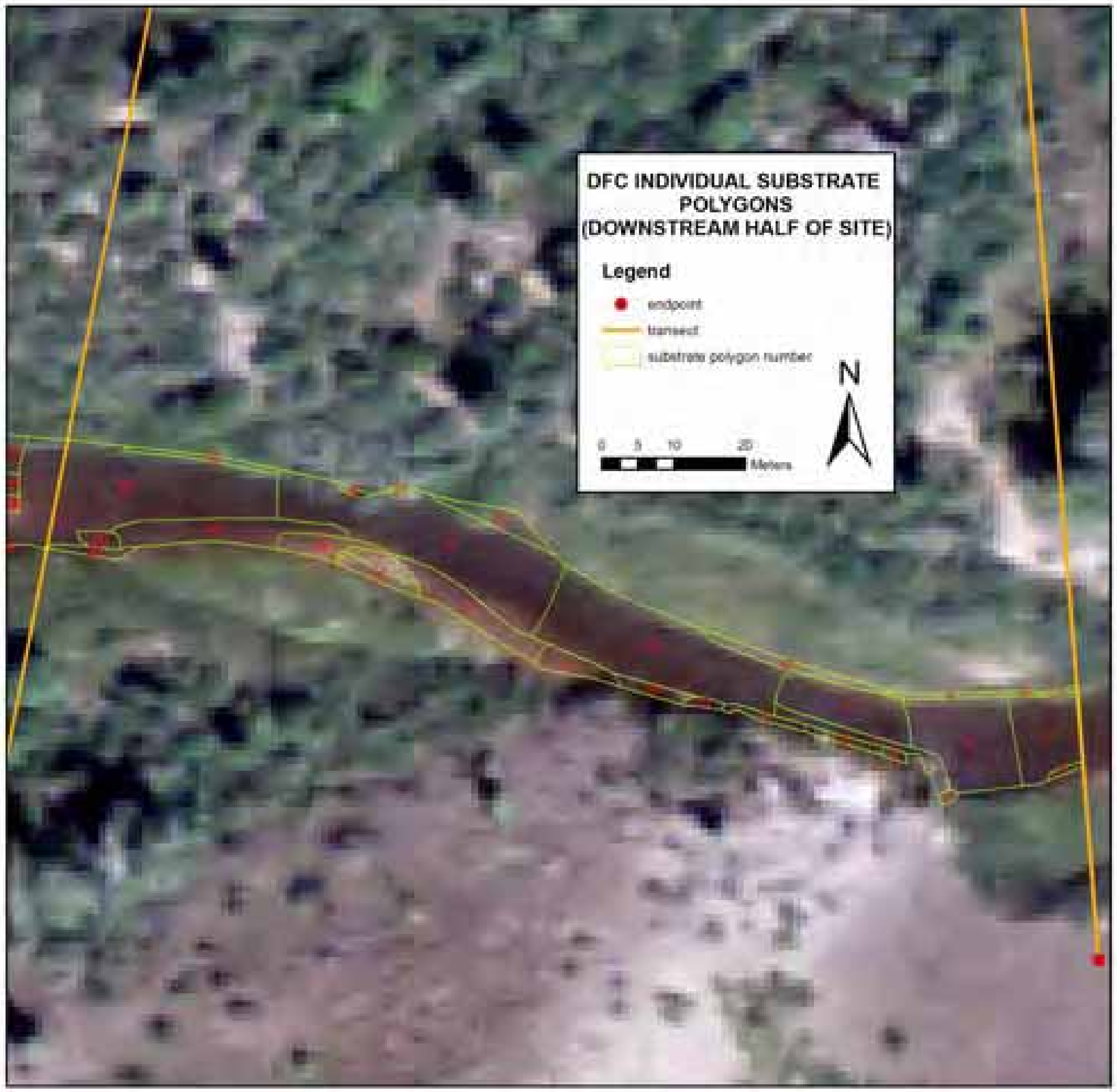
number	northing	easting	elevation (m)	distance (m)	distance feet	cumu dist feet	distance from xs 1=0	elevation feet	Adj elev to 2006	Description
161	4445787.43	476072.76	2110.22	0.00	0.00	0.00	0.00	6923.63	6921.52	tw
162	4445785.85	476066.98	2109.90	5.99	19.65	19.65	19.65	6922.58	6920.47	tw
163	4445783.45	476062.94	2109.33	4.70	15.42	35.07	35.07	6920.71	6918.60	tw
165	4445782.11	476058.97	2109.03	4.19	13.74	48.81	48.81	6919.73	6917.61	tw
166	4445780.45	476053.36	2108.75	5.85	19.18	67.99	67.99	6918.81	6916.69	tw
167	4445778.84	476046.07	2108.81	7.47	24.51	92.51	92.51	6919.01	6916.89	tw
169	4445775.13	476036.78	2108.68	10.01	32.83	125.33	125.33	6918.58	6916.46	tw
170	4445771.60	476033.01	2108.73	5.17	16.95	142.28	142.28	6918.74	6916.63	tw
171	4445770.16	476032.33	2108.51	1.59	5.21	147.49	147.49	6918.02	6915.91	tw
220	4445767.00	476028.10	2108.56	5.28	17.33	164.82	164.82	6918.19	6916.07	tw split
221	4445765.15	476024.49	2108.48	4.06	13.33	178.15	178.15	6917.92	6915.81	tw1
222	4445761.52	476020.24	2108.35	5.58	18.30	196.45	196.45	6917.50	6915.38	tw1
224	4445761.85	476015.25	2107.76	5.00	16.41	212.86	212.86	6915.56	6913.44	tw1
226	4445756.37	476012.34	2107.91	6.20	20.36	233.22	233.22	6916.05	6913.94	tw1
228	4445752.45	476012.27	2107.88	3.92	12.88	246.10	246.10	6915.95	6913.84	tw1
230	4445746.55	476008.46	2107.62	7.02	23.02	269.12	269.12	6915.10	6912.98	tw1
234	4445741.95	476006.68	2107.02	4.93	16.19	285.30	285.30	6913.13	6911.02	tw1
235	4445738.35	476005.80	2106.91	3.71	12.17	297.47	297.47	6912.77	6910.66	tw1
236	4445731.15	476005.09	2106.66	7.24	23.74	321.21	321.21	6911.95	6909.84	tw1
237	4445723.16	476004.43	2106.24	8.02	26.30	347.51	347.51	6910.57	6908.46	tw1
238	4445716.83	476002.17	2105.86	6.72	22.04	369.55	369.55	6909.33	6907.21	tw join
245	4445712.73	475999.60	2105.90	4.84	15.87	385.42	385.42	6909.46	6907.34	tw
246	4445694.12	475993.47	2105.46	19.60	64.30	449.73	449.73	6908.01	6905.90	tw
247	4445687.19	475988.55	2105.10	8.49	27.87	477.60	477.60	6906.83	6904.72	tw
248	4445684.18	475986.38	2105.18	3.71	12.17	489.77	489.77	6907.10	6904.98	tw
249	4445679.72	475980.70	2104.86	7.23	23.71	513.48	513.48	6906.05	6903.93	tw
250	4445675.20	475975.69	2104.70	6.74	22.13	535.61	535.61	6905.52	6903.40	tw
251	4445671.45	475968.38	2104.12	8.21	26.95	562.56	562.56	6903.62	6901.50	tw
252	4445666.27	475962.01	2103.84	8.21	26.93	589.48	589.48	6902.70	6900.58	tw
223	4445762.15	476026.91	2108.51	4.99	16.37	181.19	181.19	6918.02	6915.91	tw2
225	4445752.55	476026.50	2108.14	9.62	31.55	212.74	212.74	6916.81	6914.69	tw2
227	4445745.03	476025.54	2107.56	7.58	24.87	237.61	237.61	6914.90	6912.79	tw2
229	4445738.09	476021.02	2107.14	8.28	27.16	264.77	264.77	6913.53	6911.41	tw2
231	4445729.64	476015.28	2106.82	10.22	33.53	298.30	298.30	6912.48	6910.36	tw2
232	4445722.99	476010.19	2106.43	8.38	27.49	325.78	325.78	6911.20	6909.08	tw2
233	4445719.90	476006.54	2106.26	4.77	15.67	341.45	341.45	6910.64	6908.52	tw2

4435408.54	462824.32	1577.38	3.62	11.88	197.82	197.82	5175.38	tw
4435409.97	462820.26	1577.29	4.31	14.13	211.95	211.95	5175.09	tw
4435411.44	462816.59	1577.43	3.95	12.95	224.91	224.91	5175.56	thal
4435415.67	462805.81	1577.58	11.58	38.00	262.91	262.91	5176.03	thal
4435422.40	462796.09	1577.42	11.83	38.81	301.72	301.72	5175.51	thal
4435428.86	462785.38	1577.32	12.51	41.04	342.76	342.76	5175.18	thal
4435433.32	462776.06	1577.19	10.33	33.89	376.64	376.64	5174.77	thal
4435436.18	462768.84	1576.90	7.76	25.46	402.11	402.11	5173.80	thal
4435437.10	462764.10	1576.66	4.84	15.87	417.97	417.97	5173.02	thal
4435438.45	462754.21	1576.97	9.98	32.75	450.72	450.72	5174.03	thal
4435437.34	462740.52	1576.94	13.73	45.06	495.78	495.78	5173.94	thal
4435439.88	462729.23	1577.01	11.57	37.97	533.75	533.75	5174.18	thal
4435442.71	462719.69	1576.93	9.95	32.64	566.39	566.39	5173.90	thal1
4435445.16	462715.10	1576.74	5.20	17.06	583.45	583.45	5173.27	thal1
4435446.10	462706.67	1576.64	8.48	27.83	611.28	611.28	5172.94	thal1
4435446.72	462696.91	1576.48	9.78	32.10	643.38	643.38	5172.43	thal1
4435446.33	462689.84	1576.30	7.08	23.24	666.62	666.62	5171.85	thal1
4435445.67	462686.06	1576.00	3.83	12.57	679.19	679.19	5170.85	thal1
4435446.13	462679.77	1575.93	6.31	20.71	699.90	699.90	5170.63	thal
4435445.59	462675.53	1575.95	4.27	14.01	713.92	713.92	5170.70	thal
4435445.05	462670.37	1576.09	5.19	17.03	730.94	730.94	5171.15	thal
4435444.67	462659.29	1575.98	11.08	36.36	767.31	767.31	5170.78	thal
4435441.04	462648.43	1575.83	11.45	37.57	804.88	804.88	5170.29	thal
4435436.99	462642.29	1576.05	7.36	24.15	829.03	829.03	5171.02	thal
4435428.43	462634.33	1575.70	11.68	38.34	867.37	867.37	5169.86	thal
4435420.80	462630.62	1575.55	8.48	27.83	895.20	895.20	5169.37	thal
4435414.63	462622.50	1575.78	10.20	33.48	928.67	928.67	5170.13	thal
4435414.07	462620.59	1575.44	1.98	6.51	935.18	935.18	5169.03	thal
4435401.68	462617.37	1575.40	12.81	42.02	977.20	977.20	5168.89	thal
4435380.12	462618.38	1574.75	21.58	70.82	1048.02	1048.02	5166.76	thal
4435375.70	462620.65	1574.53	4.97	16.31	1064.33	1064.33	5166.02	thal
4435370.66	462620.75	1574.61	5.04	16.54	1080.87	1080.87	5166.31	thal
4435362.34	462616.45	1575.01	9.36	30.72	1111.59	1111.59	5167.60	thal
4435350.56	462611.59	1575.06	12.75	41.82	1153.41	1153.41	5167.79	thal
4435348.19	462611.13	1574.42	2.41	7.91	1161.32	1161.32	5165.69	thal
4435341.99	462602.33	1574.55	10.77	35.33	1196.65	1196.65	5166.10	thal
4435342.11	462595.78	1573.93	6.54	21.47	1218.12	1218.12	5164.06	thal
4435339.85	462588.38	1574.88	7.74	25.40	1243.52	1243.52	5167.18	thal
4435394.98	462616.08	1575.13	29.64	97.25	992.44	992.44	5167.99	thal1.5
4435386.76	462617.44	1574.94	8.33	27.32	1019.76	1019.76	5167.38	thal1.5
4435433.95	462726.57	1577.00	14.36	47.12	542.89	542.89	5174.14	thal 2
4435432.14	462719.45	1576.54	7.34	24.08	566.98	566.98	5172.62	thal 2
4435431.23	462713.86	1576.73	5.66	18.57	585.55	585.55	5173.24	thal 2
4435430.47	462704.45	1576.50	9.44	30.98	616.53	616.53	5172.49	thal 2
4435430.65	462697.83	1576.62	6.63	21.74	638.27	638.27	5172.90	thal 2
4435434.15	462692.45	1576.55	6.42	21.06	659.33	659.33	5172.68	thal 2
4435439.32	462687.77	1576.29	6.97	22.88	682.21	682.21	5171.81	thal 2
4435443.20	462682.67	1576.26	6.40	21.01	703.22	703.22	5171.72	thal 2
4435414.29	462630.57	1575.83	6.51	21.37	916.56	916.56	5170.29	thal 3
4435400.55	462630.17	1575.45	13.74	45.08	961.64	961.64	5169.05	thal 3
4435393.95	462625.14	1575.18	8.30	27.22	988.86	988.86	5168.15	thal 3
4435383.38	462620.26	1575.34	11.65	38.21	1027.08	1027.08	5168.70	thal 3

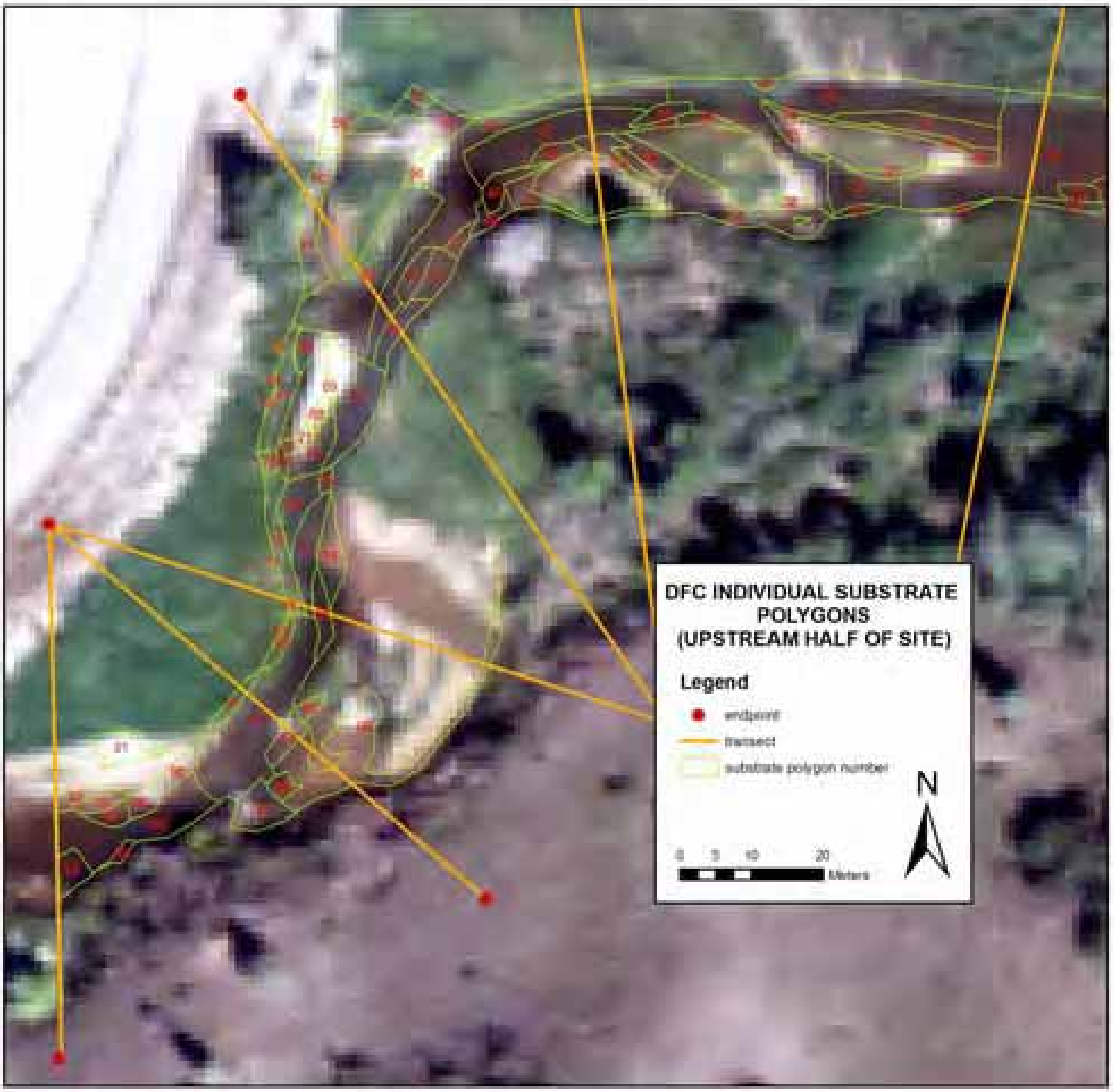
0	4432920.55	460061.40	1543.19	3.38	11.10	278.64	1543.19	5063.21	tw
0	4432914.58	460059.30	1542.38	6.33	20.77	299.41	1542.38	5060.55	tw
0	4432910.73	460060.72	1542.70	4.11	13.47	312.87	1542.70	5061.60	tw
0	4432906.03	460062.03	1542.90	4.87	15.99	328.86	1542.90	5062.25	tw
0	4432894.11	460064.07	1543.37	12.10	39.69	368.55	1543.37	5063.80	tw
0	4432888.81	460063.37	1543.18	5.35	17.56	386.10	1543.18	5063.17	tw
0	4432885.11	460059.80	1542.65	5.14	16.86	402.96	1542.65	5061.43	tw
0	4432882.84	460055.40	1542.53	4.95	16.25	419.21	1542.53	5061.04	tw
0	4432879.46	460050.39	1542.48	6.05	19.84	439.05	1542.48	5060.88	tw
0	4432877.43	460047.10	1542.97	3.86	12.68	451.73	1542.97	5062.48	tw
0	4432869.33	460037.13	1543.13	12.85	42.15	493.88	1543.13	5063.01	tw
0	4432908.59	459986.76	1542.84	63.86	209.51	703.39	1542.84	5062.06	tw
0	4432915.62	459985.15	1542.68	7.22	23.67	727.06	1542.68	5061.53	tw
0	4432919.23	459983.88	1541.84	3.83	12.56	739.62	1541.84	5058.78	tw
0	4432926.29	459976.77	1542.59	10.02	32.88	772.49	1542.59	5061.24	tw
0	4432929.26	459971.83	1542.56	5.76	18.91	791.41	1542.56	5061.14	tw
0	4432930.30	459969.18	1542.30	2.85	9.34	800.74	1542.30	5060.29	tw
0	4432931.51	459967.10	1542.11	2.40	7.88	808.63	1542.11	5059.66	tw
0	4432933.76	459963.64	1542.27	4.13	13.55	822.18	1542.27	5060.19	tw
0	4432939.37	459955.65	1542.22	9.77	32.05	854.23	1542.22	5060.02	tw
0	4432938.94	459952.59	1541.80	3.09	10.14	864.37	1541.80	5058.65	tw
0	4432933.33	459949.41	1541.91	6.45	21.15	885.51	1541.91	5059.01	tw
0	4432925.76	459944.42	1541.99	9.06	29.73	915.25	1541.99	5059.27	tw
0	4432923.79	459942.81	1541.11	2.54	8.34	923.59	1541.11	5056.38	tw
0	4432922.13	459939.32	1541.50	3.87	12.69	936.28	1541.50	5057.66	tw
0	4432925.50	459932.82	1541.98	7.33	24.05	960.33	1541.98	5059.24	tw
0	4432932.64	459918.84	1542.03	15.69	51.48	1011.81	1542.03	5059.40	tw
0	4432936.52	459909.99	1541.91	9.67	31.72	1043.53	1541.91	5059.01	tw
0	4432937.70	459906.29	1541.39	3.88	12.73	1056.26	1541.39	5057.30	tw
0	4432936.98	459900.30	1541.56	6.03	19.80	1076.06	1541.56	5057.86	tw
0	4432934.12	459890.38	1541.31	10.32	33.87	1109.93	1541.31	5057.04	tw
0	4432931.01	459885.95	1541.29	5.41	17.76	1127.69	1541.29	5056.97	tw
0	4432927.65	459882.76	1541.10	4.64	15.22	1142.91	1541.10	5056.35	tw
0	4432922.98	459881.82	1541.34	4.77	15.64	1158.54	1541.34	5057.14	tw
0	4432921.86	459881.69	1541.02	1.12	3.68	1162.22	1541.02	5056.09	tw
0	4432919.90	459882.62	1540.83	2.17	7.13	1169.36	1540.83	5055.46	tw
0	4432913.57	459888.41	1541.51	8.58	28.15	1197.50	1541.51	5057.69	tw
0	4432911.00	459892.45	1541.80	4.79	15.70	1213.20	1541.80	5058.65	tw
0	4432905.19	459898.75	1541.61	8.57	28.11	1241.31	1541.61	5058.02	tw
0	4432902.26	459900.72	1541.29	3.54	11.60	1252.91	1541.29	5056.97	tw
0	4432898.98	459902.48	1541.00	3.72	12.21	1265.12	1541.00	5056.02	tw
0	4432895.94	459901.51	1540.98	3.19	10.47	1275.59	1540.98	5055.96	tw
0	4432892.67	459899.18	1541.29	4.01	13.17	1288.76	1541.29	5056.97	tw
0	4432885.14	459897.87	1541.60	7.65	25.09	1313.85	1541.60	5057.99	tw
0	4432881.45	459896.33	1541.09	4.00	13.12	1326.96	1541.09	5056.32	tw
0	4432876.31	459891.48	1541.23	7.06	23.17	1350.14	1541.23	5056.78	tw
0	4432873.83	459889.27	1540.44	3.32	10.90	1361.04	1540.44	5054.18	tw
0	4432871.37	459885.50	1541.06	4.51	14.79	1375.83	1541.06	5056.22	tw
0	4432864.82	459872.01	1541.52	15.00	49.20	1425.03	1541.52	5057.73	tw
0	4432864.34	459864.52	1541.34	7.50	24.60	1449.64	1541.34	5057.14	tw
0	4432864.69	459862.05	1540.75	2.50	8.19	1457.83	1540.75	5055.20	tw
0	4432862.01	459856.65	1540.99	6.03	19.78	1477.61	1540.99	5055.99	tw
0	4432858.15	459851.81	1540.82	6.20	20.34	1497.94	1540.82	5055.43	tw
0	4432855.48	459849.61	1540.67	3.45	11.33	1509.28	1540.67	5054.94	tw
0	4432851.97	459846.98	1540.99	4.39	14.39	1523.67	1540.99	5055.99	tw
0	4432849.86	459845.41	1541.02	2.63	8.64	1532.31	1541.02	5056.09	tw
0	4432846.92	459843.68	1540.26	3.41	11.20	1543.50	1540.26	5053.59	tw

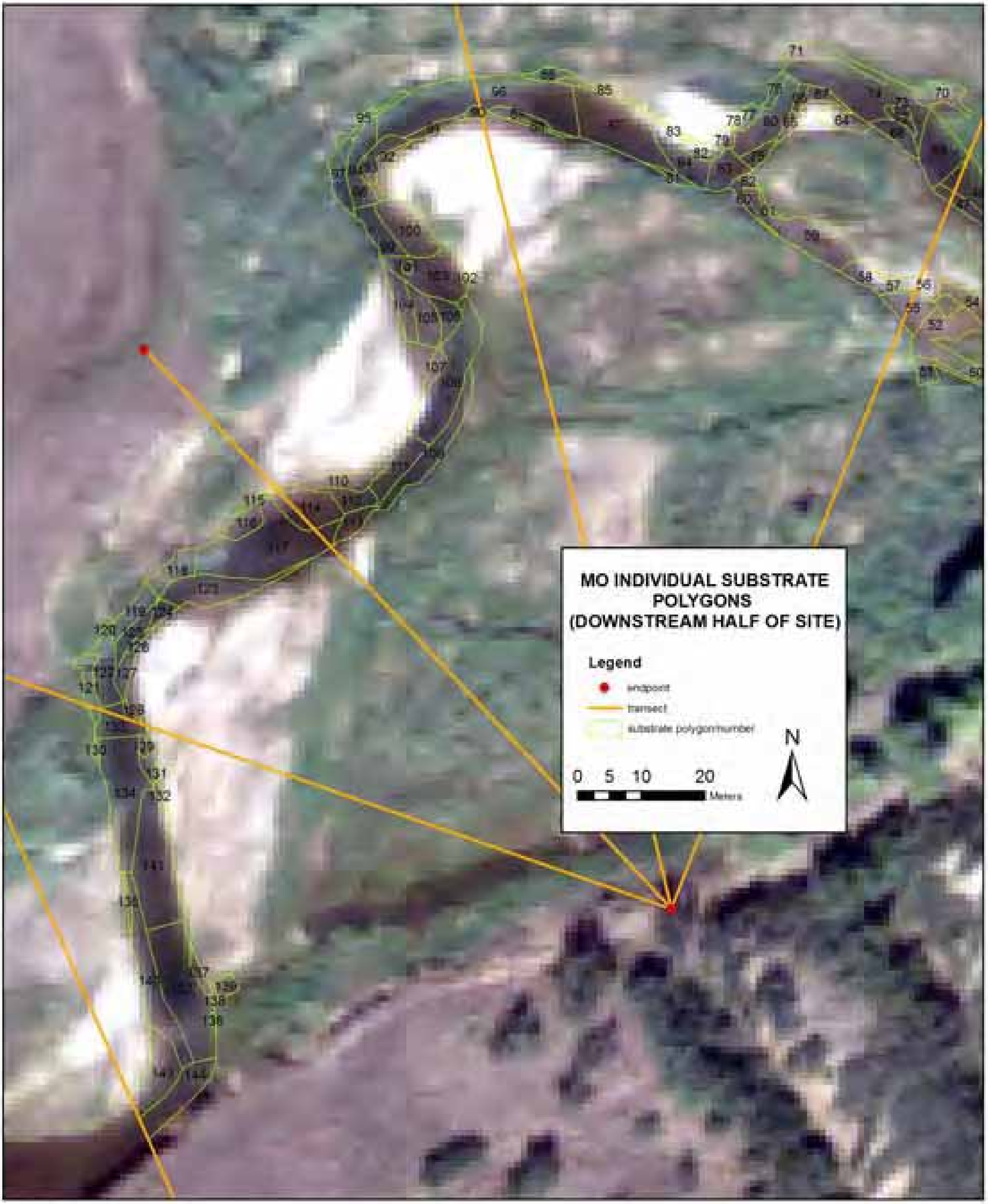
68.26	458751.76	1528.66	7.54	24.75	273.57	273.57	5015.53	tw
64.86	458753.58	1528.49	3.86	12.65	286.22	286.22	5014.98	tw
62.30	458756.19	1527.56	3.66	12.02	298.24	298.24	5011.92	tw
58.70	458762.92	1527.60	7.63	25.03	323.27	323.27	5012.06	tw
57.75	458764.34	1527.68	1.71	5.61	328.88	328.88	5012.32	tw
58.14	458768.70	1528.10	4.37	14.34	343.22	343.22	5013.70	tw
54.85	458773.68	1528.61	5.97	19.58	362.80	362.80	5015.37	tw
47.39	458780.71	1528.31	10.25	33.63	396.43	396.43	5014.39	tw
42.19	458783.53	1528.24	5.92	19.43	415.86	415.86	5014.16	tw
33.63	458784.95	1528.17	8.68	28.47	444.33	444.33	5013.93	tw
31.21	458782.81	1527.85	3.23	10.60	454.94	454.94	5012.88	tw
28.32	458781.93	1527.92	3.02	9.91	464.84	464.84	5013.11	tw
17.59	458777.12	1527.97	11.75	38.57	503.41	503.41	5013.27	thal
06.63	458768.51	1527.94	13.93	45.71	549.12	549.12	5013.17	thal
01.35	458761.35	1527.42	8.90	29.21	578.34	578.34	5011.47	thal
00.02	458754.80	1527.40	6.68	21.91	600.25	600.25	5011.40	thal
04.78	458751.87	1527.30	5.60	18.38	618.63	618.63	5011.07	thal
09.38	458749.11	1527.39	5.36	17.59	636.22	636.22	5011.37	thal
16.03	458737.26	1527.69	13.58	44.56	680.78	680.78	5012.35	thal
24.59	458725.26	1527.50	14.74	48.36	729.14	729.14	5011.73	thal
30.54	458713.24	1527.34	13.42	44.02	773.16	773.16	5011.20	thal
32.74	458702.31	1526.96	11.15	36.57	809.73	809.73	5009.96	thal
31.89	458690.62	1527.26	11.73	38.47	848.21	848.21	5010.94	thal
30.43	458682.07	1527.26	8.67	28.44	876.64	876.64	5010.94	thal
28.60	458670.96	1527.14	11.27	36.97	913.61	913.61	5010.55	thal
31.81	458654.58	1527.25	16.69	54.76	968.37	968.37	5010.91	thal
31.85	458635.85	1527.17	18.73	61.46	1029.82	1029.82	5010.64	thal
32.35	458620.59	1527.07	15.27	50.09	1079.92	1079.92	5010.32	thal
23.60	458582.56	1526.96	39.02	128.04	1207.96	1207.96	5009.96	thal
18.47	458562.13	1526.70	21.06	69.09	1277.05	1277.05	5009.10	thal
14.05	458544.42	1526.59	18.25	59.88	1336.93	1336.93	5008.74	thal
06.05	458523.97	1526.50	21.96	72.06	1408.99	1408.99	5008.45	thal
03.00	458495.76	1526.31	28.38	93.11	1502.10	1502.10	5007.82	thal
05.67	458474.39	1526.20	21.53	70.64	1572.74	1572.74	5007.46	thal
06.90	458463.81	1526.17	10.65	34.94	1607.68	1607.68	5007.36	thal
09.13	458456.84	1526.14	7.33	24.03	1631.72	1631.72	5007.27	thal
11.97	458450.12	1526.19	7.29	23.91	1655.63	1655.63	5007.43	thal lft
16.46	458443.97	1525.89	7.62	24.99	1680.61	1680.61	5006.45	thal lft
24.59	458442.47	1525.61	8.27	27.13	1707.74	1707.74	5005.53	thal lft
28.18	458444.90	1525.45	4.34	14.24	1721.99	1721.99	5005.00	thal lft
35.16	458449.66	1525.05	8.45	27.71	1749.70	1749.70	5003.69	thal
43.19	458451.37	1525.61	8.21	26.95	1776.65	1776.65	5005.53	thal
47.80	458454.39	1525.88	5.51	18.07	1794.71	1794.71	5006.41	thal
53.75	458460.06	1525.69	8.22	26.97	1821.68	1821.68	5005.79	thal
53.33	458462.86	1525.02	2.83	9.27	1830.96	1830.96	5003.59	thal
59.34	458464.96	1525.22	6.37	20.90	1851.86	1851.86	5004.25	thal
66.39	458455.98	1525.01	11.42	37.47	1889.33	1889.33	5003.56	thal
71.84	458450.33	1525.34	7.85	25.76	1915.09	1915.09	5004.64	thal
79.43	458444.36	1525.29	9.65	31.67	1946.76	1946.76	5004.48	thal
82.15	458439.76	1524.74	5.35	17.55	1964.30	1964.30	5002.67	thal
86.09	458423.94	1525.08	16.30	53.47	2017.77	2017.77	5003.79	thal
86.25	458408.96	1525.28	14.98	49.15	2066.92	2066.92	5004.44	thal
79.45	458388.92	1525.17	21.16	69.43	2136.35	2136.35	5004.08	thal
68.29	458368.33	1524.98	23.42	76.85	2213.20	2213.20	5003.46	thal
51.85	458352.83	1524.57	22.59	74.13	2287.33	2287.33	5002.11	tw
48.60	458347.17	1524.63	6.53	21.41	2308.74	2308.74	5002.31	tw
46.44	458341.67	1524.70	5.92	19.41	2328.15	2328.15	5002.54	tw
46.34	458340.52	1524.67	1.15	3.78	2331.93	2331.93	5002.44	tw
45.17	458338.01	1524.18	2.77	9.08	2341.01	2341.01	5000.83	tw
42.04	458335.76	1524.10	3.86	12.65	2353.66	2353.66	5000.57	tw
36.58	458331.65	1524.26	6.83	22.41	2376.08	2376.08	5001.10	tw
29.60	458327.90	1524.39	7.93	26.02	2402.09	2402.09	5001.52	tw
21.04	458324.41	1524.33	9.24	30.32	2432.41	2432.41	5001.33	tw
08.07	458319.46	1524.22	13.89	45.56	2477.97	2477.97	5000.97	tw
90.75	458314.92	1524.30	17.90	58.74	2536.71	2536.71	5001.23	tw
82.31	458315.21	1524.34	8.44	27.70	2564.41	2564.41	5001.36	tw
71.99	458318.27	1524.23	10.77	35.34	2599.74	2599.74	5001.00	tw
70.13	458318.91	1524.11	1.96	6.45	2606.19	2606.19	5000.60	tw
62.54	458319.53	1523.91	7.62	24.99	2631.18	2631.18	4999.95	tw
55.58	458319.45	1523.84	6.96	22.85	2654.03	2654.03	4999.72	tw
53.21	458318.20	1523.72	2.67	8.76	2662.79	2662.79	4999.33	tw
43.52	458317.71	1523.89	9.70	31.84	2694.63	2694.63	4999.88	tw

APPENDIX 3.1A. MAPS OF INDIVIDUAL SUBSTRATE POLYGONS



DFC INDIVIDUAL SUBSTRATE POLYGONS (DOWNSTREAM HALF OF SITE)


DFC INDIVIDUAL SUBSTRATE POLYGONS (UPSTREAM HALF OF SITE)
Legend
● endpoint
transect
substrate polygon number
N
0 5 10 20
Meters
21



MO INDIVIDUAL SUBSTRATE POLYGONS (DOWNSTREAM HALF OF SITE)


MO INDIVIDUAL SUBSTRATE POLYGONS
(UPSTREAM HALF OF SITE)
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endpoint
transect
substrate polygon/number
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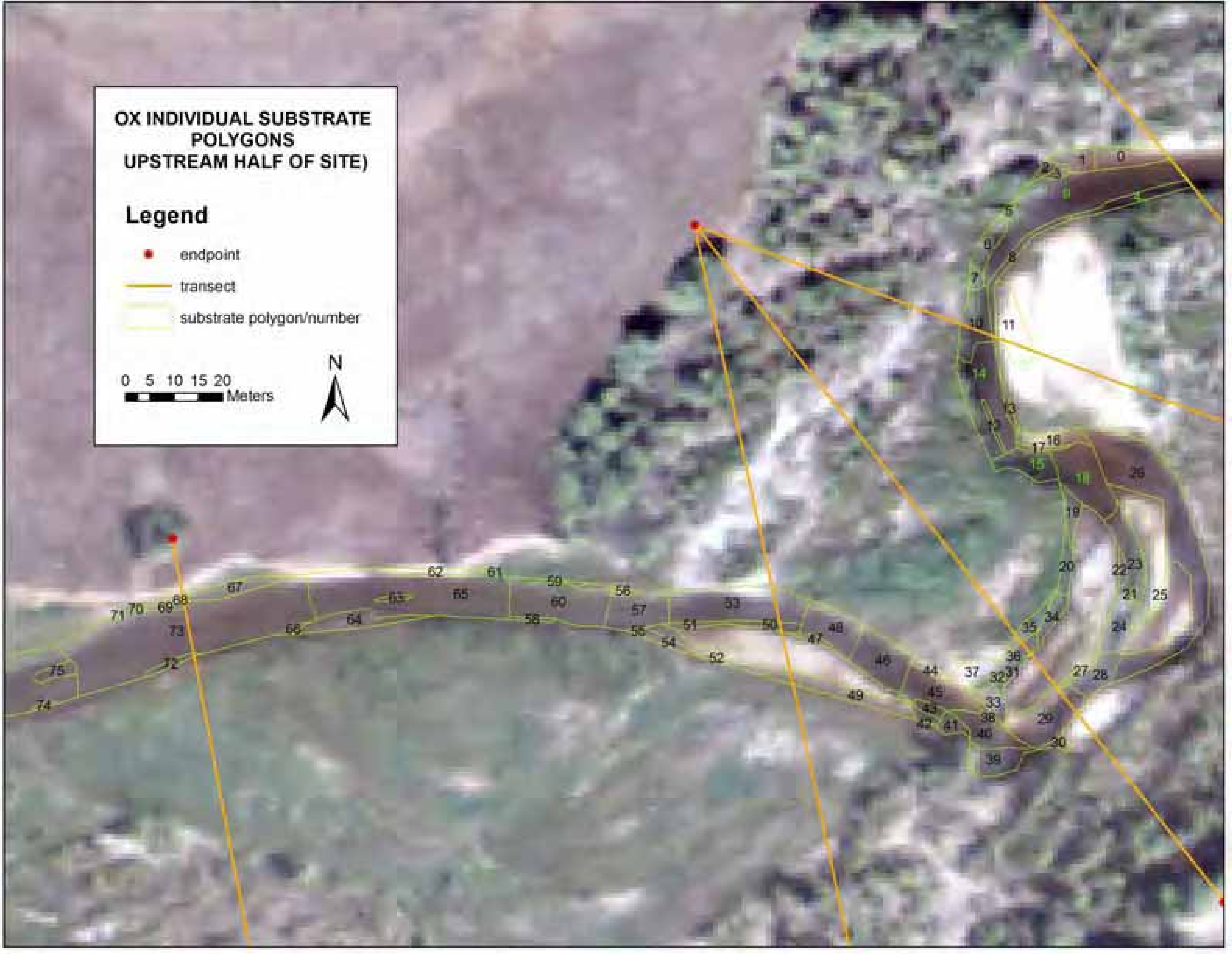
OX INDIVIDUAL SUBSTRATE POLYGONS (DOWNSTREAM HALF OF SITE)


OX INDIVIDUAL SUBSTRATE POLYGONS UPSTREAM HALF OF SITE)
Legend
endpoint
transect
substrate polygon/number
0 5 10 15 20
Meters
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APPENDIX 3.1B. SUBSTRATE POLYGON ATTRIBUTE TABLES

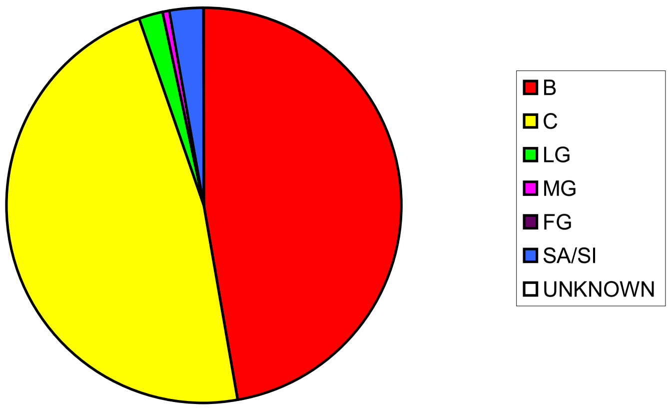
68.43	4SF 6CLM		gravel		20	20	20	20	20
170.84	3SF 7CLM		gravel		23.3	23.3	23.4	15	15
305.51	6S 4CL		sand/silt		20	20			60
3400.77	1.5SF 8.5CLM		gravel		28.3	28.3	28.4	7.5	7.5
781.79	3S 1M 6CL		gravel		30	30	10		30
207.41	4SI 1M 5CL		sand/silt		25	25	10		40
337.11	8S 2CL		sand/silt		10	10			80
362.00	3S 7CLM		gravel		23.3	23.3	23.4		30
18.58	SI		sand/silt						100
140.87	5S 5CL		sand/silt		25	25			50
38.00	SI		sand/silt						100
3828.56	1SF 4C 5LM		gravel		40	25	25	5	5
178.13	7S 3CLM		sand/silt		10	10	10		70
129.12	1C 2SF 7LM		gravel		10	35	35	10	10
1007.02	3.5SF 6.5CLM		gravel		21.6	21.7	21.7	17.5	17.5
40.15	3S 7CLM		gravel		23.3	23.3	23.4		30
4810.38	1.5SF 3.5C 5LM		gravel		35	25	25	7.5	7.5
112.68	5SF 5CLM		gravel		16.6	16.7	16.7	25	25
594.56	2S 1F 7CLM		gravel		23.3	23.3	23.4	10	20
62.67	3SF 7CLM		gravel		23.3	23.3	23.4	15	15
201.00	CLM		gravel		33.3	33.3	33.4		
391.01	5S 5CLM		sand/silt		16.6	16.7	16.7		50
73.21	2.5S 7.5CLM		gravel		25	25	25		25
503.72	5S 5CLM		sand/silt		16.6	16.7	16.7		50
537.64	2SF 8CLM		gravel		26.6	26.7	26.7	10	10
76.60	4S 6CL		sand/silt		30	30			40
1019.36	S1		sand/silt						100
235.53	2.5 S 7.5 CLM	Dam at downstream end of polygon	gravel		25	25	25		25
54.85	9S 1L	Part slightly cemented	sand/silt			10			90
130.99	4S 6MLF		gravel			20	20	20	40
46.21	?		unknown						
161.32	1C 8LMF 1S	Deep and fast	gravel		10	26.6	26.7	26.7	10
3055.82	1SF 4C 5LM		gravel		40	25	25	5	5
144.78	S1		sand/silt						100
350.00	S1		sand/silt						100
220.52	4S 6CLM		gravel-sand/silt		20	20	20		40
158.06	9S 1CL		sand/silt		10				90
1152.11	2SF 8CLM		gravel		26.6	26.7	26.7	10	10
93.83	3SF 7CLM		gravel		23.3	23.3	23.4	15	15
255.95	2SF 3M 5CL		gravel		25	25	30	10	10
265.42	2SF 8CLM		gravel		26.6	26.7	26.7	10	10
211.58	4SI 6CLM		gravel-sand/silt		20	20	20		40
2236.04	1SF 9CLM		gravel		30	30	30	5	5
70.95	S		sand/silt						100
66.72	SI		sand/silt						100
531.21	3S 1F 6CLM		gravel		20	20	20	10	30
287.02	SI		sand/silt						100
231.05	8.5SI 1.5CL		sand/silt		7.5	7.5			85
440.74	SI		sand/silt						100
1767.23	5C 0.5SF 3L 1.5M		cobble		50	30	15	2.5	2.5
10.64	S		sand/silt						100
5.32	S		sand/silt						100
13.98	4SF 6CLM		gravel		20	20	20	20	20
197.66	3S 7CL		cobble-gravel		35	35			30
471.42	1SF 9CLM	Behind logs	gravel		30	30	30	5	5
91.74	8CL 2MFS		gravel		40	40	6.6	6.7	6.7
66.84	5S 5CL		sand/silt		25	25			50
37.42	3S 7CL		cobble-gravel		35	35			30
62.65	S		sand/silt						100
81.98	2SF 8CLM		gravel		26.6	26.7	26.7	10	10
52.56	S		sand/silt						100
336.41	2.5SF 7.5CLM		gravel		25	25	25	12.5	12.5
901.95	1SF 9CLM		gravel		30	30	30	5	5
57.83	5S 5LM		sand/silt			25	25		50
8.42	S1		sand/silt						100
5.72	S1		sand/silt						100
457.85	3S 2C 5LM		gravel		20	25	25		30
394.21	1SF 9CLM	Fast and deep ??	gravel		30	30	30	5	5
487.97	1.5C 0.5S 8LMF		gravel		15	26.6	26.7	26.7	5
20.71	SI		sand/silt						100
116.37	2SF 4M 4CL		gravel		20	20	40	10	10
365.41	1.5C 2.5SF 6LM		gravel		15	30	30	12.5	12.5
232.98	9S 1CG		sand/silt		5	1.6	1.7	1.7	90
88.23	S		sand/silt						100
206.10	1SF 9CLM		gravel		30	30	30	5	5
406.22	5S 5CL		sand/silt		25	25			50
114.77	4S 6CLM	Deep - assume same	gravel-sand/silt		20	20	20		40
1587.25	SI		sand/silt						100
332.34	6S 4LM		sand/silt			20	20		60

19	138.39	S		sand/silt						100	
20	40.70	S		sand/silt						100	
21	870.04	5SF 5CLM	Deep pool	gravel		16.6	16.7	16.7	25	25	
22	269.25	3.5S 6.5CLM		gravel		21.6	21.7	21.7		35	
23	858.96	2.5SF 7.5CLM		gravel		25	25	25	12.5	12.5	
24	966.25	1.5SF 8.5CLM		gravel		28.3	28.3	28.4	7.5	7.5	
25	505.10	CLM		gravel		33.3	33.3	33.4			
26	87.87	1S 9CLM		gravel		30	30	30		10	
27	57.68	1S 9CLM		gravel		30	30	30		10	
28	119.12	9S 1L		sand/silt			10			90	
29	298.92	4S 6CLM		gravel-sand/silt		20	20	20		40	
30	161.60	S1		sand/silt						100	
31	164.51	S		sand/silt						100	
32	176.98	???	Sticks sand gravel?	unknown							100
33	73.17	6S 4G		sand/silt			13.3	13.3	13.4	60	
34	68.85	S		sand/silt						100	
35	534.75	S1		sand/silt						100	
36	805.47	1.5 SF 8.5CLM	Parts cemented	gravel		28.3	28.3	28.4	7.5	7.5	
37	277.68	1S 9G		gravel			30	30	30	10	
38	211.74	???	Deep	unknown							100
39	224.05	???	Sand and many sticks	unknown							100
40	1388.15	1.5C 1.5SF 7LM		gravel		15	35	35	7.5	7.5	
41	162.76	MFS		gravel				33.3	33.3	33.4	
42	180.21	8S 2L		sand/silt			20			80	
43	222.16	2.5SF 7.5LM		gravel			37.5	37.5	12.5	12.5	
44	201.22	9S 1C		sand/silt		10				90	
45	319.73	2SF 1C 7LM		gravel		10	35	35	10	10	
46	606.12	LMFS	P RUN	gravel			25	25	25	25	
47	197.06	9S 1L	Sticks	sand/silt			10			90	
48	1506.79	2C 8LM		gravel		20	40	40			
49	377.44	2S 8LM		gravel			40	40		20	
50	324.03	1S 9MLF		gravel			30	30	30	10	
51	193.63	S1		sand/silt						100	
52	533.03	9S 1G		sand/silt			3.3	3.3	3.4	90	
53	62.99	1S 9CLM		gravel		30	30	30		10	
54	318.03	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
55	342.23	2S 8CLM		gravel		26.6	26.7	26.7		20	
56	213.07	8S 2C		sand/silt		20				80	
57	47.24	CLM		gravel		33.3	33.3	33.4			
58	215.97	S1		sand/silt						100	
59	802.25	1.5S 8.5CLM		gravel		28.3	28.3	28.4		15	
60	109.58	7S 3CL		sand/silt		15	15			70	
61	40.06	S		sand/silt						100	
62	50.89	2S 8CLM	Cemented	gravel		26.6	26.7	26.7		20	
63	301.53	???	Deep - pool	unknown							100
64	207.70	LMFS		gravel			25	25	25	25	
65	91.26	S		sand/silt						100	
66	74.49	MFS		gravel				33.3	33.3	33.4	
67	127.06	CLMFS		gravel		20	20	20	20	20	
68	214.49	3S 7CLM		gravel		23.3	23.3	23.4		30	
69	592.03	2SF 8CLM	Slightly cemented	gravel		26.6	26.7	26.7	10	10	
70	252.07	S		sand/silt						100	
71	324.49	9S 1C		sand/silt		10				90	
72	80.57	1.5 SF 8.5CLM	Slightly cemented	gravel		28.3	28.3	28.4	7.5	7.5	
73	45.57	8S 2CL	Behind sticks	sand/silt		10	10			80	
74	1234.44	CLM		gravel		33.3	33.3	33.4			
75	120.48	1.5SF 8.5CLM	Cemented	gravel		28.3	28.3	28.4	7.5	7.5	
76	97.72	5S 5CL	Fast and deep	sand/silt		25	25			50	
77	98.76	5S 5LMF		sand/silt			16.6	16.7	16.7	50	
78	31.89	LMFS		gravel			25	25	25	25	
79	142.80	CL		cobble-gravel		50	50				
80	538.09	2C 8LM		gravel		20	40	40			
81	73.15	8S 2CL		sand/silt		10	10			80	
82	106.23	S		sand/silt						100	
83	42.78	2S 8CLM		gravel		26.6	26.7	26.7		20	
84	437.87	1L 9MFS		gravel			10	30	30	30	
85	134.78	3SI 7CLM		gravel		23.3	23.3	23.4		30	
86	127.29	S		sand/silt						100	
87	1141.31	1.5SF 1.5C 7LM		gravel		15	35	35	7.5	7.5	
88	56.39	LM	On edge	gravel			50	50			
89	122.29	4S 6CL		sand/silt		30	30			40	
90	61.00	S		sand/silt						100	
91	123.05	4S 6CL		sand/silt		30	30			40	
92	61.65	MFS		gravel				33.3	33.3	33.4	
93	247.41	S		sand/silt						100	
94	39.44	4SF 6CLM		gravel		20	20	20	20	20	
95	144.89	8S 2C		sand/silt		20				80	
96	1991.77	1.5SF 8.5CLM	Fastest part of riffle - hard and cemented	gravel		28.3	28.3	28.4	7.5	7.5	
97	292.66	?	Pool	unknown							100
98	427.97	7S 3G		sand/silt			10	10	10	70	
99	311.54	5S 5CL		sand/silt		25	25			50	
100	579.47	3SF 1C 6LM		gravel		10	30	30	15	15	
101	29.68	S		sand/silt						100	
102	20.60	?	Small cemented feature w/ 8' drop	unknown							100
103	709.28	1.5C 7LM 1.5FS		gravel		15	35	35	7.5	7.5	
104	287.49	9S 1C		sand/silt		10				90	
105	336.39	8CLM 2SI		gravel		26.6	26.7	26.7		20	
106	211.94	S		sand/silt						100	
107	116.02	2SF 8LM		gravel			40	40	10	10	
108	1128.26	1C 2SF 7LM	Estimate	gravel		10	35	35	10	10	
109	550.79	9S 1C		sand/silt		10				90	
110	476.65	S		sand/silt						100	
111	379.28	2C 5LM 3FS		gravel		20	25	25	15	15	
112	236.29	4SF 6LM		gravel			30	30	20	20	
113	192.39	1S 9CLM		gravel		30	30	30		10	
114	538.73	2.5SF 1C 6.5LM		gravel		10	32.5	32.5	12.5	12.5	
115	61.85	S	Sticks	sand/silt						100	
116	225.83	2SF 8CLM	Cemented platfom Q dives into scour P/R	gravel		26.6	26.7	26.7	10	10	
117	1582.11	CLM		gravel		33.3	33.3	33.4			
118	303.46	1SF 1C 8LM		gravel		10	40	40	5	5	
119	269.81	1C 9LM		gravel		10	45	45			
120	22.30	SI	Slumped grass	sand/silt						100	
121	233.02	S		sand/silt						100	
122	379.17	?	Estimate 5S 5CLM - deep pool	unknown							100
123	667.47	4S 6CL		sand/silt		30	30			40	
124	107.53	S		sand/silt						100	

18	1297.55	4SF 6CLM		gravel		20	20	20	20	20	
19	284.73	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
20	286.30	7S 3CLM		sand/silt		10	10	10		70	
21	33.84	5S 5G		gravel-sand/silt			16.6	16.7	16.7	50	
22	100.72	1SF 1C 8LM		gravel		10	40	40	5	5	
23	832.42	CLM		gravel		33.3	33.3	33.4			
24	682.69	1.5SF 8.5CLM		gravel		28.3	28.3	28.4	7.5	7.5	
25	168.41	5S 5G		gravel-sand/silt			16.6	16.7	16.7	50	
26	4088.74	5S 5CLM	Sticks	sand/silt		16.6	16.7	16.7		50	
27	115.16	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
28	565.98	CLM		gravel		33.3	33.3	33.4			
29	1273.07	1.5SF 8.5CLM		gravel		28.3	28.3	28.4	7.5	7.5	
30	93.54	S		sand/silt						100	
31	108.88	3.5S 6.5CLM		gravel		21.6	21.7	21.7		35	
32	19.04	CLM	Dry bar	gravel		33.3	33.3	33.4			
33	327.89	SI		sand/silt						100	
34	308.60	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
35	320.38	1C 2S 7LMF	Dry bar	gravel		10	23.3	23.3	23.4	20	
36	349.20	1S 9CLM		gravel		30	30	30		10	
37	388.29	LM	High bar	gravel			50	50			
38	96.09	5S 5MF		gravel-sand/silt				25	25	50	
39	632.30	?	Deep	unknown							100
40	667.05	5SF 5CLM	??	gravel		16.6	16.7	16.7	25	25	
41	207.23	S		sand/silt						100	
42	128.04	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
43	143.95	1C 4SF 5LM		gravel		10	25	25	20	20	
44	145.84	1SF 9CLM		gravel		30	30	30	5	5	
45	905.63	3SF 7CLM		gravel		23.3	23.3	23.4	15	15	
46	1076.49	2MF 1SF 7CL		gravel		35	35	10	15	5	
47	96.90	8S 2C		sand/silt						100	
48	915.95	1SF 9CLM		gravel		30	30	30	5	5	
49	731.60	9S 1CL		sand/silt						100	
50	237.21	3S 7CLM		gravel		23.3	23.3	23.4		30	
51	125.68	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
52	699.81	3S 2M 5CL		cobble-gravel-sand/silt		25	25	20		30	
53	2055.92	2SF 8CLM		gravel		26.6	26.7	26.7	10	10	
54	187.28	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
55	48.23	S		sand/silt						100	
56	48.51	4SF 6CLM		gravel		20	20	20	20	20	
57	967.16	CLM		gravel		33.3	33.3	33.4			
58	67.24	8SF 2LM		gravel			10	10	40	40	
59	88.28	S		sand/silt						100	
60	1749.70	2SF 8CLM		gravel		26.6	26.7	26.7	10	10	
61	47.05	S		sand/silt						100	
62	281.10	9.5CLM 0.5SF		gravel		31.6	31.7	31.7	2.5	2.5	
63	71.81	1.5SF 8.5CLM		gravel		28.3	28.3	28.4	7.5	7.5	
64	655.08	5S 5CLM	Sticks	sand/silt		16.6	16.7	16.7		50	
65	3787.95	1.5SF 8.5CLM		gravel		28.3	28.3	28.4	7.5	7.5	
66	53.65	1C 9LM		gravel		10	45	45			
67	510.36	4S 6CLM	Sticks	gravel-sand/silt		20	20	20		40	
68	69.07	SI		sand/silt						100	
69	136.31	2S 8CLM		gravel		26.6	26.7	26.7		20	
70	15.30	3S 7CLM	Cemented chunk	gravel		23.3	23.3	23.4		30	
71	46.81	3S 7CLM		gravel		23.3	23.3	23.4		30	
72	136.52	2.5S 7.5CLM		gravel		25	25	25		25	
73	6146.34	1SF 9CLM		gravel		30	30	30	5	5	
74	45.13	5SI 5CL		sand/silt		25	25			50	
75	220.33	2S 8CLM		gravel		26.6	26.7	26.7		20	
76	261.22	4S 6CLM	Sticks	gravel-sand/silt		20	20	20		40	
77	7228.34	1.5SF 8.5CLM		gravel		28.3	28.3	28.4	7.5	7.5	
78	653.23	4S 6CL	Some SI along edge	cobble-gravel-sand/silt		30	30			40	
79	155.58	S		sand/silt						100	
80	76.77	4SI 6CL	Behind log	cobble-gravel-sand/silt		30	30			40	
81	17.45	SI		sand/silt						100	
82	337.39	?	Est. 5S 5CLM	sand/silt		16.6	16.7	16.7		50	
83	91.53	5SF 5LM	Sticks	gravel			25	25	25	25	
84	1040.27	CLM		gravel		33.3	33.3	33.4			
85	7248.70	2SF 8CLM		gravel		26.6	26.7	26.7	10	10	
86	86.99	6F 1S 1L 2M		gravel			10	20	60	10	
87	67.07	S		sand/silt						100	
88	831.96	1.5SF 1.5C 7LM		gravel		15	35	35	7.5	7.5	
89	125.87	4S 6CLM		gravel-sand/silt		20	20	20		40	
90	47.85	2.5S 7.5CLM		gravel		25	25	25		25	
91	1515.81	CLM		gravel		33.3	33.3	33.4			
92	852.38	?	Deep est. 2SF 8CLM some grass clumps	gravel		26.6	26.7	26.7	10	10	
93	625.54	2.5SF 1C 6.5LM		gravel		10	32.5	32.5	12.5	12.5	
94	57.22	SI		sand/silt						100	
95	189.18	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
96	57.28	SI		sand/silt						100	
97	150.04	5S 5CLM		sand/silt		16.6	16.7	16.7		50	
98	54.57	8S 2L		sand/silt			20			80	
99	145.66	SI		sand/silt						100	
100	56.60	5SI 5G		gravel-sand/silt			16.6	16.7	16.7	50	
101	80.70	SI		sand/silt						100	
102	116.11	6SI 4CLM		sand/silt		13.3	13.3	13.4		60	
103	349.14	SI		sand/silt						100	
104	178.53	3SF 7CLM		gravel		23.3	23.3	23.4	15	15	
105	292.41	S		sand/silt						100	
106	460.19	1M 1S 8CL		gravel		40	40	10		10	
107	364.11	1SF 9CLM		gravel		30	30	30	5	5	
108	608.25	2C 1F 7LM		gravel		20	35	35	10		
109	361.20	2B 8CLM		gravel	20	26.6	26.7	26.7			
110	445.69	B SI		boulder-sand/silt	50					50	
111	1091.18	2SF 2C 6LM		gravel		20	30	30	10	10	
112	78.04	S		sand/silt						100	
113	138.73	8S 2CL		sand/silt		10	10			80	
114	289.20	8S 2B C		sand/silt	10	10				80	
115	237.10	CLS		cobble-gravel-sand/silt		33.3	33.3			33.4	
116	130.53	SI		sand/silt						100	
117	1318.52	2S 8CL		cobble-gravel		40	40			20	
118	906.33	5SI 5CL	Sticks	sand/silt		25	25			50	
119	186.41	BSC		boulder-cobble-sand/silt	33.3	33.3				33.4	
120	53.68	SI		sand/silt						100	

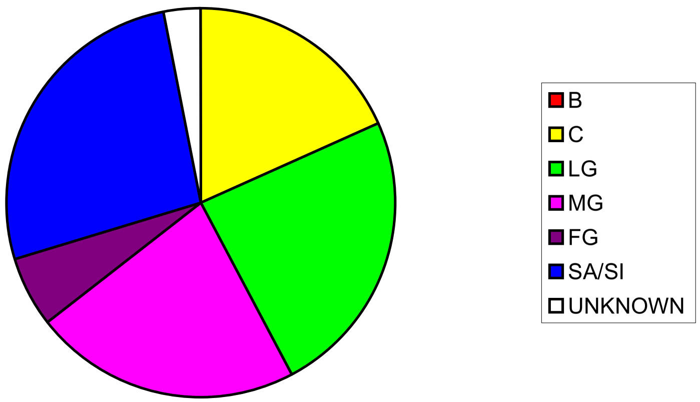
APPENDIX 3.2. PEBBLE COUNT DATA AND PLOTS FOR EACH STUDY SITE

SXW 06

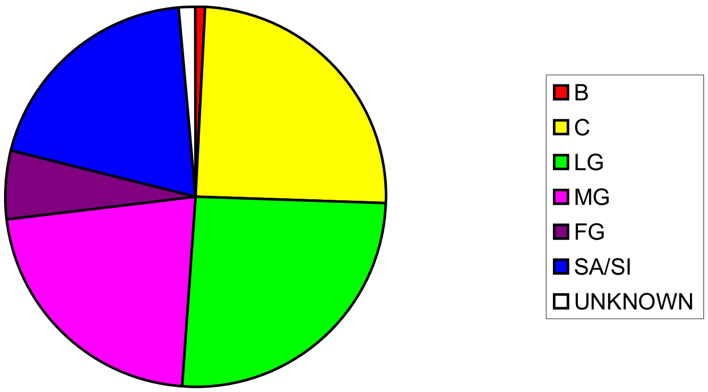


DFC07

MO 07



OX 07



APPENDIX 4.1: END CAP SURVEY POINTS

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459902.56,4432925.99,"mo 3",38
459902.02,4432938.60,"mo 3",39
459894.71,4432917.55,"mo 3.1",40
459885.10,4432906.07,"mo 3.1",41
459867.56,4432876.17,"mo 3.4",42
459880.33,4432863.25,"mo 4",43
459867.00,4432875.91,"mo 4",44
459852.47,4432833.83,"mo 5",45
459839.43,4432839.16,"mo 5",46
459847.64,4432779.97,"mo 6",47
459849.86,4432773.91,"mo 6",48
459799.72,4432774.03,"mo 6.1",49
459796.90,4432759.80,"mo 6.1",50
458783.70,4432327.27,"ox 1",51
458789.80,4432314.98,"ox 1",52
458759.22,4432282.65,"ox 2",53
458744.96,4432290.23,"ox 2",54
458783.35,4432270.04,"ox 2.1",55
458764.99,4432254.47,"ox 2.1",56
458758.40,4432225.42,"ox 3",57
458771.94,4432206.99,"ox 3",58
458712.92,4432214.07,"ox 4",59
458706.95,4432236.03,"ox 4",60
458589.47,4432219.58,"ox 5",61
458587.69,4432234.95,"ox 5",62
458490.50,4432214.10,"ox 6",63
458489.27,4432200.85,"ox 6",64
458460.42,4432206.19,"ox 7",65
458474.92,4432217.02,"ox 7",66
458460.77,4432246.73,"ox 7.1",67
458447.62,4432254.37,"ox 7.1",68
458305.66,4432123.96,"ox 8",69
458320.63,4432123.23,"ox 8",70
458321.74,4432150.21,"ox 7.2",71
458305.73,4432152.06,"ox 7.2",72
458316.90,4432097.74,"ox 8.1",73
458301.60,4432103.36,"ox 8.1",74
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APPENDIX 4.2A: PEBBLE COUNT DATA

5	15	11	13	85	-7.5	15	7	25	85	-7.5	13	8	13	87	-7.5
0	4	2	11	96	-8.0	8	4	7	92	-8.0	5	5	8	95	-8.0
5	2	2	2	98	-8.5	4	4	4	96	-8.5	0	0	5	100	-8.5
0			2	100	-9.0			4	100	-9.0			0	100	-9.0
		100					100					100			
					Percentile (mm)					Percentile (mm)					Percentile (mm)
	15	19	-3.5	-4.0	12	15	17	-4.0	-4.5	19	15	17	-3.0	-3.5	10
	21	34	-4.5	-5.0	25	25	34	-5.5	-6.0	45	23	28	-4.5	-5.0	26
	50	60	-6.0	-6.5	64	44	60	-6.5	-7.0	103	43	57	-6.0	-6.5	76
	72	85	-7.0	-7.5	138	60	85	-7.0	-7.5	157	74	87	-7.0	-7.5	131
	72	85	-7.0	-7.5	175	60	85	-7.0	-7.5	178	74	87	-7.0	-7.5	166
	85	96	-7.5	-8.0	211	85	92	-7.5	-8.0	231	87	95	-7.5	-8.0	205

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20
7	23	23	21.2	20	5	7	<2	1	0	20	5	7	<2	1	0	20
8	48	48	46.4	20	5	8	<2	1	0	20	5	8	<2	1	0	20
9	33	33	34.3	21	8	9	<2	1	0	21	8	9	<2	1	0	21
10	100	100	62.6	22	9	10	<2	1	0	22	9	10	<2	1	0	22
11	80	80	57.5	23	10.1	11	78	78	39.3	23	10.1	11	50	50	34.3	23
12	10	10	11.1	23	10.1	12	69	69	36.3	23	10.1	12	85	85	55.5	23
13	68	68	50.5	24	12.1	13	109	109	51.5	24	12.1	13	68	68	44.4	24
14	76	76	55.5	25	13.1	14	135	135	61.6	25	13.1	14	67	67	43.4	25
15	90	90	59.5	27	14.1	15	80	80	40.4	27	14.1	15	9	9	15.1	27
16	43	43	41.4	27	14.1	16	60	60	30.3	27	14.1	16	190	190	88.8	27
17	3	3	6	29	16.1	17	59	59	28.2	29	16.1	17	123	123	71.7	29
18	80	80	57.5	30	17.1	18	145	145	66.6	30	17.1	18	80	80	52.5	30
19	96	96	61.6	31	18.1	19	62	62	33.3	31	18.1	19	7	7	13.1	31
20	300	300	96.9	31	18.1	20	65	65	34.3	31	18.1	20	91	91	57.5	31
21	150	150	76.7	31	18.1	21	29	29	19.1	31	18.1	21	6	6	11.1	31
22	70	70	51.5	32	21.2	22	239	239	91.9	32	21.2	22	73	73	48.4	32
23	180	180	83.8	33	22.2	23	132	132	60.6	33	22.2	23	70	70	46.4	33
24	25	25	24.2	34	23.2	24	93	93	45.4	34	23.2	24	75	75	50.5	34
25	47	47	44.4	34	23.2	25	54	54	27.2	34	23.2	25	6	6	11.1	34
26	250	250	94.9	34	23.2	26	482	482	100	34	23.2	26	37	37	30.3	34
27	245	245	93.9	35	26.2	27	139	139	63.6	35	26.2	27	128	128	73.7	35
28	175	175	82.8	40	27.2	28	146	146	69.6	40	27.2	28	14	14	17.1	40
29	180	180	83.8	40	27.2	29	145	145	66.6	40	27.2	29	8	8	14.1	40
30	30	30	30.3	40	27.2	30	60	60	30.3	40	27.2	30	98	98	62.6	40
31	125	125	69.6	42	30.3	31	145	145	66.6	42	30.3	31	135	135	75.7	42
32	94	94	60.6	42	30.3	32	59	59	28.2	42	30.3	32	56	56	35.3	42
33	25	25	24.2	44	32.3	33	15	15	14.1	44	32.3	33	105	105	65.6	44
34	25	25	24.2	44	32.3	34	30	30	20.2	44	32.3	34	93	93	59.5	44
35	6	6	8	46	34.3	35	205	205	86.8	46	34.3	35	280	280	97.9	46
36	39	39	36.3	48	35.3	36	410	410	97.9	48	35.3	36	60	60	37.3	48
37	105	105	64.6	49	36.3	37	135	135	61.6	49	36.3	37	70	70	46.4	49
38	47	47	44.4	50	37.3	38	70	70	37.3	50	37.3	38	60	60	37.3	50
39	5	5	7	54	38.3	39	22	22	16.1	54	38.3	39	155	155	79.7	54
40	77	77	56.5	54	38.3	40	260	260	92.9	54	38.3	40	73	73	48.4	54
41	14	14	16.1	55	40.4	41	152	152	73.7	55	40.4	41	93	93	59.5	55
42	200	200	86.8	55	40.4	42	90	90	43.4	55	40.4	42	24	24	23.2	55
43	10	10	11.1	55	40.4	43	28	28	17.1	55	40.4	43	315	315	100	55
44	150	150	76.7	55	40.4	44	35	35	22.2	55	40.4	44	270	270	96.9	55
45	110	110	65.6	61	44.4	45	20	20	15.1	61	44.4	45	97	97	61.6	61
46	150	150	76.7	62	45.4	46	110	110	52.5	62	45.4	46	31	31	26.2	62
47	125	125	69.6	62	45.4	47	102	102	48.4	62	45.4	47	160	160	80.8	62
48	32	32	32.3	62	45.4	48	360	360	95.9	62	45.4	48	245	245	94.9	62
49	150	150	76.7	64	48.4	49	42	42	24.2	64	48.4	49	150	150	77.7	64
50	50	50	48.4	67	49.4	50	150	150	70.7	67	49.4	50	100	100	64.6	67
51	170	170	81.8	67	49.4	51	113	113	55.5	67	49.4	51	170	170	84.8	67
52	11	11	14.1	70	51.5	52	165	165	76.7	70	51.5	52	10	10	16.1	70
53	400	400	98.9	72	52.5	53	120	120	57.5	72	52.5	53	17	17	19.1	72
54	35	35	35.3	74	53.5	54	80	80	40.4	74	53.5	54	200	200	90.9	74
55	200	200	86.8	75	54.5	55	180	180	84.8	75	54.5	55	285	285	98.9	75
56	15	15	18.1	75	54.5	56	200	200	85.8	75	54.5	56	180	180	86.8	75
57	300	300	96.9	76	56.5	57	150	150	70.7	76	56.5	57	163	163	82.8	76
58	48	48	46.4	78	57.5	58	175	175	83.8	78	57.5	58	130	130	74.7	78
59	40	40	37.3	80	58.5	59	120	120	57.5	80	58.5	59	19	19	20.2	80
60	210	210	88.8	82	59.5	60	160	160	74.7	82	59.5	60	61	61	40.4	82
61	62	62	49.4	83	60.6	61	108	108	50.5	83	60.6	61	115	115	69.6	83
62	195	195	85.8	84	61.6	62	220	220	88.8	84	61.6	62	125	125	72.7	84
63	120	120	67.6	85	62.6	63	117	117	56.5	85	62.6	63	56	56	35.3	85
64	160	160	80.8	86	63.6	64	210	210	87.8	86	63.6	64	60	60	37.3	86
65	40	40	37.3	88	64.6	65	50	50	26.2	88	64.6	65	140	140	76.7	88
66	140	140	73.7	88	64.6	66	310	310	94.9	88	64.6	66	39	39	31.3	88
67	24	24	23.2	89	66.6	67	170	170	80.8	89	66.6	67	49	49	33.3	89
68	125	125	69.6	90	67.6	68	170	170	80.8	90	67.6	68	92	92	58.5	90
69	120	120	67.6	90	67.6	69	160	160	74.7	90	67.6	69	220	220	92.9	90
70	136	136	72.7	90	67.6	70	100	100	46.4	90	67.6	70	25	25	24.2	90
71	210	210	88.8	90	67.6	71	67	67	35.3	90	67.6	71	235	235	93.9	90
72	140	140	73.7	92	71.7	72	225	225	89.8	92	71.7	72	27	27	25.2	92
73	45	45	43.4	93	72.7	73	7	7	11.1	93	72.7	73	77	77	51.5	93
74	42	42	40.4	93	72.7	74	139	139	63.6	93	72.7	74	98	98	62.6	93
75	100	100	62.6	95	74.7	75	140	140	65.6	95	74.7	75	165	165	83.8	95
76	235	235	92.9	99	75.7	76	275	275	93.9	99	75.7	76	260	260	95.9	99
77	26	26	28.2	100	76.7	77	165	165	76.7	100	76.7	77	35	35	28.2	100
78	14	14	16.1	100	76.7	78	33	33	21.2	100	76.7	78	110	110	67.6	100
79	30	30	30.3	105	78.7	79	170	170	80.8	105	78.7	79	105	105	65.6	105
80	430	430	100	107	79.7	80	165	165	76.7	107	79.7	80	82	82	54.5	107

19	10	12	81	-7.5	14	9	24	86	-7.5	9	6	16	91	-7.5
9	7	10	91	-8.0	5	4	9	95	-8.0	3	2	6	97	-8.0
2	2	7	98	-8.5	1	1	4	99	-8.5	1	1	2	99	-8.5
		2	100	-9.0			1	100	-9.0			1	100	-9.0
	100					**100**					**100**			

				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**
15	19	-3.0	-3.5	9	16	18	-2.5	-3.0	6	13	17	-3.0	-3.5	10
24	28	-4.0	-4.5	17	21	29	-4.5	-5.0	27	23	31	-4.0	-4.5	17
46	55	-6.0	-6.5	74	46	62	-6.5	-7.0	98	43	52	-5.5	-6.0	59
69	81	-7.0	-7.5	152	62	86	-7.0	-7.5	154	75	91	-7.0	-7.5	128
81	91	-7.5	-8.0	200	62	86	-7.0	-7.5	175	75	91	-7.0	-7.5	155
81	91	-7.5	-8.0	247	86	95	-7.5	-8.0	211	75	91	-7.0	-7.5	176

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20
7	<2	1	0	20	5	7	<2	1	0	20	5	7	<2	1	0	20
8	23	23	28.2	20	5	8	<2	1	0	20	5	8	<2	1	0	20
9	120	120	67.6	21	8	9	<2	1	0	21	8	9	38	38	40.4	21
10	71	71	49.4	22	9	10	<2	1	0	22	9	10	66	66	54.5	22
11	10	10	15.1	23	10.1	11	<2	1	0	23	10.1	11	3	3	8	23
12	99	99	61.6	23	10.1	12	<2	1	0	23	10.1	12	20	20	26.2	23
13	65	65	46.4	24	12.1	13	<2	1	0	24	12.1	13	12	12	17.1	24
14	60	60	45.4	25	13.1	14	146	146	69.6	25	13.1	14	25	25	31.3	25
15	7	7	13.1	27	14.1	15	5	5	14.1	27	14.1	15	16	16	22.2	27
16	72	72	50.5	27	14.1	16	23	23	21.2	27	14.1	16	57	57	50.5	27
17	26	26	31.3	29	16.1	17	53	53	41.4	29	16.1	17	65	65	52.5	29
18	400	400	98.9	30	17.1	18	115	115	57.5	30	17.1	18	49	49	44.4	30
19	250	250	90.9	31	18.1	19	230	230	91.9	31	18.1	19	50	50	45.4	31
20	49	49	41.4	31	18.1	20	180	180	84.8	31	18.1	20	7	7	12.1	31
21	300	300	94.9	31	18.1	21	270	270	95.9	31	18.1	21	19	19	23.2	31
22	92	92	55.5	32	21.2	22	27	27	24.2	32	21.2	22	115	115	74.7	32
23	94	94	58.5	33	22.2	23	185	185	86.8	33	22.2	23	105	105	68.6	33
24	82	82	52.5	34	23.2	24	340	340	98.9	34	23.2	24	110	110	72.7	34
25	190	190	81.8	34	23.2	25	115	115	57.5	34	23.2	25	9	9	13.1	34
26	44	44	40.4	34	23.2	26	125	125	60.6	34	23.2	26	80	80	56.5	34
27	160	160	76.7	35	26.2	27	7	7	16.1	35	26.2	27	105	105	68.6	35
28	135	135	71.7	40	27.2	28	160	160	72.7	40	27.2	28	130	130	75.7	40
29	70	70	47.4	40	27.2	29	23	23	21.2	40	27.2	29	100	100	65.6	40
30	32	32	34.3	40	27.2	30	35	35	29.2	40	27.2	30	54	54	47.4	40
31	270	270	91.9	42	30.3	31	100	100	48.4	42	30.3	31	150	150	84.8	42
32	20	20	25.2	42	30.3	32	37	37	31.3	42	30.3	32	48	48	43.4	42
33	230	230	89.8	44	32.3	33	32	32	27.2	44	32.3	33	90	90	63.6	44
34	85	85	53.5	44	32.3	34	43	43	36.3	44	32.3	34	19	19	23.2	44
35	92	92	55.5	46	34.3	35	168	168	77.7	46	34.3	35	21	21	29.2	46
36	6	6	11.1	48	35.3	36	155	155	70.7	48	35.3	36	83	83	60.6	48
37	150	150	74.7	49	36.3	37	100	100	48.4	49	36.3	37	100	100	65.6	49
38	59	59	44.4	50	37.3	38	130	130	62.6	50	37.3	38	102	102	67.6	50
39	25	25	29.2	54	38.3	39	125	125	60.6	54	38.3	39	190	190	91.9	54
40	400	400	98.9	54	38.3	40	145	145	68.6	54	38.3	40	135	135	79.7	54
41	73	73	51.5	55	40.4	41	231	231	92.9	55	40.4	41	410	410	100	55
42	105	105	64.6	55	40.4	42	40	40	33.3	55	40.4	42	105	105	68.6	55
43	350	350	97.9	55	40.4	43	80	80	45.4	55	40.4	43	5	5	9	55
44	134	134	70.7	55	40.4	44	155	155	70.7	55	40.4	44	200	200	92.9	55
45	200	200	85.8	61	44.4	45	255	255	94.9	61	44.4	45	160	160	88.8	61
46	70	70	47.4	62	45.4	46	298	298	96.9	62	45.4	46	98	98	64.6	62
47	25	25	29.2	62	45.4	47	50	50	39.3	62	45.4	47	15	15	20.2	62
48	330	330	95.9	62	45.4	48	45	45	37.3	62	45.4	48	215	215	93.9	62
49	3	3	7	64	48.4	49	170	170	79.7	64	48.4	49	6	6	10.1	64
50	90	90	54.5	67	49.4	50	37	37	31.3	67	49.4	50	25	25	31.3	67
51	15	15	22.2	67	49.4	51	168	168	77.7	67	49.4	51	152	152	85.8	67
52	13	13	19.1	70	51.5	52	48	48	38.3	70	51.5	52	80	80	56.5	70
53	10	10	15.1	72	52.5	53	104	104	53.5	72	52.5	53	89	89	62.6	72
54	16	16	23.2	74	53.5	54	110	110	56.5	74	53.5	54	140	140	80.8	74
55	115	115	66.6	75	54.5	55	10	10	18.1	75	54.5	55	70	70	55.5	75
56	10	10	15.1	75	54.5	56	4	4	13.1	75	54.5	56	10	10	15.1	75
57	130	130	69.6	76	56.5	57	137	137	66.6	76	56.5	57	84	84	61.6	76
58	170	170	79.7	78	57.5	58	130	130	62.6	78	57.5	58	170	170	89.8	78
59	92	92	55.5	80	58.5	59	5	5	14.1	80	58.5	59	20	20	26.2	80
60	41	41	37.3	82	59.5	60	115	115	57.5	82	59.5	60	22	22	30.3	82
61	220	220	88.8	83	60.6	61	35	35	29.2	83	60.6	61	9	9	13.1	83
62	110	110	65.6	84	61.6	62	40	40	33.3	84	61.6	62	146	146	83.8	84
63	35	35	36.3	85	62.6	63	160	160	72.7	85	62.6	63	35	35	39.3	85
64	145	145	73.7	86	63.6	64	63	63	43.4	86	63.6	64	19	19	23.2	86
65	29	29	32.3	88	64.6	65	100	100	48.4	88	64.6	65	220	220	94.9	88
66	42	42	38.3	88	64.6	66	135	135	64.6	88	64.6	66	20	20	26.2	88
67	100	100	62.6	89	66.6	67	28	28	25.2	89	66.6	67	14	14	19.1	89
68	196	196	84.8	90	67.6	68	170	170	79.7	90	67.6	68	171	171	90.9	90
69	34	34	35.3	90	67.6	69	200	200	88.8	90	67.6	69	10	10	15.1	90
70	95	95	59.5	90	67.6	70	23	23	21.2	90	67.6	70	25	25	31.3	90
71	190	190	81.8	90	67.6	71	32	32	27.2	90	67.6	71	130	130	75.7	90
72	100	100	62.6	92	71.7	72	195	195	87.8	92	71.7	72	140	140	80.8	92
73	10	10	15.1	93	72.7	73	52	52	40.4	93	72.7	73	38	38	40.4	93
74	30	30	33.3	93	72.7	74	7	7	16.1	93	72.7	74	105	105	68.6	93
75	43	43	39.3	95	74.7	75	320	320	97.9	95	74.7	75	132	132	77.7	95
76	150	150	74.7	99	75.7	76	65	65	44.4	99	75.7	76	133	133	78.7	99
77	56	56	42.4	100	76.7	77	160	160	72.7	100	76.7	77	152	152	85.8	100
78	332	332	96.9	100	76.7	78	175	175	83.8	100	76.7	78	54	54	47.4	100
79	3	3	7	105	78.7	79	105	105	54.5	105	78.7	79	80	80	56.5	105

0	31	16	12	69	-7.0	38	22	5	62	-7.0	30	18	19	70	-7.0
5	15	8	16	85	-7.5	16	6	22	84	-7.5	12	9	18	88	-7.5
0	7	6	8	93	-8.0	10	7	6	90	-8.0	3	3	9	97	-8.0
5	1	1	6	99	-8.5	3	3	7	97	-8.5	0	0	3	100	-8.5
0			1	100	-9.0			3	100	-9.0			0	100	-9.0
		100					**100**					**100**			

				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**
14	23	-3.5	-4.0	12	16	19	-2.0	-2.5	4	#N/A	#N/A	#N/A	#N/A	#N/A
23	26	-4.0	-4.5	20	22	28	-3.5	-4.0	13	25	26	-3.5	-4.0	11
42	57	-6.0	-6.5	77	42	51	-5.5	-6.0	62	42	51	-6.0	-6.5	87
69	85	-7.0	-7.5	145	62	84	-7.0	-7.5	157	70	88	-7.0	-7.5	141
69	85	-7.0	-7.5	176	84	90	-7.5	-8.0	180	70	88	-7.0	-7.5	167
85	93	-7.5	-8.0	224	90	97	-8.0	-8.5	256	88	97	-7.5	-8.0	195

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20
7	115	115	63.6	20	5	7	<2	1	0	20	5	7	<2	1	0	20
8	68	68	44.4	20	5	8	<2	1	0	20	5	8	<2	1	0	20
9	95	95	57.5	21	8	9	<2	1	0	21	8	9	<2	1	0	21
10	25	25	26.2	22	9	10	<2	1	0	22	9	10	<2	1	0	22
11	31	31	28.2	23	10.1	11	<2	1	0	23	10.1	11	<2	1	0	23
12	67	67	43.4	23	10.1	12	<2	1	0	23	10.1	12	<2	1	0	23
13	230	230	92.9	24	12.1	13	<2	1	0	24	12.1	13	<2	1	0	24
14	15	15	18.1	25	13.1	14	<2	1	0	25	13.1	14	<2	1	0	25
15	5	5	7	27	14.1	15	<2	1	0	27	14.1	15	<2	1	0	27
16	110	110	60.6	27	14.1	16	<2	1	0	27	14.1	16	<2	1	0	27
17	72	72	46.4	29	16.1	17	45	45	39.3	29	16.1	17	<2	1	0	29
18	33	33	29.2	30	17.1	18	15	15	24.2	30	17.1	18	100	100	54.5	30
19	4	4	6	31	18.1	19	156	156	76.7	31	18.1	19	210	210	92.9	31
20	20	20	25.2	31	18.1	20	300	300	94.9	31	18.1	20	69	69	44.4	31
21	42	42	33.3	31	18.1	21	13	13	22.2	31	18.1	21	115	115	60.6	31
22	190	190	86.8	32	21.2	22	105	105	58.5	32	21.2	22	220	220	94.9	32
23	90	90	53.5	33	22.2	23	135	135	63.6	33	22.2	23	9	9	20.2	33
24	350	350	98.9	34	23.2	24	5	5	16.1	34	23.2	24	8	8	19.1	34
25	34	34	30.3	34	23.2	25	60	60	48.4	34	23.2	25	120	120	63.6	34
26	16	16	21.2	34	23.2	26	140	140	67.6	34	23.2	26	150	150	78.7	34
27	44	44	34.3	35	26.2	27	80	80	53.5	35	26.2	27	51	51	38.3	35
28	200	200	88.8	40	27.2	28	155	155	74.7	40	27.2	28	220	220	94.9	40
29	135	135	72.7	40	27.2	29	160	160	77.7	40	27.2	29	305	305	100	40
30	70	70	45.4	40	27.2	30	200	200	86.8	40	27.2	30	115	115	60.6	40
31	75	75	48.4	42	30.3	31	78	78	51.5	42	30.3	31	26	26	30.3	42
32	80	80	49.4	42	30.3	32	95	95	57.5	42	30.3	32	168	168	83.8	42
33	290	290	95.9	44	32.3	33	135	135	63.6	44	32.3	33	140	140	73.7	44
34	190	190	86.8	44	32.3	34	125	125	61.6	44	32.3	34	120	120	63.6	44
35	19	19	24.2	46	34.3	35	55	55	44.4	46	34.3	35	150	150	78.7	46
36	140	140	75.7	48	35.3	36	78	78	51.5	48	35.3	36	120	120	63.6	48
37	110	110	60.6	49	36.3	37	13	13	22.2	49	36.3	37	150	150	78.7	49
38	200	200	88.8	50	37.3	38	45	45	39.3	50	37.3	38	140	140	73.7	50
39	270	270	93.9	54	38.3	39	140	140	67.6	54	38.3	39	11	11	24.2	54
40	98	98	58.5	54	38.3	40	122	122	60.6	54	38.3	40	125	125	68.6	54
41	280	280	94.9	55	40.4	41	10	10	20.2	55	40.4	41	35	35	33.3	55
42	13	13	15.1	55	40.4	42	61	61	50.5	55	40.4	42	39	39	35.3	55
43	186	186	85.8	55	40.4	43	135	135	63.6	55	40.4	43	81	81	47.4	55
44	170	170	80.8	55	40.4	44	10	10	20.2	55	40.4	44	62	62	40.4	55
45	18	18	23.2	61	44.4	45	200	200	86.8	61	44.4	45	130	130	70.7	61
46	130	130	69.6	62	45.4	46	5	5	16.1	62	45.4	46	65	65	42.4	62
47	85	85	52.5	62	45.4	47	24	24	29.2	62	45.4	47	64	64	41.4	62
48	140	140	75.7	62	45.4	48	81	81	54.5	62	45.4	48	105	105	57.5	62
49	173	173	82.8	64	48.4	49	50	50	42.4	64	48.4	49	25	25	29.2	64
50	320	320	97.9	67	49.4	50	55	55	44.4	67	49.4	50	112	112	59.5	67
51	84	84	51.5	67	49.4	51	52	52	43.4	67	49.4	51	130	130	70.7	67
52	7	7	9	70	51.5	52	35	35	36.3	70	51.5	52	140	140	73.7	70
53	66	66	42.4	72	52.5	53	170	170	78.7	72	52.5	53	150	150	78.7	72
54	150	150	77.7	74	53.5	54	55	55	44.4	74	53.5	54	95	95	51.5	74
55	175	175	83.8	75	54.5	55	40	40	37.3	75	54.5	55	60	60	39.3	75
56	135	135	72.7	75	54.5	56	310	310	95.9	75	54.5	56	82	82	48.4	75
57	5	5	7	76	56.5	57	140	140	67.6	76	56.5	57	96	96	53.5	76
58	48	48	35.3	78	57.5	58	155	155	74.7	78	57.5	58	194	194	90.9	78
59	50	50	38.3	80	58.5	59	60	60	48.4	80	58.5	59	31	31	32.3	80
60	90	90	53.5	82	59.5	60	121	121	59.5	82	59.5	60	74	74	45.4	82
61	200	200	88.8	83	60.6	61	89	89	55.5	83	60.6	61	220	220	94.9	83
62	90	90	53.5	84	61.6	62	90	90	56.5	84	61.6	62	4	4	17.1	84
63	130	130	69.6	85	62.6	63	175	175	79.7	85	62.6	63	85	85	49.4	85
64	180	180	84.8	86	63.6	64	45	45	39.3	86	63.6	64	185	185	88.8	86
65	125	125	68.6	88	64.6	65	146	146	71.7	88	64.6	65	175	175	84.8	88
66	14	14	16.1	88	64.6	66	25	25	31.3	88	64.6	66	9	9	20.2	88
67	63	63	41.4	89	66.6	67	150	150	72.7	89	66.6	67	19	19	26.2	89
68	210	210	91.9	90	67.6	68	150	150	72.7	90	67.6	68	130	130	70.7	90
69	16	16	21.2	90	67.6	69	22	22	28.2	90	67.6	69	300	300	98.9	90
70	40	40	32.3	90	67.6	70	135	135	63.6	90	67.6	70	105	105	57.5	90
71	11	11	12.1	90	67.6	71	31	31	35.3	90	67.6	71	13	13	25.2	90
72	48	48	35.3	92	71.7	72	185	185	84.8	92	71.7	72	95	95	51.5	92
73	90	90	53.5	93	72.7	73	42	42	38.3	93	72.7	73	50	50	37.3	93
74	27	27	27.2	93	72.7	74	180	180	81.8	93	72.7	74	100	100	54.5	93
75	135	135	72.7	95	74.7	75	180	180	81.8	95	74.7	75	178	178	85.8	95
76	100	100	59.5	99	75.7	76	145	145	70.7	99	75.7	76	179	179	86.8	99
77	15	15	18.1	100	76.7	77	205	205	88.8	100	76.7	77	10	10	22.2	100
78	130	130	69.6	100	76.7	78	285	285	91.9	100	76.7	78	125	125	68.6	100
79	120	120	66.6	105	78.7	79	180	180	81.8	105	78.7	79	185	185	88.8	105

7.5	23	13	22	77	-7.5	34	23	18	66	-7.5	21	14	21	79	-7.5
8.0	10	8	13	90	-8.0	11	6	23	89	-8.0	7	5	14	93	-8.0
8.5	2	2	8	98	-8.5	5	5	6	95	-8.5	2	2	5	98	-8.5
9.0			2	100	-9.0			5	100	-9.0			2	100	-9.0
		100					**100**					**100**			
					Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**
	16	17	-4.0	-4.5	16	15	18	-4.5	-5.0	25	15	20	-5.0	-5.5	34
	23	29	-5.5	-6.0	51	22	26	-5.5	-6.0	59	24	27	-6.0	-6.5	72
	37	55	-6.5	-7.0	116	48	66	-7.0	-7.5	133	27	58	-6.5	-7.0	117
	55	77	-7.0	-7.5	175	66	89	-7.5	-8.0	207	58	79	-7.0	-7.5	169
	77	90	-7.5	-8.0	218	66	89	-7.5	-8.0	237	79	93	-7.5	-8.0	204
	90	98	-8.0	-8.5	256	89	95	-8.0	-8.5	271	79	93	-7.5	-8.0	237

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18
6	<2	1	0	20	5	6	140	140	52.5	20	5	6	110	110	41.4	20
7	<2	1	0	20	5	7	110	110	41.4	20	5	7	160	160	68.6	20
8	<2	1	0	20	5	8	360	360	94.9	20	5	8	120	120	47.4	20
9	12	12	12.1	21	8	9	140	140	52.5	21	8	9	240	240	87.8	21
10	190	190	77.7	22	9	10	10	10	11.1	22	9	10	175	175	76.7	22
11	125	125	53.5	23	10.1	11	305	305	91.9	23	10.1	11	155	155	67.6	23
12	260	260	90.9	23	10.1	12	170	170	64.6	23	10.1	12	8	8	6	23
13	170	170	71.7	24	12.1	13	445	445	98.9	24	12.1	13	125	125	56.5	24
14	230	230	85.8	25	13.1	14	130	130	48.4	25	13.1	14	60	60	22.2	25
15	6	6	9	27	14.1	15	5	5	6	27	14.1	15	12	12	10.1	27
16	260	260	90.9	27	14.1	16	17	17	13.1	27	14.1	16	10	10	8	27
17	230	230	85.8	29	16.1	17	230	230	84.8	29	16.1	17	105	105	36.3	29
18	170	170	71.7	30	17.1	18	64	64	25.2	30	17.1	18	120	120	47.4	30
19	540	540	100	31	18.1	19	82	82	32.3	31	18.1	19	255	255	89.8	31
20	3	3	8	31	18.1	20	45	45	21.2	31	18.1	20	140	140	62.6	31
21	190	190	77.7	31	18.1	21	87	87	35.3	31	18.1	21	130	130	58.5	31
22	100	100	39.3	32	21.2	22	135	135	51.5	32	21.2	22	220	220	84.8	32
23	240	240	87.8	33	22.2	23	140	140	52.5	33	22.2	23	300	300	95.9	33
24	180	180	75.7	34	23.2	24	7	7	9	34	23.2	24	400	400	98.9	34
25	120	120	51.5	34	23.2	25	215	215	77.7	34	23.2	25	100	100	34.3	34
26	80	80	32.3	34	23.2	26	395	395	96.9	34	23.2	26	255	255	89.8	34
27	130	130	55.5	35	26.2	27	25	25	16.1	35	26.2	27	45	45	18.1	35
28	200	200	80.8	40	27.2	28	155	155	62.6	40	27.2	28	8	8	6	40
29	115	115	48.4	40	27.2	29	140	140	52.5	40	27.2	29	120	120	47.4	40
30	48	48	23.2	40	27.2	30	110	110	41.4	40	27.2	30	55	55	20.2	40
31	160	160	69.6	42	30.3	31	105	105	38.3	42	30.3	31	80	80	24.2	42
32	300	300	93.9	42	30.3	32	4	4	5	42	30.3	32	98	98	32.3	42
33	39	39	22.2	44	32.3	33	160	160	63.6	44	32.3	33	16	16	12.1	44
34	110	110	46.4	44	32.3	34	220	220	80.8	44	32.3	34	35	35	15.1	44
35	79	79	31.3	46	34.3	35	40	40	20.2	46	34.3	35	285	285	94.9	46
36	150	150	65.6	48	35.3	36	185	185	67.6	48	35.3	36	165	165	70.7	48
37	130	130	55.5	49	36.3	37	75	75	28.2	49	36.3	37	92	92	27.2	49
38	130	130	55.5	50	37.3	38	35	35	19.1	50	37.3	38	225	225	85.8	50
39	300	300	93.9	54	38.3	39	55	55	24.2	54	38.3	39	21	21	13.1	54
40	227	227	84.8	54	38.3	40	465	465	100	54	38.3	40	85	85	25.2	54
41	27	27	17.1	55	40.4	41	105	105	38.3	55	40.4	41	330	330	97.9	55
42	180	180	75.7	55	40.4	42	65	65	26.2	55	40.4	42	195	195	81.8	55
43	120	120	51.5	55	40.4	43	22	22	14.1	55	40.4	43	120	120	47.4	55
44	240	240	87.8	55	40.4	44	300	300	90.9	55	40.4	44	100	100	34.3	55
45	100	100	39.3	61	44.4	45	29	29	17.1	61	44.4	45	185	185	79.7	61
46	160	160	69.6	62	45.4	46	120	120	45.4	62	45.4	46	95	95	29.2	62
47	49	49	24.2	62	45.4	47	235	235	85.8	62	45.4	47	175	175	76.7	62
48	21	21	16.1	62	45.4	48	130	130	48.4	62	45.4	48	255	255	89.8	62
49	350	350	97.9	64	48.4	49	125	125	46.4	64	48.4	49	120	120	47.4	64
50	80	80	32.3	67	49.4	50	130	130	48.4	67	49.4	50	131	131	59.5	67
51	130	130	55.5	67	49.4	51	100	100	37.3	67	49.4	51	64	64	23.2	67
52	50	50	26.2	70	51.5	52	245	245	87.8	70	51.5	52	55	55	20.2	70
53	98	98	38.3	72	52.5	53	145	145	59.5	72	52.5	53	187	187	80.8	72
54	13	13	14.1	74	53.5	54	5	5	6	74	53.5	54	95	95	29.2	74
55	32	32	19.1	75	54.5	55	34	34	18.1	75	54.5	55	310	310	96.9	75
56	57	57	28.2	75	54.5	56	220	220	80.8	75	54.5	56	35	35	15.1	75
57	70	70	29.2	76	56.5	57	200	200	74.7	76	56.5	57	133	133	60.6	76
58	34	34	20.2	78	57.5	58	80	80	30.3	78	57.5	58	440	440	100	78
59	49	49	24.2	80	58.5	59	110	110	41.4	80	58.5	59	170	170	73.7	80
60	190	190	77.7	82	59.5	60	204	204	76.7	82	59.5	60	24	24	14.1	82
61	55	55	27.2	83	60.6	61	53	53	23.2	83	60.6	61	255	255	89.8	83
62	130	130	55.5	84	61.6	62	127	127	47.4	84	61.6	62	165	165	70.7	84
63	13	13	14.1	85	62.6	63	220	220	80.8	85	62.6	63	120	120	47.4	85
64	95	95	37.3	86	63.6	64	84	84	33.3	86	63.6	64	108	108	38.3	86
65	70	70	29.2	88	64.6	65	75	75	28.2	88	64.6	65	175	175	76.7	88
66	105	105	44.4	88	64.6	66	200	200	74.7	88	64.6	66	145	145	63.6	88
67	500	500	98.9	89	66.6	67	400	400	97.9	89	66.6	67	210	210	83.8	89
68	128	128	54.5	90	67.6	68	275	275	89.8	90	67.6	68	124	124	55.5	90
69	27	27	17.1	90	67.6	69	24	24	15.1	90	67.6	69	5	5	5	90
70	85	85	34.3	90	67.6	70	355	355	93.9	90	67.6	70	150	150	66.6	90
71	100	100	39.3	90	67.6	71	215	215	77.7	90	67.6	71	10	10	8	90
72	220	220	82.8	92	71.7	72	85	85	34.3	92	71.7	72	110	110	41.4	92
73	170	170	71.7	93	72.7	73	110	110	41.4	93	72.7	73	167	167	72.7	93
74	115	115	48.4	93	72.7	74	184	184	66.6	93	72.7	74	270	270	93.9	93
75	280	280	92.9	95	74.7	75	73	73	27.2	95	74.7	75	15	15	11.1	95
76	110	110	46.4	99	75.7	76	245	245	87.8	99	75.7	76	95	95	29.2	99
77	140	140	61.6	100	76.7	77	80	80	30.3	100	76.7	77	40	40	17.1	100
78	150	150	65.6	100	76.7	78	320	320	92.9	100	76.7	78	115	115	44.4	100
79	10	10	11.1	105	78.7	79	380	380	95.9	105	78.7	79	145	145	63.6	105

7.0	51	15	7	49	-7.0	63	20	9	37	-7.0	51	22	13	49	-7.0
7.5	36	18	15	64	-7.5	43	19	20	57	-7.5	29	13	22	71	-7.5
8.0	18	14	18	82	-8.0	24	17	19	76	-8.0	16	14	13	84	-8.0
8.5	4	4	14	96	-8.5	7	7	17	93	-8.5	2	2	14	98	-8.5
9.0			4	100	-9.0			7	100	-9.0			2	100	-9.0
		100					**100**					**100**			

				Percentile (mm)					Percentile (mm)					Percentile (mm)
13	18	-1.0	-2.0	3	16	20	-4.0	-5.0	16	#N/A	#N/A	#N/A	#N/A	#N/A
23	26	-4.0	-4.5	20	24	28	-6.0	-6.5	70	25	29	-5.0	-5.5	32
49	64	-7.0	-7.5	131	37	57	-7.0	-7.5	160	49	71	-7.0	-7.5	130
64	82	-7.5	-8.0	223	57	76	-7.5	-8.0	251	71	84	-7.5	-8.0	201
82	96	-8.0	-8.5	269	76	93	-8.0	-8.5	301	84	98	-8.0	-8.5	256
82	96	-8.0	-8.5	312	76	93	-8.0	-8.5	341	84	98	-8.0	-8.5	297

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20
7	<2	1	0	20	5	7	<2	1	0	20	5	7	<2	1	0	20
8	<2	1	0	20	5	8	<2	1	0	20	5	8	<2	1	0	20
9	<2	1	0	21	8	9	<2	1	0	21	8	9	<2	1	0	21
10	<2	1	0	22	9	10	<2	1	0	22	9	10	<2	1	0	22
11	<2	1	0	23	10.1	11	<2	1	0	23	10.1	11	<2	1	0	23
12	<2	1	0	23	10.1	12	<2	1	0	23	10.1	12	<2	1	0	23
13	<2	1	0	24	12.1	13	50	50	21.2	24	12.1	13	<2	1	0	24
14	19	19	23.2	25	13.1	14	160	160	44.4	25	13.1	14	<2	1	0	25
15	320	320	91.9	27	14.1	15	270	270	77.7	27	14.1	15	<2	1	0	27
16	130	130	49.4	27	14.1	16	180	180	54.5	27	14.1	16	<2	1	0	27
17	300	300	85.8	29	16.1	17	480	480	97.9	29	16.1	17	<2	1	0	29
18	260	260	82.8	30	17.1	18	357	357	91.9	30	17.1	18	<2	1	0	30
19	150	150	56.5	31	18.1	19	195	195	63.6	31	18.1	19	50	50	29.2	31
20	130	130	49.4	31	18.1	20	105	105	28.2	31	18.1	20	161	161	63.6	31
21	120	120	42.4	31	18.1	21	310	310	88.8	31	18.1	21	251	251	83.8	31
22	120	120	42.4	32	21.2	22	405	405	96.9	32	21.2	22	36	36	27.2	32
23	410	410	98.9	33	22.2	23	105	105	28.2	33	22.2	23	230	230	81.8	33
24	190	190	64.6	34	23.2	24	122	122	36.3	34	23.2	24	350	350	96.9	34
25	220	220	71.7	34	23.2	25	180	180	54.5	34	23.2	25	310	310	92.9	34
26	190	190	64.6	34	23.2	26	140	140	38.3	34	23.2	26	270	270	84.8	34
27	180	180	62.6	35	26.2	27	225	225	70.7	35	26.2	27	200	200	76.7	35
28	120	120	42.4	40	27.2	28	178	178	52.5	40	27.2	28	110	110	42.4	40
29	3	3	13.1	40	27.2	29	35	35	20.2	40	27.2	29	450	450	98.9	40
30	400	400	97.9	40	27.2	30	286	286	82.8	40	27.2	30	115	115	46.4	40
31	3	3	13.1	42	30.3	31	162	162	48.4	42	30.3	31	340	340	94.9	42
32	80	80	39.3	42	30.3	32	210	210	67.6	42	30.3	32	168	168	65.6	42
33	250	250	78.7	44	32.3	33	279	279	79.7	44	32.3	33	178	178	66.6	44
34	200	200	68.6	44	32.3	34	175	175	51.5	44	32.3	34	142	142	54.5	44
35	335	335	94.9	46	34.3	35	22	22	18.1	46	34.3	35	190	190	71.7	46
36	240	240	76.7	48	35.3	36	230	230	72.7	48	35.3	36	235	235	82.8	48
37	165	165	59.5	49	36.3	37	160	160	44.4	49	36.3	37	110	110	42.4	49
38	170	170	60.6	50	37.3	38	385	385	95.9	50	37.3	38	140	140	52.5	50
39	12	12	22.2	54	38.3	39	190	190	59.5	54	38.3	39	138	138	51.5	54
40	300	300	85.8	54	38.3	40	120	120	33.3	54	38.3	40	110	110	42.4	54
41	21	21	25.2	55	40.4	41	85	85	26.2	55	40.4	41	307	307	91.9	55
42	290	290	84.8	55	40.4	42	225	225	70.7	55	40.4	42	178	178	66.6	55
43	128	128	48.4	55	40.4	43	150	150	41.4	55	40.4	43	140	140	52.5	55
44	230	230	74.7	55	40.4	44	375	375	94.9	55	40.4	44	15	15	22.2	55
45	70	70	36.3	61	44.4	45	150	150	41.4	61	44.4	45	135	135	49.4	61
46	300	300	85.8	62	45.4	46	182	182	57.5	62	45.4	46	98	98	39.3	62
47	220	220	71.7	62	45.4	47	205	205	66.6	62	45.4	47	280	280	85.8	62
48	4	4	16.1	62	45.4	48	105	105	28.2	62	45.4	48	60	60	32.3	62
49	70	70	36.3	64	48.4	49	74	74	25.2	64	48.4	49	355	355	97.9	64
50	27	27	29.2	67	49.4	50	235	235	73.7	67	49.4	50	80	80	34.3	67
51	250	250	78.7	67	49.4	51	199	199	64.6	67	49.4	51	300	300	89.8	67
52	90	90	41.4	70	51.5	52	270	270	77.7	70	51.5	52	285	285	86.8	70
53	20	20	24.2	72	52.5	53	145	145	40.4	72	52.5	53	100	100	40.4	72
54	3	3	13.1	74	53.5	54	300	300	85.8	74	53.5	54	125	125	48.4	74
55	180	180	62.6	75	54.5	55	22	22	18.1	75	54.5	55	95	95	36.3	75
56	6	6	20.2	75	54.5	56	290	290	83.8	75	54.5	56	34	34	26.2	75
57	8	8	21.2	76	56.5	57	600	600	100	76	56.5	57	290	290	87.8	76
58	190	190	64.6	78	57.5	58	119	119	32.3	78	57.5	58	6	6	19.1	78
59	190	190	64.6	80	58.5	59	190	190	59.5	80	58.5	59	210	210	77.7	80
60	5	5	18.1	82	59.5	60	167	167	49.4	82	59.5	60	115	115	46.4	82
61	75	75	38.3	83	60.6	61	140	140	38.3	83	60.6	61	160	160	59.5	83
62	5	5	18.1	84	61.6	62	170	170	50.5	84	61.6	62	600	600	100	84
63	125	125	47.4	85	62.6	63	210	210	67.6	85	62.6	63	178	178	66.6	85
64	26	26	28.2	86	63.6	64	50	50	21.2	86	63.6	64	56	56	31.3	86
65	150	150	56.5	88	64.6	65	7	7	13.1	88	64.6	65	215	215	78.7	88
66	600	600	100	88	64.6	66	290	290	83.8	88	64.6	66	195	195	75.7	88
67	140	140	53.5	89	66.6	67	325	325	90.9	89	66.6	67	145	145	55.5	89
68	40	40	33.3	90	67.6	68	220	220	69.6	90	67.6	68	7	7	20.2	90
69	220	220	71.7	90	67.6	69	50	50	21.2	90	67.6	69	160	160	59.5	90
70	176	176	61.6	90	67.6	70	120	120	33.3	90	67.6	70	135	135	49.4	90
71	300	300	85.8	90	67.6	71	360	360	92.9	90	67.6	71	180	180	69.6	90
72	85	85	40.4	92	71.7	72	190	190	59.5	92	71.7	72	190	190	71.7	92
73	205	205	70.7	93	72.7	73	120	120	33.3	93	72.7	73	145	145	55.5	93
74	284	284	83.8	93	72.7	74	280	280	80.8	93	72.7	74	38	38	28.2	93
75	240	240	76.7	95	74.7	75	160	160	44.4	95	74.7	75	320	320	93.9	95
76	135	135	52.5	99	75.7	76	580	580	98.9	99	75.7	76	50	50	29.2	99
77	160	160	58.5	100	76.7	77	250	250	75.7	100	76.7	77	31	31	24.2	100
78	300	300	85.8	100	76.7	78	17	17	16.1	100	76.7	78	3	3	18.1	100
79	235	235	75.7	105	78.7	79	185	185	58.5	105	78.7	79	345	345	95.9	105

7.5	27	10	12	73	-7.5	40	15	18	60	-7.5	28	12	13	72	-7.5
8.0	17	7	10	83	-8.0	25	13	15	75	-8.0	16	9	12	84	-8.0
8.5	10	10	7	90	-8.5	12	12	13	88	-8.5	7	7	9	93	-8.5
9.0			10	100	-9.0			12	100	-9.0			7	100	-9.0
		100					100					100			

				Percentile (mm)					Percentile (mm)					Percentile (mm)
15	17	-2.5	-3.0	7	15	17	-3.0	-4.0	11	15	17	-2.0	-2.5	5
23	26	-4.0	-4.5	20	25	26	-5.5	-6.0	45	21	26	-3.5	-4.5	20
50	61	-6.5	-7.0	90	42	60	-7.0	-7.5	149	40	52	-6.0	-6.5	85
73	83	-7.5	-8.0	193	75	88	-8.0	-8.5	256	72	84	-7.5	-8.0	197
83	90	-8.0	-8.5	269	75	88	-8.0	-8.5	325	84	93	-8.0	-8.5	256
90	100	-8.5	-9.0	362	88	100	-8.5	-9.0	384	84	93	-8.0	-8.5	323

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm replace "<2" with 1
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20
7	<2	1	0	20	5	7	<2	1	0	20	5	7	<2	1	0	20
8	<2	1	0	20	5	8	<2	1	0	20	5	8	<2	1	0	20
9	<2	1	0	21	8	9	<2	1	0	21	8	9	<2	1	0	21
10	<2	1	0	22	9	10	<2	1	0	22	9	10	<2	1	0	22
11	170	170	67.6	23	10.1	11	<2	1	0	23	10.1	11	<2	1	0	23
12	15	15	19.1	23	10.1	12	23	23	19.1	23	10.1	12	<2	1	0	23
13	50	50	36.3	24	12.1	13	260	260	75.7	24	12.1	13	<2	1	0	24
14	600	600	97.9	25	13.1	14	25	25	20.2	25	13.1	14	<2	1	0	25
15	190	190	74.7	27	14.1	15	11	11	16.1	27	14.1	15	90	90	50.5	27
16	130	130	61.6	27	14.1	16	300	300	80.8	27	14.1	16	80	80	47.4	27
17	52	52	38.3	29	16.1	17	27	27	21.2	29	16.1	17	260	260	84.8	29
18	3	3	10.1	30	17.1	18	120	120	37.3	30	17.1	18	400	400	94.9	30
19	215	215	77.7	31	18.1	19	150	150	51.5	31	18.1	19	165	165	69.6	31
20	280	280	84.8	31	18.1	20	310	310	83.8	31	18.1	20	145	145	64.6	31
21	230	230	79.7	31	18.1	21	330	330	86.8	31	18.1	21	135	135	61.6	31
22	90	90	47.4	32	21.2	22	145	145	49.4	32	21.2	22	130	130	59.5	32
23	48	48	35.3	33	22.2	23	360	360	87.8	33	22.2	23	240	240	80.8	33
24	500	500	93.9	34	23.2	24	27	27	21.2	34	23.2	24	13	13	22.2	34
25	55	55	40.4	34	23.2	25	480	480	93.9	34	23.2	25	145	145	64.6	34
26	118	118	54.5	34	23.2	26	180	180	57.5	34	23.2	26	305	305	87.8	34
27	170	170	67.6	35	26.2	27	260	260	75.7	35	26.2	27	135	135	61.6	35
28	16	16	22.2	40	27.2	28	240	240	70.7	40	27.2	28	160	160	67.6	40
29	290	290	85.8	40	27.2	29	21	21	18.1	40	27.2	29	8	8	17.1	40
30	500	500	93.9	40	27.2	30	390	390	88.8	40	27.2	30	500	500	97.9	40
31	19	19	24.2	42	30.3	31	180	180	57.5	42	30.3	31	4	4	14.1	42
32	7	7	15.1	42	30.3	32	140	140	47.4	42	30.3	32	45	45	35.3	42
33	19	19	24.2	44	32.3	33	185	185	60.6	44	32.3	33	5	5	15.1	44
34	420	420	90.9	44	32.3	34	220	220	64.6	44	32.3	34	350	350	92.9	44
35	5	5	14.1	46	34.3	35	170	170	55.5	46	34.3	35	305	305	87.8	46
36	8	8	16.1	48	35.3	36	90	90	30.3	48	35.3	36	205	205	76.7	48
37	170	170	67.6	49	36.3	37	240	240	70.7	49	36.3	37	150	150	66.6	49
38	41	41	33.3	50	37.3	38	475	475	92.9	50	37.3	38	5	5	15.1	50
39	600	600	97.9	54	38.3	39	130	130	42.4	54	38.3	39	160	160	67.6	54
40	15	15	19.1	54	38.3	40	115	115	36.3	54	38.3	40	115	115	58.5	54
41	115	115	52.5	55	40.4	41	220	220	64.6	55	40.4	41	240	240	80.8	55
42	490	490	92.9	55	40.4	42	195	195	62.6	55	40.4	42	8	8	17.1	55
43	70	70	43.4	55	40.4	43	300	300	80.8	55	40.4	43	240	240	80.8	55
44	500	500	93.9	55	40.4	44	17	17	17.1	55	40.4	44	30	30	29.2	55
45	35	35	30.3	61	44.4	45	235	235	69.6	61	44.4	45	390	390	93.9	61
46	40	40	32.3	62	45.4	46	135	135	45.4	62	45.4	46	450	450	95.9	62
47	250	250	81.8	62	45.4	47	125	125	41.4	62	45.4	47	90	90	50.5	62
48	115	115	52.5	62	45.4	48	505	505	95.9	62	45.4	48	130	130	59.5	62
49	130	130	61.6	64	48.4	49	120	120	37.3	64	48.4	49	78	78	46.4	64
50	170	170	67.6	67	49.4	50	220	220	64.6	67	49.4	50	100	100	53.5	67
51	42	42	34.3	67	49.4	51	89	89	29.2	67	49.4	51	45	45	35.3	67
52	800	800	100	70	51.5	52	150	150	51.5	70	51.5	52	280	280	85.8	70
53	250	250	81.8	72	52.5	53	485	485	94.9	72	52.5	53	65	65	40.4	72
54	15	15	19.1	74	53.5	54	60	60	25.2	74	53.5	54	110	110	55.5	74
55	14	14	18.1	75	54.5	55	100	100	33.3	75	54.5	55	42	42	34.3	75
56	135	135	63.6	75	54.5	56	280	280	79.7	75	54.5	56	28	28	27.2	75
57	120	120	55.5	76	56.5	57	7	7	14.1	76	56.5	57	12	12	21.2	76
58	320	320	88.8	78	57.5	58	165	165	54.5	78	57.5	58	35	35	31.3	78
59	160	160	65.6	80	58.5	59	145	145	49.4	80	58.5	59	110	110	55.5	80
60	4	4	13.1	82	59.5	60	95	95	32.3	82	59.5	60	320	320	90.9	82
61	127	127	60.6	83	60.6	61	130	130	42.4	83	60.6	61	450	450	95.9	83
62	65	65	42.4	84	61.6	62	130	130	42.4	84	61.6	62	170	170	70.7	84
63	80	80	46.4	85	62.6	63	240	240	70.7	85	62.6	63	310	310	89.8	85
64	310	310	87.8	86	63.6	64	175	175	56.5	86	63.6	64	111	111	57.5	86
65	120	120	55.5	88	64.6	65	240	240	70.7	88	64.6	65	72	72	45.4	88
66	220	220	78.7	88	64.6	66	150	150	51.5	88	64.6	66	70	70	42.4	88
67	32	32	27.2	89	66.6	67	90	90	30.3	89	66.6	67	70	70	42.4	89
68	120	120	55.5	90	67.6	68	320	320	84.8	90	67.6	68	10	10	20.2	90
69	70	70	43.4	90	67.6	69	190	190	61.6	90	67.6	69	60	60	37.3	90
70	58	58	41.4	90	67.6	70	6	6	12.1	90	67.6	70	60	60	37.3	90
71	125	125	59.5	90	67.6	71	110	110	35.3	90	67.6	71	83	83	49.4	90
72	3	3	10.1	92	71.7	72	690	690	100	92	71.7	72	30	30	29.2	92
73	10	10	17.1	93	72.7	73	120	120	37.3	93	72.7	73	100	100	53.5	93
74	181	181	73.7	93	72.7	74	320	320	84.8	93	72.7	74	28	28	27.2	93
75	17	17	23.2	95	74.7	75	180	180	57.5	95	74.7	75	200	200	74.7	95
76	30	30	26.2	99	75.7	76	225	225	68.6	99	75.7	76	16	16	23.2	99
77	240	240	80.8	100	76.7	77	120	120	37.3	100	76.7	77	70	70	42.4	100
78	3	3	10.1	100	76.7	78	6	6	12.1	100	76.7	78	210	210	78.7	100
79	105	105	50.5	105	78.7	79	620	620	97.9	105	78.7	79	16	16	23.2	105

14	14	49	-5.5	54	11	9	46	-5.5	56	18	18	44	-5.5	48	11	14	52	-5.5	50	16
14	14	63	-6.0	43	16	11	57	-6.0	38	12	18	62	-6.0	37	17	11	63	-6.0	34	18
16	14	77	-6.5	27	17	16	73	-6.5	26	17	12	74	-6.5	20	13	17	80	-6.5	16	9
7	16	93	-7.0	10	9	17	90	-7.0	9	8	17	91	-7.0	7	6	13	93	-7.0	7	6
0	7	100	-7.5	1	1	9	99	-7.5	1	1	8	99	-7.5	1	0	6	99	-7.5	1	1
0	0	100	-8.0	0	0	1	100	-8.0	0	0	1	100	-8.0	1	1	0	99	-8.0	0	0
0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	1	100	-8.5	0	0
	0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
100					**100**					**100**					**100**					**10**
			Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
17	-3.5	-4.0	13	15	18	-3.5	-4.0	13	14	17	-3.5	-4.0	14	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/
35	-4.5	-5.0	24	22	37	-4.5	-5.0	24	21	26	-4.5	-5.0	30	25	30	-3.0	-4.0	8	24	26
63	-5.5	-6.0	46	46	57	-5.5	-6.0	51	44	62	-5.5	-6.0	51	38	52	-5.0	-5.5	43	50	66
77	-6.0	-6.5	86	73	90	-6.5	-7.0	94	74	91	-6.5	-7.0	92	63	80	-6.0	-6.5	81	66	84
93	-6.5	-7.0	105	73	90	-6.5	-7.0	113	74	91	-6.5	-7.0	111	80	93	-6.5	-7.0	100	84	93
93	-6.5	-7.0	120	90	99	-7.0	-7.5	128	74	91	-6.5	-7.0	125	80	93	-6.5	-7.0	118	84	93

size (mm)	Size (mm) replace "<2" with 1	Percent Rank		count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank		count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank		count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank		count	size (
<2	1	0		1	<2	1	0		1	<2	1	0		1	<2	1	0		1	<2
<2	1	0		2	<2	1	0		2	<2	1	0		2	<2	1	0		2	<2
<2	1	0		3	<2	1	0		3	<2	1	0		3	<2	1	0		3	<2
<2	1	0		4	<2	1	0		4	<2	1	0		4	<2	1	0		4	<2
<2	1	0		5	<2	1	0		5	<2	1	0		5	<2	1	0		5	<2
<2	1	0		6	<2	1	0		6	<2	1	0		6	<2	1	0		6	<2
<2	1	0		7	145	145	95.9		7	<2	1	0		7	<2	1	0		7	<2
105	105	84.8		8	110	110	85.8		8	<2	1	0		8	<2	1	0		8	<2
33	33	35.3		9	100	100	80.8		9	<2	1	0		9	<2	1	0		9	<2
59	59	60.6		10	10	10	9		10	<2	1	0		10	<2	1	0		10	<2
44	44	47.4		11	61	61	56.5		11	<2	1	0		11	<2	1	0		11	<2
30	30	32.3		12	91	91	73.7		12	<2	1	0		12	<2	1	0		12	<2
40	40	41.4		13	34	34	39.3		13	<2	1	0		13	<2	1	0		13	<2
16	16	16.1		14	95	95	77.7		14	125	125	90.9		14	<2	1	0		14	<2
110	110	86.8		15	65	65	57.5		15	152	152	96.9		15	<2	1	0		15	<2
35	35	37.3		16	93	93	75.7		16	40	40	36.3		16	<2	1	0		16	<2
51	51	52.5		17	43	43	44.4		17	25	25	23.2		17	<2	1	0		17	<2
21	21	20.2		18	135	135	92.9		18	37	37	32.3		18	<2	1	0		18	<2
19	19	17.1		19	165	165	98.9		19	64	64	61.6		19	<2	1	0		19	<2
42	42	44.4		20	86	86	68.6		20	94	94	74.7		20	<2	1	0		20	<2
65	65	63.6		21	25	25	27.2		21	66	66	62.6		21	<2	1	0		21	<2
100	100	78.7		22	78	78	63.6		22	42	42	41.4		22	<2	1	0		22	<2
26	26	26.2		23	107	107	84.8		23	46	46	44.4		23	10	10	26.2		23	15
82	82	73.7		24	53	53	52.5		24	135	135	93.9		24	125	125	90.9		24	42
65	65	63.6		25	71	71	58.5		25	41	41	38.3		25	140	140	94.9		25	18
65	65	63.6		26	126	126	89.8		26	89	89	71.7		26	130	130	93.9		26	50
112	112	88.8		27	46	46	46.4		27	151	151	95.9		27	125	125	90.9		27	31
100	100	78.7		28	94	94	76.7		28	119	119	88.8		28	60	60	62.6		28	35
29	29	30.3		29	80	80	64.6		29	22	22	20.2		29	91	91	80.8		29	45
20	20	19.1		30	115	115	87.8		30	193	193	100		30	125	125	90.9		30	18
19	19	17.1		31	74	74	60.6		31	80	80	64.6		31	24	24	32.3		31	73
53	53	54.5		32	23	23	22.2		32	115	115	87.8		32	87	87	77.7		32	14
10	10	13.1		33	10	10	9		33	23	23	21.2		33	81	81	71.7		33	76
122	122	90.9		34	160	160	96.9		34	19	19	17.1		34	93	93	82.8		34	10
40	40	41.4		35	120	120	88.8		35	52	52	49.4		35	45	45	50.5		35	11
28	28	28.2		36	9	9	8		36	35	35	29.2		36	10	10	26.2		36	79
56	56	56.5		37	20	20	20.2		37	53	53	50.5		37	70	70	65.6		37	40
150	150	96.9		38	75	75	61.6		38	39	39	33.3		38	18	18	30.3		38	18
42	42	44.4		39	43	43	44.4		39	102	102	82.8		39	11	11	29.2		39	60
100	100	78.7		40	82	82	65.6		40	58	58	57.5		40	295	295	100		40	49
7	7	10.1		41	49	49	49.4		41	100	100	78.7		41	36	36	43.4		41	70
31	31	34.3		42	185	185	100		42	57	57	56.5		42	4	4	22.2		42	9
160	160	98.9		43	39	39	42.4		43	56	56	55.5		43	50	50	55.5		43	34
84	84	75.7		44	143	143	94.9		44	54	54	51.5		44	55	55	57.5		44	15
34	34	36.3		45	76	76	62.6		45	36	36	30.3		45	161	161	98.9		45	55
3	3	7		46	15	15	16.1		46	95	95	75.7		46	68	68	64.6		46	39
30	30	32.3		47	10	10	9		47	32	32	25.2		47	59	59	61.6		47	21
79	79	71.7		48	55	55	53.5		48	12	12	14.1		48	43	43	49.4		48	38
47	47	50.5		49	12	12	15.1		49	13	13	16.1		49	95	95	83.8		49	70
74	74	68.6		50	32	32	35.3		50	40	40	36.3		50	55	55	57.5		50	53
40	40	41.4		51	5	5	6		51	55	55	53.5		51	86	86	75.7		51	48
5	5	9		52	30	30	33.3		52	60	60	58.5		52	36	36	43.4		52	50
29	29	30.3		53	10	10	9		53	109	109	85.8		53	33	33	38.3		53	61
36	36	39.3		54	52	52	51.5		54	60	60	58.5		54	19	19	31.3		54	55
100	100	78.7		55	11	11	14.1		55	24	24	22.2		55	145	145	96.9		55	12
24	24	23.2		56	32	32	35.3		56	41	41	38.3		56	105	105	84.8		56	13
111	111	87.8		57	86	86	68.6		57	54	54	51.5		57	49	49	54.5		57	71
46	46	49.4		58	27	27	29.2		58	162	162	98.9		58	55	55	57.5		58	85
48	48	51.5		59	28	28	30.3		59	39	39	33.3		59	120	120	89.8		59	31
35	35	37.3		60	16	16	17.1		60	103	103	83.8		60	70	70	65.6		60	8
25	25	24.2		61	82	82	65.6		61	81	81	68.6		61	35	35	40.4		61	75
57	57	58.5		62	35	35	40.4		62	130	130	91.9		62	45	45	50.5		62	46
64	64	62.6		63	140	140	93.9		63	90	90	73.7		63	76	76	67.6		63	11
83	83	74.7		64	29	29	32.3		64	95	95	75.7		64	39	39	45.4		64	64
26	26	26.2		65	10	10	9		65	120	120	89.8		65	86	86	75.7		65	65
100	100	78.7		66	91	91	73.7		66	51	51	48.4		66	35	35	40.4		66	11
95	95	77.7		67	23	23	22.2		67	43	43	42.4		67	87	87	77.7		67	30
51	51	52.5		68	85	85	67.6		68	161	161	97.9		68	92	92	81.8		68	86
85	85	76.7		69	98	98	79.7		69	36	36	30.3		69	46	46	52.5		69	36
128	128	92.9		70	31	31	34.3		70	100	100	78.7		70	24	24	32.3		70	13
42	42	44.4		71	46	46	46.4		71	145	145	94.9		71	46	46	52.5		71	55
80	80	72.7		72	55	55	53.5		72	96	96	77.7		72	10	10	26.2		72	11
103	103	83.8		73	72	72	59.5		73	31	31	24.2		73	145	145	96.9		73	37
125	125	91.9		74	51	51	50.5		74	33	33	26.2		74	39	39	45.4		74	11
36	36	39.3		75	23	23	22.2		75	80	80	64.6		75	9	9	25.2		75	58
28	28	28.2		76	46	46	46.4		76	39	39	33.3		76	32	32	37.3		76	79
56	56	56.5		77	160	160	96.9		77	89	89	71.7		77	27	27	35.3		77	13
21	21	20.2		78	105	105	81.8		78	83	83	69.6		78	110	110	86.8		78	74
45	45	48.4		79	129	129	90.9		79	41	41	38.3		79	85	85	74.7		79	20
105	105	84.8		80	33	33	37.3		80	100	100	78.7		80	34	34	39.3		80	81
58	58	59.5		81	19	19	19.1		81	85	85	70.7		81	35	35	40.4		81	64
76	76	69.6		82	40	40	43.4		82	34	34	27.2		82	76	76	67.6		82	73
21	21	20.2		83	60	60	55.5		83	55	55	53.5		83	40	40	47.4		83	21
140	140	94.9		84	6	6	7		84	101	101	81.8		84	110	110	86.8		84	78
121	121	89.8		85	20	20	20.2		85	133	133	92.9		85	80	80	70.7		85	74
8	8	12.1		86	23	23	22.2		86	19	19	17.1		86	78	78	69.6		86	56
78	78	70.7		87	105	105	81.8		87	34	34	27.2		87	30	30	36.3		87	13
10	10	13.1		88	90	90	71.7		88	49	49	47.4		88	53	53	56.5		88	54
156	156	97.9		89	133	133	91.9		89	113	113	86.8		89	115	115	88.8		89	33
130	130	93.9		90	25	25	27.2		90	106	106	84.8		90	82	82	72.7		90	5
25	25	24.2		91	36	36	41.4		91	12	12	14.1		91	90	90	79.7		91	25
143	143	95.9		92	89	89	70.7		92	9	9	13.1		92	140	140	94.9		92	93

65	18	9	35	-5.5	66	15	9	34	-5.5	62	20	6	38	-5.5	57	11	10	43	-5.5	36	8	20
47	21	18	53	-6.0	51	27	15	49	-6.0	42	19	20	58	-6.0	46	18	11	54	-6.0	28	11	8
26	19	21	74	-6.5	24	16	27	76	-6.5	23	12	19	77	-6.5	28	16	18	72	-6.5	17	10	11
7	7	19	93	-7.0	8	7	16	92	-7.0	11	7	12	89	-7.0	12	10	16	88	-7.0	7	7	10
0	0	7	100	-7.5	1	1	7	99	-7.5	4	4	7	96	-7.5	2	2	10	98	-7.5	0	0	7
0	0	0	100	-8.0	0	0	1	100	-8.0	0	0	4	100	-8.0	0	0	2	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
13	20	-4.0	-4.5	19	13	18	-4.0	-4.5	20	15	23	-4.0	-4.5	17	15	20	-3.5	-4.0	12	#N/A	#N/A	#N/A
20	26	-4.5	-5.0	30	25	34	-5.0	-5.5	32	23	32	-4.5	-5.0	24	20	26	-4.0	-4.5	21	23	29	-3.5
35	53	-5.5	-6.0	60	49	76	-6.0	-6.5	65	38	58	-5.5	-6.0	56	43	54	-5.5	-6.0	56	44	64	-5.0
74	93	-6.5	-7.0	92	49	76	-6.0	-6.5	89	58	77	-6.0	-6.5	87	72	88	-6.5	-7.0	96	72	83	-6.0
74	93	-6.5	-7.0	108	76	92	-6.5	-7.0	107	77	89	-6.5	-7.0	111	72	88	-6.5	-7.0	117	83	93	-6.5
74	93	-6.5	-7.0	121	76	92	-6.5	-7.0	122	89	96	-7.0	-7.5	134	88	98	-7.0	-7.5	137	83	93	-6.5

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	92	92	74.7
3	55	55	39.3
4	33	33	26.2
5	26	26	21.2
6	25	25	20.2
7	97	97	77.7
8	35	35	28.2
9	55	55	39.3
10	100	100	80.8
11	77	77	63.6
12	80	80	66.6
13	74	74	62.6
14	30	30	24.2
15	67	67	57.5
16	65	65	53.5
17	80	80	66.6
18	21	21	18.1
19	60	60	46.4
20	39	39	31.3
21	93	93	75.7
22	60	60	46.4
23	52	52	38.3
24	17	17	13.1
25	33	33	26.2
26	14	14	10.1
27	61	61	50.5
28	110	110	86.8
29	60	60	46.4
30	96	96	76.7
31	9	9	2
32	60	60	46.4
33	100	100	80.8
34	106	106	84.8
35	35	35	28.2
36	35	35	28.2
37	42	42	34.3
38	115	115	90.9
39	66	66	55.5
40	88	88	73.7
41	70	70	58.5
42	82	82	69.6
43	77	77	63.6
44	59	59	44.4
45	117	117	91.9
46	10	10	5
47	9	9	2
48	12	12	7
49	5	5	1
50	72	72	60.6
51	82	82	69.6
52	30	30	24.2
53	10	10	5
54	136	136	95.9
55	145	145	98.9
56	58	58	42.4
57	50	50	35.3
58	58	58	42.4
59	62	62	51.5
60	110	110	86.8
61	140	140	97.9
62	12	12	7
63	28	28	23.2
64	99	99	79.7
65	40	40	33.3
66	73	73	61.6
67	21	21	18.1
68	80	80	66.6
69	50	50	35.3
70	82	82	69.6
71	50	50	35.3
72	27	27	22.2
73	98	98	78.7
74	100	100	80.8
75	119	119	92.9
76	12	12	7
77	104	104	83.8
78	78	78	65.6
79	114	114	89.8
80	130	130	93.9
81	18	18	14.1
82	83	83	72.7
83	139	139	96.9
84	132	132	94.9
85	9	9	2
86	65	65	53.5
87	70	70	58.5
88	66	66	55.5
89	108	108	85.8
90	110	110	86.8
91	56	56	41.4
92	159	159	100
93	59	59	44.4
94	39	39	31.3
95	16	16	11.1
96	16	16	11.1
97	18	18	14.1
98	63	63	52.5
99	18	18	14.1
100	18	18	14.1

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	110	110	83.8
8	47	47	35.3
9	62	62	47.4
10	85	85	67.6
11	65	65	49.4
12	80	80	63.6
13	27	27	21.2
14	16	16	11.1
15	30	30	23.2
16	19	19	14.1
17	70	70	56.5
18	37	37	27.2
19	99	99	79.7
20	90	90	71.7
21	90	90	71.7
22	27	27	21.2
23	42	42	32.3
24	82	82	65.6
25	119	119	87.8
26	48	48	36.3
27	49	49	37.3
28	67	67	55.5
29	81	81	64.6
30	130	130	92.9
31	84	84	66.6
32	40	40	30.3
33	50	50	38.3
34	65	65	49.4
35	90	90	71.7
36	110	110	83.8
37	65	65	49.4
38	145	145	94.9
39	15	15	10.1
40	13	13	8
41	125	125	90.9
42	39	39	29.2
43	140	140	93.9
44	50	50	38.3
45	13	13	8
46	22	22	16.1
47	17	17	13.1
48	110	110	83.8
49	25	25	18.1
50	62	62	47.4
51	60	60	45.4
52	57	57	44.4
53	25	25	18.1
54	100	100	80.8
55	60	60	45.4
56	46	46	34.3
57	30	30	23.2
58	12	12	7
59	50	50	38.3
60	73	73	61.6
61	78	78	62.6
62	45	45	33.3
63	25	25	18.1
64	70	70	56.5
65	34	34	25.2
66	19	19	14.1
67	120	120	88.8
68	41	41	31.3
69	165	165	98.9
70	65	65	49.4
71	90	90	71.7
72	50	50	38.3
73	71	71	58.5
74	90	90	71.7
75	145	145	94.9
76	145	145	94.9
77	145	145	94.9
78	85	85	67.6
79	105	105	82.8
80	115	115	86.8
81	96	96	77.7
82	38	38	28.2
83	120	120	88.8
84	95	95	76.7
85	66	66	53.5
86	195	195	100
87	54	54	42.4
88	22	22	16.1
89	85	85	67.6
90	125	125	90.9
91	56	56	43.4
92	16	16	11.1
93	72	72	60.6
94	71	71	58.5
95	97	97	78.7
96	100	100	80.8
97	86	86	70.7
98	66	66	53.5
99	5	5	6
100	35	35	26.2

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	48	48	39.3
6	21	21	20.2
7	55	55	46.4
8	52	52	45.4
9	160	160	93.9
10	12	12	13.1
11	115	115	85.8
12	60	60	54.5
13	120	120	87.8
14	7	7	7
15	35	35	33.3
16	20	20	18.1
17	71	71	63.6
18	32	32	30.3
19	25	25	24.2
20	21	21	20.2
21	49	49	40.4
22	24	24	23.2
23	63	63	57.5
24	49	49	40.4
25	95	95	80.8
26	14	14	14.1
27	62	62	56.5
28	9	9	9
29	58	58	52.5
30	26	26	27.2
31	87	87	73.7
32	79	79	68.6
33	65	65	58.5
34	50	50	42.4
35	84	84	72.7
36	50	50	42.4
37	10	10	10.1
38	55	55	46.4
39	17	17	15.1
40	99	99	84.8
41	140	140	90.9
42	95	95	80.8
43	10	10	10.1
44	33	33	32.3
45	21	21	20.2
46	55	55	46.4
47	40	40	36.3
48	81	81	70.7
49	90	90	75.7
50	89	89	74.7
51	19	19	16.1
52	4	4	4
53	189	189	98.9
54	185	185	97.9
55	55	55	46.4
56	38	38	34.3
57	19	19	16.1
58	93	93	78.7
59	157	157	92.9
60	77	77	67.6
61	25	25	24.2
62	4	4	4
63	65	65	58.5
64	27	27	28.2
65	57	57	51.5
66	135	135	89.8
67	160	160	93.9
68	70	70	61.6
69	93	93	78.7
70	120	120	87.8
71	42	42	37.3
72	90	90	75.7
73	25	25	24.2
74	200	200	100
75	71	71	63.6
76	169	169	95.9
77	80	80	69.6
78	96	96	83.8
79	7	7	7
80	38	38	34.3
81	65	65	58.5
82	6	6	6
83	58	58	52.5
84	47	47	38.3
85	32	32	30.3
86	182	182	96.9
87	50	50	42.4
88	92	92	77.7
89	56	56	50.5
90	75	75	66.6
91	28	28	29.2
92	74	74	65.6
93	115	115	85.8
94	60	60	54.5
95	10	10	10.1
96	70	70	61.6
97	82	82	71.7
98	140	140	90.9
99	20	20	18.1
100	95	95	80.8

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	43	43	38.3
13	75	75	60.6
14	98	98	77.7
15	54	54	48.4
16	44	44	39.3
17	48	48	44.4
18	83	83	69.6
19	65	65	54.5
20	67	67	56.5
21	32	32	32.3
22	50	50	46.4
23	65	65	54.5
24	95	95	74.7
25	80	80	65.6
26	75	75	60.6
27	110	110	82.8
28	80	80	65.6
29	102	102	80.8
30	69	69	57.5
31	105	105	81.8
32	80	80	65.6
33	55	55	50.5
34	74	74	59.5
35	12	12	15.1
36	22	22	25.2
37	100	100	79.7
38	20	20	23.2
39	143	143	90.9
40	40	40	36.3
41	6	6	11.1
42	40	40	36.3
43	115	115	83.8
44	122	122	84.8
45	9	9	12.1
46	45	45	40.4
47	95	95	74.7
48	78	78	62.6
49	29	29	31.3
50	132	132	88.8
51	28	28	29.2
52	19	19	21.2
53	89	89	70.7
54	52	52	47.4
55	145	145	92.9
56	143	143	90.9
57	45	45	40.4
58	23	23	26.2
59	98	98	77.7
60	170	170	96.9
61	62	62	53.5
62	33	33	33.3
63	91	91	72.7
64	17	17	20.2
65	14	14	18.1
66	28	28	29.2
67	78	78	62.6
68	19	19	21.2
69	27	27	28.2
70	24	24	27.2
71	48	48	44.4
72	78	78	62.6
73	170	170	96.9
74	125	125	86.8
75	12	12	15.1
76	92	92	73.7
77	54	54	48.4
78	140	140	89.8
79	210	210	100
80	95	95	74.7
81	90	90	71.7
82	200	200	98.9
83	45	45	40.4
84	125	125	86.8
85	123	123	85.8
86	21	21	24.2
87	59	59	52.5
88	39	39	35.3
89	13	13	17.1
90	167	167	95.9
91	80	80	65.6
92	11	11	14.1
93	150	150	93.9
94	47	47	43.4
95	58	58	51.5
96	160	160	94.9
97	73	73	58.5
98	9	9	12.1
99	15	15	19.1
100	38	38	34.3

count	size (mm)	Size (m replac "<2" w 1
1	<2	1
2	<2	1
3	<2	1
4	<2	1
5	<2	1
6	<2	1
7	<2	1
8	<2	1
9	<2	1
10	<2	1
11	<2	1
12	<2	1
13	<2	1
14	<2	1
15	<2	1
16	<2	1
17	<2	1
18	<2	1
19	41	41
20	22	22
21	12	12
22	38	38
23	51	51
24	81	81
25	81	81
26	89	89
27	60	60
28	85	85
29	55	55
30	22	22
31	14	14
32	65	65
33	20	20
34	40	40
35	132	132
36	40	40
37	71	71
38	33	33
39	31	31
40	115	115
41	22	22
42	48	48
43	100	100
44	70	70
45	149	149
46	95	95
47	38	38
48	30	30
49	42	42
50	35	35
51	160	160
52	90	90
53	11	11
54	45	45
55	9	9
56	49	49
57	135	135
58	34	34
59	41	41
60	6	6
61	20	20
62	36	36
63	20	20
64	160	160
65	21	21
66	65	65
67	97	97
68	118	118
69	15	15
70	44	44
71	45	45
72	56	56
73	120	120
74	122	122
75	90	90
76	170	170
77	44	44
78	39	39
79	31	31
80	125	125
81	45	45
82	34	34
83	26	26
84	11	11
85	26	26
86	97	97
87	45	45
88	115	115
89	30	30
90	12	12
91	30	30
92	56	56
93	80	80
94	63	63
95	16	16
96	45	45
97	5	5
98	13	13
99	165	165
100	23	23

66	15	10	34	-4.5	65	10	6	35	-4.5	52	10	8	48	-4.5	58	12	5	42	-4.5	48	9
51	15	15	49	-5.0	55	12	10	45	-5.0	42	8	10	58	-5.0	46	9	12	54	-5.0	39	7
36	13	15	64	-5.5	43	16	12	57	-5.5	34	10	8	66	-5.5	37	15	9	63	-5.5	32	16
23	9	13	77	-6.0	27	14	16	73	-6.0	24	9	10	76	-6.0	22	13	15	78	-6.0	16	6
14	13	9	86	-6.5	13	7	14	87	-6.5	15	11	9	85	-6.5	9	5	13	91	-6.5	10	9
1	1	13	99	-7.0	6	6	7	94	-7.0	4	4	11	96	-7.0	4	4	5	96	-7.0	1	1
0	0	1	100	-7.5	0	0	6	100	-7.5	0	0	4	100	-7.5	0	0	4	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
15	19	-3.0	-3.5	9	11	18	-2.5	-3.0	7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
24	34	-4.0	-4.5	17	20	29	-3.5	-4.0	14	#N/A	#N/A	#N/A	#N/A	#N/A	25	32	-3.0	-3.5	8	#N/A	#N/A
49	64	-5.0	-5.5	33	45	57	-5.0	-5.5	37	48	58	-4.5	-5.0	24	42	54	-4.5	-5.0	28	47	52
64	77	-5.5	-6.0	61	73	87	-6.0	-6.5	67	66	76	-5.5	-6.0	62	63	78	-5.5	-6.0	60	68	84
77	86	-6.0	-6.5	83	73	87	-6.0	-6.5	84	76	85	-6.0	-6.5	87	78	91	-6.0	-6.5	75	84	90
86	99	-6.5	-7.0	100	87	94	-6.5	-7.0	105	85	96	-6.5	-7.0	106	78	91	-6.0	-6.5	88	90	99

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	28	28	41.4	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2
10	19	19	26.2	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2
11	15	15	21.2	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2
12	30	30	42.4	12	6	6	11.1	12	<2	1	0	12	<2	1	0	12	<2
13	31	31	46.4	13	34	34	46.4	13	<2	1	0	13	<2	1	0	13	<2
14	33	33	49.4	14	7	7	13.1	14	<2	1	0	14	<2	1	0	14	<2
15	3	3	8	15	7	7	13.1	15	<2	1	0	15	<2	1	0	15	<2
16	11	11	18.1	16	33	33	45.4	16	<2	1	0	16	<2	1	0	16	<2
17	26	26	37.3	17	16	16	27.2	17	<2	1	0	17	<2	1	0	17	<2
18	37	37	55.5	18	39	39	50.5	18	<2	1	0	18	<2	1	0	18	<2
19	25	25	36.3	19	41	41	51.5	19	<2	1	0	19	<2	1	0	19	<2
20	33	33	49.4	20	46	46	57.5	20	<2	1	0	20	<2	1	0	20	<2
21	30	30	42.4	21	87	87	84.8	21	<2	1	0	21	<2	1	0	21	<2
22	22	22	31.3	22	58	58	66.6	22	<2	1	0	22	<2	1	0	22	<2
23	105	105	88.8	23	70	70	76.7	23	<2	1	0	23	<2	1	0	23	<2
24	61	61	74.7	24	47	47	60.6	24	<2	1	0	24	21	21	41.4	24	<2
25	130	130	100	25	52	52	63.6	25	<2	1	0	25	42	42	61.6	25	<2
26	100	100	87.8	26	118	118	91.9	26	<2	1	0	26	26	26	48.4	26	<2
27	20	20	27.2	27	170	170	100	27	<2	1	0	27	60	60	72.7	27	15
28	45	45	62.6	28	15	15	25.2	28	3	3	27.2	28	5	5	23.2	28	52
29	75	75	79.7	29	79	79	80.8	29	32	32	55.5	29	10	10	28.2	29	9
30	53	53	69.6	30	31	31	42.4	30	15	15	36.3	30	52	52	67.6	30	26
31	125	125	97.9	31	14	14	23.2	31	5	5	29.2	31	85	85	88.8	31	28
32	121	121	93.9	32	109	109	88.8	32	52	52	69.6	32	50	50	64.6	32	45
33	43	43	60.6	33	21	21	32.3	33	15	15	36.3	33	9	9	25.2	33	109
34	64	64	76.7	34	46	46	57.5	34	16	16	38.3	34	24	24	43.4	34	100
35	39	39	56.5	35	120	120	92.9	35	60	60	71.7	35	10	10	28.2	35	15
36	9	9	15.1	36	25	25	35.3	36	90	90	82.8	36	65	65	78.7	36	52
37	24	24	34.3	37	47	47	60.6	37	20	20	43.4	37	63	63	75.7	37	16
38	6	6	12.1	38	65	65	73.7	38	11	11	32.3	38	90	90	90.9	38	4
39	59	59	72.7	39	80	80	81.8	39	12	12	35.3	39	64	64	77.7	39	17
40	76	76	81.8	40	85	85	82.8	40	9	9	31.3	40	8	8	24.2	40	30
41	74	74	78.7	41	62	62	70.7	41	98	98	88.8	41	12	12	32.3	41	3
42	22	22	31.3	42	44	44	55.5	42	50	50	67.6	42	17	17	37.3	42	24
43	50	50	65.6	43	110	110	89.8	43	4	4	28.2	43	25	25	47.4	43	51
44	21	21	30.3	44	123	123	93.9	44	22	22	47.4	44	27	27	51.5	44	109
45	26	26	37.3	45	13	13	21.2	45	20	20	43.4	45	180	180	100	45	27
46	15	15	21.2	46	16	16	27.2	46	95	95	86.8	46	31	31	53.5	46	77
47	26	26	37.3	47	64	64	71.7	47	32	32	55.5	47	9	9	25.2	47	52
48	24	24	34.3	48	7	7	13.1	48	36	36	59.5	48	140	140	97.9	48	20
49	41	41	58.5	49	35	35	47.4	49	51	51	68.6	49	16	16	35.3	49	101
50	76	76	81.8	50	7	7	13.1	50	11	11	32.3	50	40	40	59.5	50	115
51	17	17	24.2	51	15	15	25.2	51	41	41	62.6	51	30	30	52.5	51	5
52	54	54	70.7	52	30	30	39.3	52	11	11	32.3	52	70	70	82.8	52	50
53	122	122	94.9	53	21	21	32.3	53	110	110	92.9	53	58	58	71.7	53	10
54	75	75	79.7	54	14	14	23.2	54	62	62	74.7	54	100	100	92.9	54	48
55	6	6	12.1	55	42	42	52.5	55	20	20	43.4	55	35	35	54.5	55	101
56	4	4	10.1	56	11	11	19.1	56	27	27	51.5	56	85	85	88.8	56	7
57	35	35	52.5	57	13	13	21.2	57	56	56	70.7	57	40	40	59.5	57	64
58	70	70	77.7	58	6	6	11.1	58	32	32	55.5	58	16	16	35.3	58	16
59	4	4	10.1	59	65	65	73.7	59	64	64	75.7	59	45	45	62.6	59	55
60	15	15	21.2	60	19	19	31.3	60	100	100	89.8	60	115	115	94.9	60	9
61	30	30	42.4	61	143	143	97.9	61	125	125	95.9	61	24	24	43.4	61	9
62	60	60	73.7	62	21	21	32.3	62	23	23	48.4	62	68	68	80.8	62	79
63	34	34	51.5	63	27	27	37.3	63	28	28	53.5	63	24	24	43.4	63	30
64	3	3	8	64	9	9	18.1	64	85	85	81.8	64	10	10	28.2	64	9
65	36	36	53.5	65	18	18	30.3	65	42	42	65.6	65	38	38	57.5	65	5
66	12	12	19.1	66	32	32	44.4	66	115	115	94.9	66	36	36	55.5	66	50
67	18	18	25.2	67	27	27	37.3	67	60	60	71.7	67	26	26	48.4	67	70
68	10	10	16.1	68	30	30	39.3	68	27	27	51.5	68	19	19	40.4	68	15
69	115	115	92.9	69	58	58	66.6	69	90	90	82.8	69	130	130	96.9	69	10
70	40	40	57.5	70	61	61	69.6	70	132	132	96.9	70	10	10	28.2	70	60
71	32	32	47.4	71	78	78	79.7	71	16	16	38.3	71	70	70	82.8	71	40
72	45	45	62.6	72	135	135	95.9	72	74	74	77.7	72	62	62	73.7	72	35
73	50	50	65.6	73	85	85	82.8	73	19	19	42.4	73	23	23	42.4	73	51
74	10	10	16.1	74	46	46	57.5	74	76	76	78.7	74	84	84	87.8	74	40
75	22	22	31.3	75	44	44	55.5	75	67	67	76.7	75	122	122	95.9	75	125
76	36	36	53.5	76	35	35	47.4	76	41	41	62.6	76	18	18	39.3	76	20
77	32	32	47.4	77	58	58	66.6	77	81	81	80.8	77	17	17	37.3	77	55
78	20	20	27.2	78	96	96	87.8	78	7	7	30.3	78	15	15	33.3	78	10
79	30	30	42.4	79	73	73	77.7	79	110	110	92.9	79	63	63	75.7	79	21
80	52	52	68.6	80	66	66	75.7	80	76	76	78.7	80	75	75	86.8	80	30
81	44	44	61.6	81	145	145	98.9	81	93	93	85.8	81	37	37	56.5	81	64
82	41	41	58.5	82	88	88	85.8	82	31	31	54.5	82	26	26	48.4	82	24
83	125	125	97.9	83	130	130	94.9	83	145	145	98.9	83	95	95	91.9	83	61
84	124	124	95.9	84	64	64	71.7	84	35	35	58.5	84	65	65	78.7	84	130
85	105	105	88.8	85	50	50	62.6	85	25	25	50.5	85	24	24	43.4	85	36
86	50	50	65.6	86	52	52	63.6	86	160	160	100	86	15	15	33.3	86	125
87	112	112	91.9	87	76	76	78.7	87	90	90	82.8	87	62	62	73.7	87	7
88	78	78	83.8	88	55	55	65.6	88	40	40	61.6	88	52	52	67.6	88	79
89	95	95	86.8	89	90	90	86.8	89	60	60	71.7	89	155	155	98.9	89	71
90	84	84	84.8	90	42	42	52.5	90	140	140	97.9	90	47	47	63.6	90	41
91	46	46	64.6	91	30	30	39.3	91	41	41	62.6	91	50	50	64.6	91	9
92	105	105	88.8	92	117	117	90.9	92	18	18	41.4	92	70	70	82.8	92	98
93	13	13	20.2	93	37	37	49.4	93	105	105	90.9	93	39	39	58.5	93	62
94	54	54	70.7	94	7	7	13.1	94	36	36	59.5	94	105	105	93.9	94	30
95	27	27	40.4	95	135	135	95.9	95	20	20	43.4	95	53	53	69.6	95	68
96	88	88	85.8	96	26	26	36.3	96	17	17	40.4	96	54	54	70.7	96	22
97	6	6	12.1	97	42	42	52.5	97	95	95	86.8	97	68	68	80.8	97	58
98	124	124	95.9	98	31	31	42.4	98	46	46	66.6	98	51	51	66.6	98	9
99	20	20	27.2	99	12	12	20.2	99	108	108	91.9	99	70	70	82.8	99	35
100	62	62	75.7	100	17	17	29.2	100	23	23	48.4	100	9	9	25.2	100	15

51	15	16	49	-5.5	54	20	14	46	-5.5	58	24	12	42	-5.5	47	13	8	53	-5.5	50	18
36	16	15	64	-6.0	34	12	20	66	-6.0	34	18	24	66	-6.0	34	10	13	66	-6.0	32	19
20	11	16	80	-6.5	22	18	12	78	-6.5	16	8	18	84	-6.5	24	16	10	76	-6.5	13	10
9	8	11	91	-7.0	4	3	18	96	-7.0	8	7	8	92	-7.0	8	7	16	92	-7.0	3	3
1	1	8	99	-7.5	1	1	3	99	-7.5	1	1	7	99	-7.5	1	1	7	99	-7.5	0	0
0	0	1	100	-8.0	0	0	1	100	-8.0	0	0	1	100	-8.0	0	0	1	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
14	18	-3.5	-4.0	13	16	17	-3.0	-3.5	8	14	18	-3.5	-4.0	13	#N/A	#N/A	#N/A	#N/A	#N/A	16	17
22	33	-4.5	-5.0	25	21	27	-4.0	-4.5	20	22	30	-4.5	-5.0	26	#N/A	#N/A	#N/A	#N/A	#N/A	24	30
49	64	-5.5	-6.0	46	46	66	-5.5	-6.0	48	42	66	-5.5	-6.0	51	45	53	-5.0	-5.5	40	50	68
64	80	-6.0	-6.5	81	66	78	-6.0	-6.5	83	66	84	-6.0	-6.5	76	66	76	-6.0	-6.5	87	68	87
80	91	-6.5	-7.0	102	78	96	-6.5	-7.0	101	84	92	-6.5	-7.0	90	76	92	-6.5	-7.0	107	68	87
80	91	-6.5	-7.0	124	78	96	-6.5	-7.0	114	84	92	-6.5	-7.0	117	76	92	-6.5	-7.0	122	87	97

																WITH GLOVES	
count	**size (mm)**	**Size (mm) replace "<2" with 1**	**Percent Rank**	**count**	**size (mm)**	**Size (mm) replace "<2" with 1**	**Percent Rank**	**count**	**size (mm)**	**Size (mm) replace "<2" with 1**	**Percent Rank**	**count**	**size (mm)**	**Size (mm) replace "<2" with 1**	**Percent Rank**	**count**	**size (mm)**
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	23	23	22.2	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2
10	60	60	60.6	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2
11	88	88	76.7	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2
12	109	109	82.8	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2
13	28	28	29.2	13	<2	1	0	13	56	56	55.5	13	<2	1	0	13	<2
14	35	35	37.3	14	<2	1	0	14	49	49	46.4	14	<2	1	0	14	<2
15	47	47	49.4	15	<2	1	0	15	78	78	74.7	15	<2	1	0	15	<2
16	33	33	33.3	16	50	50	46.4	16	65	65	66.6	16	<2	1	0	16	<2
17	25	25	26.2	17	115	115	93.9	17	49	49	46.4	17	<2	1	0	17	25
18	24	24	24.2	18	30	30	28.2	18	36	36	32.3	18	<2	1	0	18	40
19	43	43	41.4	19	31	31	29.2	19	29	29	27.2	19	<2	1	0	19	15
20	44	44	42.4	20	25	25	27.2	20	82	82	76.7	20	<2	1	0	20	111
21	8	8	8	21	20	20	23.2	21	59	59	61.6	21	<2	1	0	21	145
22	64	64	63.6	22	62	62	62.6	22	60	60	62.6	22	<2	1	0	22	100
23	121	121	90.9	23	15	15	17.1	23	35	35	31.3	23	<2	1	0	23	26
24	120	120	88.8	24	58	58	58.5	24	6	6	12.1	24	<2	1	0	24	78
25	35	35	37.3	25	96	96	78.7	25	57	57	58.5	25	<2	1	0	25	89
26	45	45	46.4	26	80	80	70.7	26	27	27	25.2	26	<2	1	0	26	50
27	55	55	55.5	27	110	110	89.8	27	135	135	92.9	27	<2	1	0	27	39
28	33	33	33.3	28	111	111	91.9	28	140	140	94.9	28	110	110	83.8	28	46
29	35	35	37.3	29	86	86	73.7	29	17	17	18.1	29	22	22	32.3	29	7
30	12	12	14.1	30	17	17	21.2	30	43	43	40.4	30	100	100	78.7	30	21
31	19	19	21.2	31	53	53	55.5	31	90	90	81.8	31	22	22	32.3	31	70
32	115	115	85.8	32	99	99	81.8	32	58	58	60.6	32	65	65	66.6	32	57
33	70	70	69.6	33	16	16	19.1	33	11	11	13.1	33	19	19	31.3	33	33
34	110	110	83.8	34	20	20	23.2	34	42	42	38.3	34	22	22	32.3	34	73
35	90	90	77.7	35	22	22	25.2	35	96	96	86.8	35	223	223	100	35	40
36	160	160	96.9	36	22	22	25.2	36	25	25	24.2	36	47	47	54.5	36	54
37	45	45	46.4	37	52	52	53.5	37	56	56	55.5	37	26	26	40.4	37	52
38	30	30	32.3	38	40	40	36.3	38	43	43	40.4	38	31	31	43.4	38	75
39	14	14	15.1	39	50	50	46.4	39	98	98	88.8	39	107	107	82.8	39	135
40	8	8	8	40	100	100	82.8	40	91	91	84.8	40	85	85	73.7	40	120
41	86	86	75.7	41	38	38	32.3	41	60	60	62.6	41	69	69	68.6	41	15
42	57	57	59.5	42	130	130	96.9	42	70	70	70.7	42	120	120	89.8	42	20
43	65	65	64.6	43	58	58	58.5	43	34	34	30.3	43	105	105	80.8	43	40
44	115	115	85.8	44	155	155	98.9	44	49	49	46.4	44	42	42	51.5	44	51
45	66	66	67.6	45	51	51	51.5	45	55	55	53.5	45	52	52	56.5	45	54
46	34	34	35.3	46	52	52	53.5	46	82	82	76.7	46	90	90	75.7	46	73
47	68	68	68.6	47	230	230	100	47	69	69	69.6	47	22	22	32.3	47	84
48	220	220	100	48	86	86	73.7	48	36	36	32.3	48	133	133	94.9	48	64
49	65	65	64.6	49	10	10	16.1	49	165	165	98.9	49	75	75	71.7	49	120
50	53	53	53.5	50	70	70	68.6	50	48	48	44.4	50	39	39	48.4	50	60
51	70	70	69.6	51	42	42	40.4	51	40	40	36.3	51	110	110	83.8	51	86
52	55	55	55.5	52	56	56	57.5	52	17	17	18.1	52	130	130	92.9	52	23
53	44	44	42.4	53	101	101	84.8	53	86	86	79.7	53	22	22	32.3	53	41
54	72	72	71.7	54	32	32	31.3	54	81	81	75.7	54	165	165	98.9	54	73
55	120	120	88.8	55	55	55	56.5	55	41	41	37.3	55	46	46	53.5	55	80
56	34	34	35.3	56	90	90	76.7	56	36	36	32.3	56	38	38	47.4	56	15
57	55	55	55.5	57	50	50	46.4	57	16	16	16.1	57	132	132	93.9	57	68
58	145	145	94.9	58	45	45	43.4	58	30	30	28.2	58	80	80	72.7	58	31
59	110	110	83.8	59	50	50	46.4	59	47	47	42.4	59	110	110	83.8	59	27
60	50	50	51.5	60	17	17	21.2	60	55	55	53.5	60	23	23	39.3	60	10
61	53	53	53.5	61	120	120	94.9	61	100	100	89.8	61	74	74	70.7	61	30
62	80	80	73.7	62	64	64	65.6	62	24	24	22.2	62	105	105	80.8	62	19
63	90	90	77.7	63	15	15	17.1	63	49	49	46.4	63	10	10	28.2	63	72
64	16	16	16.1	64	82	82	72.7	64	60	60	62.6	64	102	102	79.7	64	71
65	150	150	95.9	65	45	45	43.4	65	39	39	35.3	65	55	55	58.5	65	20
66	56	56	58.5	66	16	16	19.1	66	48	48	44.4	66	119	119	88.8	66	44
67	44	44	42.4	67	113	113	92.9	67	14	14	15.1	67	87	87	74.7	67	84
68	9	9	10.1	68	62	62	62.6	68	24	24	22.2	68	55	55	58.5	68	23
69	25	25	26.2	69	31	31	29.2	69	141	141	96.9	69	59	59	63.6	69	48
70	100	100	81.8	70	51	51	51.5	70	67	67	67.6	70	39	39	48.4	70	67
71	160	160	96.9	71	88	88	75.7	71	103	103	90.9	71	3	3	27.2	71	52
72	115	115	85.8	72	90	90	76.7	72	56	56	55.5	72	133	133	94.9	72	29
73	95	95	80.8	73	45	45	43.4	73	75	75	71.7	73	12	12	29.2	73	105
74	18	18	19.1	74	62	62	62.6	74	76	76	73.7	74	110	110	83.8	74	75
75	138	138	91.9	75	65	65	66.6	75	140	140	94.9	75	29	29	42.4	75	41
76	90	90	77.7	76	39	39	34.3	76	19	19	20.2	76	15	15	30.3	76	70
77	40	40	40.4	77	44	44	41.4	77	182	182	100	77	139	139	96.9	77	19
78	60	60	60.6	78	125	125	95.9	78	16	16	16.1	78	140	140	97.9	78	124
79	10	10	11.1	79	98	98	79.7	79	125	125	91.9	79	31	31	43.4	79	18
80	24	24	24.2	80	40	40	36.3	80	12	12	14.1	80	91	91	76.7	80	92
81	29	29	31.3	81	50	50	46.4	81	96	96	86.8	81	22	22	32.3	81	110
82	25	25	26.2	82	38	38	32.3	82	64	64	65.6	82	33	33	45.4	82	27
83	11	11	13.1	83	98	98	79.7	83	54	54	52.5	83	55	55	58.5	83	11
84	50	50	51.5	84	44	44	41.4	84	47	47	42.4	84	122	122	90.9	84	9
85	17	17	18.1	85	60	60	60.6	85	135	135	92.9	85	125	125	91.9	85	48
86	80	80	73.7	86	68	68	67.6	86	90	90	81.8	86	110	110	83.8	86	59
87	10	10	11.1	87	100	100	82.8	87	51	51	50.5	87	62	62	64.6	87	32
88	23	23	22.2	88	105	105	86.8	88	42	42	38.3	88	62	62	64.6	88	95
89	65	65	64.6	89	80	80	70.7	89	84	84	78.7	89	54	54	57.5	89	131
90	49	49	50.5	90	110	110	89.8	90	31	31	29.2	90	35	35	46.4	90	61
91	28	28	29.2	91	60	60	60.6	91	19	19	20.2	91	71	71	69.6	91	31
92	60	60	60.6	92	105	105	86.8	92	145	145	97.9	92	39	39	48.4	92	16
93	79	79	72.7	93	40	40	36.3	93	27	27	25.2	93	49	49	55.5	93	95
94	18	18	19.1	94	105	105	86.8	94	90	90	81.8	94	55	55	58.5	94	68
95	160	160	96.9	95	103	103	85.8	95	75	75	71.7	95	26	26	40.4	95	44
96	140	140	92.9	96	145	145	97.9	96	86	86	79.7	96	56	56	62.6	96	50
97	140	140	92.9	97	8	8	15.1	97	51	51	50.5	97	65	65	66.6	97	73
98	16	16	16.1	98	39	39	34.3	98	95	95	85.8	98	22	22	32.3	98	53
99	44	44	42.4	99	40	40	36.3	99	57	57	58.5	99	45	45	52.5	99	46
100	45	45	46.4	100	72	72	69.6	100	67	67	67.6	100	99	99	77.7	100	62

51	18	12	49	-5.5	53	20	9	47	-5.5	43	13	9	57	-5.5	48	8	7	52	-5.5	40	9	7
33	10	18	67	-6.0	33	17	20	67	-6.0	30	11	13	70	-6.0	40	16	8	60	-6.0	31	19	9
23	20	10	77	-6.5	16	11	17	84	-6.5	19	15	11	81	-6.5	24	21	16	76	-6.5	12	9	19
3	3	20	97	-7.0	5	5	11	95	-7.0	4	4	15	96	-7.0	3	2	21	97	-7.0	3	2	9
0	0	3	100	-7.5	0	0	5	100	-7.5	0	0	4	100	-7.5	1	1	2	99	-7.5	1	1	2
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	1	100	-8.0	0	0	1
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
15	19	-3.5	-4.0	12	13	18	-3.5	-4.0	14	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
25	37	-4.5	-5.0	23	18	27	-4.0	-4.5	21	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	67	-5.5	-6.0	46	47	67	-5.5	-6.0	47	48	57	-5.0	-5.5	35	45	52	-5.0	-5.5	41	44	53	-4.5
67	77	-6.0	-6.5	84	67	84	-6.0	-6.5	75	70	81	-6.0	-6.5	75	60	76	-6.0	-6.5	88	69	88	-6.0
77	97	-6.5	-7.0	102	84	95	-6.5	-7.0	90	81	96	-6.5	-7.0	97	76	97	-6.5	-7.0	103	69	88	-6.0
77	97	-6.5	-7.0	113	84	95	-6.5	-7.0	109	81	96	-6.5	-7.0	111	76	97	-6.5	-7.0	114	88	97	-6.5

WITH GLOVES

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (m replac "<2" w 1
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1
8	10	10	13.1	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1
9	17	17	19.1	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1
10	14	14	16.1	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1
11	55	55	59.5	11	30	30	31.3	11	<2	1	0	11	<2	1	0	11	<2	1
12	37	37	41.4	12	40	40	43.4	12	<2	1	0	12	<2	1	0	12	<2	1
13	21	21	23.2	13	31	31	36.3	13	<2	1	0	13	<2	1	0	13	<2	1
14	33	33	37.3	14	50	50	51.5	14	<2	1	0	14	<2	1	0	14	<2	1
15	37	37	41.4	15	49	49	48.4	15	<2	1	0	15	<2	1	0	15	<2	1
16	120	120	90.9	16	37	37	40.4	16	<2	1	0	16	<2	1	0	16	<2	1
17	62	62	66.6	17	25	25	27.2	17	<2	1	0	17	<2	1	0	17	<2	1
18	41	41	45.4	18	27	27	29.2	18	<2	1	0	18	<2	1	0	18	<2	1
19	18	18	21.2	19	39	39	42.4	19	<2	1	0	19	<2	1	0	19	<2	1
20	23	23	25.2	20	17	17	18.1	20	<2	1	0	20	<2	1	0	20	<2	1
21	50	50	55.5	21	27	27	29.2	21	<2	1	0	21	<2	1	0	21	<2	1
22	12	12	15.1	22	21	21	22.2	22	<2	1	0	22	<2	1	0	22	<2	1
23	26	26	28.2	23	71	71	71.7	23	<2	1	0	23	<2	1	0	23	<2	1
24	39	39	43.4	24	21	21	22.2	24	<2	1	0	24	<2	1	0	24	<2	1
25	52	52	57.5	25	40	40	43.4	25	<2	1	0	25	<2	1	0	25	<2	1
26	58	58	63.6	26	33	33	38.3	26	<2	1	0	26	<2	1	0	26	<2	1
27	70	70	68.6	27	20	20	19.1	27	25	25	36.3	27	<2	1	0	27	12	12
28	47	47	50.5	28	139	139	97.9	28	115	115	90.9	28	<2	1	0	28	148	148
29	8	8	10.1	29	50	50	51.5	29	9	9	30.3	29	88	88	74.7	29	45	45
30	93	93	78.7	30	37	37	40.4	30	48	48	58.5	30	80	80	68.6	30	34	34
31	16	16	18.1	31	96	96	85.8	31	90	90	80.8	31	37	37	46.4	31	20	20
32	88	88	76.7	32	122	122	93.9	32	60	60	67.6	32	80	80	68.6	32	50	50
33	42	42	46.4	33	51	51	55.5	33	110	110	86.8	33	50	50	53.5	33	54	54
34	96	96	81.8	34	9	9	11.1	34	135	135	98.9	34	53	53	54.5	34	22	22
35	31	31	35.3	35	83	83	79.7	35	32	32	45.4	35	105	105	86.8	35	118	118
36	49	49	53.5	36	150	150	98.9	36	156	156	100	36	28	28	39.3	36	70	70
37	120	120	90.9	37	30	30	31.3	37	49	49	59.5	37	90	90	75.7	37	5	5
38	134	134	98.9	38	14	14	13.1	38	64	64	69.6	38	95	95	78.7	38	21	21
39	140	140	100	39	49	49	48.4	39	50	50	61.6	39	100	100	82.8	39	25	25
40	94	94	79.7	40	49	49	48.4	40	26	26	39.3	40	100	100	82.8	40	60	60
41	80	80	71.7	41	109	109	89.8	41	44	44	54.5	41	86	86	72.7	41	115	115
42	111	111	86.8	42	87	87	82.8	42	11	11	32.3	42	170	170	98.9	42	18	18
43	83	83	72.7	43	15	15	14.1	43	30	30	42.4	43	100	100	82.8	43	31	31
44	34	34	39.3	44	67	67	68.6	44	37	37	49.4	44	28	28	39.3	44	88	88
45	56	56	61.6	45	20	20	19.1	45	56	56	64.6	45	58	58	55.5	45	72	72
46	123	123	93.9	46	60	60	60.6	46	37	37	49.4	46	29	29	41.4	46	81	81
47	85	85	74.7	47	80	80	74.7	47	7	7	27.2	47	126	126	96.9	47	135	135
48	57	57	62.6	48	110	110	90.9	48	110	110	86.8	48	15	15	31.3	48	82	82
49	11	11	14.1	49	113	113	91.9	49	123	123	95.9	49	41	41	50.5	49	31	31
50	60	60	64.6	50	90	90	83.8	50	52	52	62.6	50	108	108	89.8	50	87	87
51	47	47	50.5	51	95	95	84.8	51	132	132	97.9	51	105	105	86.8	51	68	68
52	5	5	8	52	137	137	96.9	52	30	30	42.4	52	58	58	55.5	52	95	95
53	70	70	68.6	53	80	80	74.7	53	11	11	32.3	53	65	65	60.6	53	36	36
54	31	31	35.3	54	115	115	92.9	54	34	34	48.4	54	119	119	93.9	54	88	88
55	34	34	39.3	55	85	85	80.8	55	61	61	68.6	55	79	79	67.6	55	17	17
56	125	125	95.9	56	100	100	86.8	56	8	8	28.2	56	111	111	92.9	56	95	95
57	26	26	28.2	57	57	57	59.5	57	120	120	94.9	57	72	72	64.6	57	68	68
58	125	125	95.9	58	69	69	69.6	58	71	71	73.7	58	92	92	76.7	58	55	55
59	46	46	49.4	59	22	22	26.2	59	25	25	36.3	59	36	36	45.4	59	102	102
60	105	105	84.8	60	50	50	51.5	60	22	22	34.3	60	93	93	77.7	60	93	93
61	40	40	44.4	61	80	80	74.7	61	55	55	63.6	61	150	150	97.9	61	19	19
62	17	17	19.1	62	30	30	31.3	62	37	37	49.4	62	73	73	66.6	62	8	8
63	30	30	33.3	63	62	62	62.6	63	66	66	70.7	63	58	58	55.5	63	7	7
64	92	92	77.7	64	26	26	28.2	64	110	110	86.8	64	120	120	94.9	64	70	70
65	26	26	28.2	65	64	64	65.6	65	49	49	59.5	65	98	98	80.8	65	18	18
66	55	55	59.5	66	70	70	70.7	66	43	43	53.5	66	41	41	50.5	66	32	32
67	22	22	24.2	67	50	50	51.5	67	8	8	28.2	67	25	25	37.3	67	55	55
68	49	49	53.5	68	5	5	10.1	68	119	119	93.9	68	110	110	90.9	68	123	123
69	115	115	87.8	69	20	20	19.1	69	82	82	76.7	69	22	22	35.3	69	72	72
70	83	83	72.7	70	61	61	61.6	70	69	69	71.7	70	30	30	43.4	70	72	72
71	15	15	17.1	71	76	76	73.7	71	72	72	74.7	71	29	29	41.4	71	98	98
72	96	96	81.8	72	63	63	63.6	72	57	57	65.6	72	99	99	81.8	72	77	77
73	115	115	87.8	73	104	104	87.8	73	9	9	30.3	73	38	38	48.4	73	25	25
74	25	25	26.2	74	64	64	65.6	74	86	86	79.7	74	17	17	33.3	74	35	35
75	85	85	74.7	75	71	71	71.7	75	95	95	81.8	75	25	25	37.3	75	26	26
76	3	3	7	76	80	80	74.7	76	100	100	82.8	76	80	80	68.6	76	32	32
77	47	47	50.5	77	63	63	63.6	77	32	32	45.4	77	71	71	63.6	77	9	9
78	54	54	58.5	78	21	21	22.2	78	103	103	83.8	78	22	22	35.3	78	54	54
79	103	103	83.8	79	16	16	17.1	79	29	29	40.4	79	81	81	71.7	79	83	83
80	110	110	85.8	80	15	15	14.1	80	83	83	77.7	80	101	101	85.8	80	80	80
81	123	123	93.9	81	104	104	87.8	81	22	22	34.3	81	121	121	95.9	81	45	45
82	65	65	67.6	82	52	52	56.5	82	46	46	57.5	82	9	9	28.2	82	8	8
83	8	8	10.1	83	55	55	57.5	83	31	31	44.4	83	110	110	90.9	83	10	10
84	130	130	97.9	84	85	85	80.8	84	78	78	75.7	84	12	12	30.3	84	9	9
85	25	25	26.2	85	30	30	31.3	85	115	115	90.9	85	49	49	52.5	85	84	84
86	95	95	80.8	86	55	55	57.5	86	110	110	86.8	86	95	95	78.7	86	37	37
87	33	33	37.3	87	30	30	31.3	87	45	45	55.5	87	21	21	34.3	87	27	27
88	120	120	90.9	88	175	175	100	88	25	25	36.3	88	16	16	32.3	88	84	84
89	26	26	28.2	89	34	34	39.3	89	105	105	84.8	89	30	30	43.4	89	54	54
90	27	27	32.3	90	32	32	37.3	90	59	59	66.6	90	66	66	62.6	90	181	181
91	9	9	12.1	91	9	9	11.1	91	85	85	78.7	91	65	65	60.6	91	29	29
92	45	45	47.4	92	130	130	95.9	92	32	32	45.4	92	37	37	46.4	92	10	10
93	60	60	64.6	93	15	15	14.1	93	115	115	90.9	93	39	39	49.4	93	85	85
94	5	5	8	94	80	80	74.7	94	130	130	96.9	94	62	62	59.5	94	70	70
95	50	50	55.5	95	47	47	47.4	95	69	69	71.7	95	11	11	29.2	95	17	17
96	45	45	47.4	96	65	65	67.6	96	105	105	84.8	96	105	105	86.8	96	36	36
97	30	30	33.3	97	45	45	46.4	97	29	29	40.4	97	87	87	73.7	97	59	59
98	75	75	70.7	98	125	125	94.9	98	41	41	52.5	98	190	190	100	98	14	14
99	20	20	22.2	99	21	21	22.2	99	45	45	55.5	99	72	72	64.6	99	51	51
100	115	115	87.8	100	40	40	43.4	100	4	4	26.2	100	60	60	58.5	100	101	101

58	15	20	42	-5.5	53	20	9	47	-5.5	34	19	19	66	-5.5	40	17	15	60	-5.5	33	13
43	26	15	57	-6.0	33	17	20	67	-6.0	15	8	19	85	-6.0	23	14	17	77	-6.0	20	11
17	10	26	83	-6.5	16	11	17	84	-6.5	7	5	8	93	-6.5	9	9	14	91	-6.5	9	6
7	7	10	93	-7.0	5	5	11	95	-7.0	2	2	5	98	-7.0	0	0	9	100	-7.0	3	3
0	0	7	100	-7.5	0	0	5	100	-7.5	0	0	2	100	-7.5	0	0	0	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
16	22	-4.5	-5.0	23	13	18	-3.5	-4.0	14	13	24	-3.5	-4.0	12	16	18	-3.0	-3.5	8	15	22
22	42	-5.0	-5.5	34	18	27	-4.0	-4.5	21	24	39	-4.0	-4.5	16	18	28	-3.5	-4.0	14	22	28
42	57	-5.5	-6.0	54	47	67	-5.5	-6.0	47	47	66	-5.0	-5.5	34	45	60	-5.0	-5.5	36	38	52
57	83	-6.0	-6.5	81	67	84	-6.0	-6.5	75	66	85	-5.5	-6.0	53	60	77	-5.5	-6.0	61	67	80
83	93	-6.5	-7.0	93	84	95	-6.5	-7.0	90	66	85	-5.5	-6.0	63	77	91	-6.0	-6.5	76	80	91
83	93	-6.5	-7.0	115	84	95	-6.5	-7.0	109	85	93	-6.0	-6.5	79	77	91	-6.0	-6.5	88	80	91

WITH GLOVES

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	77	77	68.6	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	59	59	51.5	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	70	70	64.6	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	62	62	55.5	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	10
7	8	8	5	7	<2	1	0	7	11	11	12.1	7	<2	1	0	7	9
8	6	6	3	8	<2	1	0	8	22	22	36.3	8	<2	1	0	8	4
9	4	4	2	9	<2	1	0	9	40	40	59.5	9	<2	1	0	9	23
10	57	57	48.4	10	<2	1	0	10	47	47	66.6	10	<2	1	0	10	16
11	35	35	28.2	11	30	30	31.3	11	35	35	51.5	11	<2	1	0	11	22
12	24	24	17.1	12	40	40	43.4	12	8	8	9	12	<2	1	0	12	32
13	90	90	80.8	13	31	31	36.3	13	48	48	67.6	13	29	29	38.3	13	42
14	65	65	57.5	14	50	50	51.5	14	50	50	70.7	14	15	15	21.2	14	120
15	125	125	91.9	15	49	49	48.4	15	61	61	82.8	15	49	49	63.6	15	15
16	36	36	30.3	16	37	37	40.4	16	58	58	77.7	16	72	72	84.8	16	42
17	75	75	66.6	17	25	25	27.2	17	12	12	13.1	17	33	33	45.4	17	11
18	35	35	28.2	18	27	27	29.2	18	18	18	28.2	18	74	74	85.8	18	83
19	14	14	11.1	19	39	39	42.4	19	29	29	42.4	19	44	44	56.5	19	21
20	77	77	68.6	20	17	17	18.1	20	14	14	17.1	20	40	40	50.5	20	34
21	15	15	12.1	21	27	27	29.2	21	18	18	28.2	21	37	37	49.4	21	11
22	9	9	6	22	21	21	22.2	22	17	17	24.2	22	25	25	32.3	22	7
23	26	26	18.1	23	71	71	71.7	23	21	21	34.3	23	80	80	87.8	23	37
24	46	46	42.4	24	21	21	22.2	24	19	19	31.3	24	92	92	92.9	24	68
25	58	58	49.4	25	40	40	43.4	25	28	28	41.4	25	21	21	29.2	25	6
26	55	55	47.4	26	33	33	38.3	26	97	97	93.9	26	36	36	47.4	26	39
27	28	28	20.2	27	20	20	19.1	27	10	10	11.1	27	61	61	75.7	27	26
28	65	65	57.5	28	139	139	97.9	28	33	33	47.4	28	105	105	95.9	28	72
29	17	17	13.1	29	50	50	51.5	29	14	14	17.1	29	36	36	47.4	29	27
30	40	40	35.3	30	37	37	40.4	30	55	55	74.7	30	91	91	91.9	30	3
31	39	39	34.3	31	96	96	85.8	31	17	17	24.2	31	43	43	54.5	31	24
32	100	100	86.8	32	122	122	93.9	32	20	20	33.3	32	47	47	61.6	32	34
33	78	78	70.7	33	51	51	55.5	33	145	145	100	33	46	46	60.6	33	24
34	115	115	89.8	34	9	9	11.1	34	55	55	74.7	34	98	98	94.9	34	5
35	125	125	91.9	35	83	83	79.7	35	29	29	42.4	35	45	45	57.5	35	17
36	54	54	45.4	36	150	150	98.9	36	42	42	62.6	36	89	89	90.9	36	130
37	40	40	35.3	37	30	30	31.3	37	38	38	54.5	37	25	25	32.3	37	37
38	49	49	43.4	38	14	14	13.1	38	12	12	13.1	38	24	24	31.3	38	22
39	27	27	19.1	39	49	49	48.4	39	120	120	97.9	39	6	6	14.1	39	15
40	140	140	95.9	40	49	49	48.4	40	52	52	71.7	40	55	55	69.6	40	35
41	98	98	85.8	41	109	109	89.8	41	17	17	24.2	41	110	110	100	41	14
42	135	135	94.9	42	87	87	82.8	42	12	12	13.1	42	81	81	88.8	42	16
43	83	83	77.7	43	15	15	14.1	43	4	4	7	43	79	79	86.8	43	27
44	40	40	35.3	44	67	67	68.6	44	21	21	34.3	44	45	45	57.5	44	8
45	78	78	70.7	45	20	20	19.1	45	31	31	45.4	45	13	13	19.1	45	78
46	30	30	21.2	46	60	60	60.6	46	7	7	8	46	45	45	57.5	46	57
47	90	90	80.8	47	80	80	74.7	47	33	33	47.4	47	59	59	72.7	47	9
48	34	34	26.2	48	110	110	90.9	48	18	18	28.2	48	70	70	81.8	48	28
49	75	75	66.6	49	113	113	91.9	49	35	35	51.5	49	27	27	36.3	49	8
50	38	38	31.3	50	90	90	83.8	50	58	58	77.7	50	50	50	65.6	50	47
51	33	33	22.2	51	95	95	84.8	51	34	34	50.5	51	54	54	67.6	51	20
52	65	65	57.5	52	137	137	96.9	52	63	63	83.8	52	57	57	71.7	52	107
53	78	78	70.7	53	80	80	74.7	53	39	39	58.5	53	15	15	21.2	53	56
54	6	6	3	54	115	115	92.9	54	78	78	86.8	54	15	15	21.2	54	55
55	65	65	57.5	55	85	85	80.8	55	17	17	24.2	55	49	49	63.6	55	87
56	80	80	75.7	56	100	100	86.8	56	9	9	10.1	56	30	30	42.4	56	23
57	148	148	97.9	57	57	57	59.5	57	59	59	79.7	57	59	59	72.7	57	87
58	20	20	15.1	58	69	69	69.6	58	59	59	79.7	58	54	54	67.6	58	75
59	60	60	52.5	59	22	22	26.2	59	16	16	20.2	59	12	12	18.1	59	62
60	74	74	65.6	60	50	50	51.5	60	49	49	68.6	60	105	105	95.9	60	45
61	42	42	41.4	61	80	80	74.7	61	83	83	88.8	61	50	50	65.6	61	24
62	34	34	26.2	62	30	30	31.3	62	83	83	88.8	62	47	47	61.6	62	90
63	105	105	87.8	63	62	62	62.6	63	29	29	42.4	63	8	8	15.1	63	21
64	10	10	7	64	26	26	28.2	64	64	64	84.8	64	62	62	76.7	64	41
65	82	82	76.7	65	64	64	65.6	65	16	16	20.2	65	105	105	95.9	65	95
66	33	33	22.2	66	70	70	70.7	66	38	38	54.5	66	40	40	50.5	66	6
67	33	33	22.2	67	50	50	51.5	67	41	41	61.6	67	65	65	77.7	67	38
68	180	180	100	68	5	5	10.1	68	85	85	91.9	68	3	3	12.1	68	54
69	130	130	93.9	69	20	20	19.1	69	16	16	20.2	69	65	65	77.7	69	160
70	95	95	84.8	70	61	61	61.6	70	83	83	88.8	70	15	15	21.2	70	93
71	40	40	35.3	71	76	76	73.7	71	25	25	40.4	71	5	5	13.1	71	34
72	58	58	49.4	72	63	63	63.6	72	23	23	39.3	72	40	40	50.5	72	123
73	10	10	7	73	104	104	87.8	73	43	43	63.6	73	17	17	28.2	73	50
74	38	38	31.3	74	64	64	65.6	74	90	90	92.9	74	71	71	83.8	74	48
75	54	54	45.4	75	71	71	71.7	75	22	22	36.3	75	16	16	26.2	75	20
76	38	38	31.3	76	80	80	74.7	76	16	16	20.2	76	70	70	81.8	76	62
77	78	78	70.7	77	63	63	63.6	77	97	97	93.9	77	25	25	32.3	77	85
78	79	79	74.7	78	21	21	22.2	78	15	15	19.1	78	11	11	17.1	78	47
79	17	17	13.1	79	16	16	17.1	79	44	44	64.6	79	21	21	29.2	79	58
80	65	65	57.5	80	15	15	14.1	80	38	38	54.5	80	13	13	19.1	80	3
81	40	40	35.3	81	104	104	87.8	81	37	37	53.5	81	43	43	54.5	81	17
82	61	61	54.5	82	52	52	56.5	82	60	60	81.8	82	35	35	46.4	82	17
83	140	140	95.9	83	55	55	57.5	83	45	45	65.6	83	30	30	42.4	83	29
84	33	33	22.2	84	85	85	80.8	84	54	54	72.7	84	29	29	38.3	84	54
85	120	120	90.9	85	30	30	31.3	85	67	67	85.8	85	9	9	16.1	85	44
86	84	84	79.7	86	55	55	57.5	86	105	105	95.9	86	55	55	69.6	86	65
87	165	165	98.9	87	30	30	31.3	87	105	105	95.9	87	29	29	38.3	87	11
88	10	10	7	88	175	175	100	88	38	38	54.5	88	26	26	35.3	88	24
89	68	68	62.6	89	34	34	39.3	89	22	22	36.3	89	16	16	26.2	89	102
90	92	92	83.8	90	32	32	37.3	90	40	40	59.5	90	29	29	38.3	90	33
91	50	50	44.4	91	9	9	11.1	91	19	19	31.3	91	15	15	21.2	91	130
92	62	62	55.5	92	130	130	95.9	92	80	80	87.8	92	106	106	98.9	92	52
93	69	69	63.6	93	15	15	14.1	93	31	31	45.4	93	27	27	36.3	93	5
94	110	110	88.8	94	80	80	74.7	94	33	33	47.4	94	31	31	44.4	94	40
95	83	83	77.7	95	47	47	47.4	95	13	13	16.1	95	65	65	77.7	95	80
96	40	40	35.3	96	65	65	67.6	96	3	3	6	96	40	40	50.5	96	9
97	12	12	10.1	97	45	45	46.4	97	54	54	72.7	97	59	59	72.7	97	24
98	23	23	16.1	98	125	125	94.9	98	55	55	74.7	98	95	95	93.9	98	17
99	60	60	52.5	99	21	21	22.2	99	49	49	68.6	99	82	82	89.8	99	23
100	90	90	80.8	100	40	40	43.4	100	140	140	98.9	100	68	68	80.8	100	12

50	21	14	50	-5.5	61	18	17	39	-5.5	45	12	18	55	-5.5	53	12	15	47	-5.5	40	14
29	18	21	71	-6.0	43	21	18	57	-6.0	33	14	12	67	-6.0	41	25	12	59	-6.0	26	13
11	9	18	89	-6.5	22	15	21	78	-6.5	19	15	14	81	-6.5	16	14	25	84	-6.5	13	11
2	2	9	98	-7.0	7	6	15	93	-7.0	4	3	15	96	-7.0	2	2	14	98	-7.0	2	1
0	0	2	100	-7.5	1	1	6	99	-7.5	1	1	3	99	-7.5	0	0	2	100	-7.5	1	1
0	0	0	100	-8.0	0	0	1	100	-8.0	0	0	1	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
14	24	-4.0	-4.5	17	13	22	-4.5	-5.0	25	14	18	-3.0	-3.5	10	12	18	-3.5	-4.0	14	14	27
24	36	-4.5	-5.0	23	22	39	-5.0	-5.5	34	23	30	-4.0	-4.5	18	23	32	-4.5	-5.0	24	14	27
50	71	-5.5	-6.0	45	39	57	-5.5	-6.0	56	37	55	-5.0	-5.5	41	47	59	-5.5	-6.0	49	44	60
71	89	-6.0	-6.5	69	57	78	-6.0	-6.5	86	67	81	-6.0	-6.5	78	59	84	-6.0	-6.5	80	74	87
71	89	-6.0	-6.5	82	78	93	-6.5	-7.0	104	81	96	-6.5	-7.0	97	84	98	-6.5	-7.0	90	74	87
89	98	-6.5	-7.0	94	78	93	-6.5	-7.0	119	81	96	-6.5	-7.0	111	84	98	-6.5	-7.0	105	87	98

WITH GLOVES

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	83	83	73.7	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	130	130	93.9	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	86	86	75.7	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	105	105	84.8	5	<2	1	0	5	<2	1	0	5	5
6	59	59	66.6	6	48	48	41.4	6	<2	1	0	6	<2	1	0	6	17
7	63	63	69.6	7	48	48	41.4	7	<2	1	0	7	<2	1	0	7	130
8	47	47	51.5	8	64	64	56.5	8	<2	1	0	8	31	31	28.2	8	20
9	19	19	18.1	9	33	33	22.2	9	<2	1	0	9	90	90	83.8	9	38
10	5	5	5	10	22	22	10.1	10	<2	1	0	10	24	24	24.2	10	63
11	27	27	27.2	11	21	21	9	11	<2	1	0	11	65	65	59.5	11	12
12	18	18	15.1	12	41	41	31.3	12	<2	1	0	12	100	100	91.9	12	69
13	28	28	28.2	13	44	44	35.3	13	<2	1	0	13	31	31	28.2	13	31
14	33	33	36.3	14	38	38	27.2	14	46	46	55.5	14	50	50	49.4	14	28
15	18	18	15.1	15	22	22	10.1	15	115	115	94.9	15	120	120	95.9	15	12
16	17	17	14.1	16	58	58	50.5	16	68	68	68.6	16	95	95	86.8	16	32
17	55	55	59.5	17	62	62	55.5	17	90	90	78.7	17	73	73	67.6	17	18
18	58	58	64.6	18	71	71	63.6	18	53	53	60.6	18	75	75	70.7	18	45
19	22	22	22.2	19	113	113	88.8	19	90	90	78.7	19	96	96	88.8	19	41
20	57	57	63.6	20	82	82	70.7	20	100	100	85.8	20	78	78	74.7	20	75
21	30	30	32.3	21	31	31	19.1	21	70	70	72.7	21	5	5	7	21	11
22	52	52	56.5	22	100	100	83.8	22	95	95	83.8	22	79	79	75.7	22	15
23	60	60	67.6	23	150	150	95.9	23	95	95	83.8	23	19	19	19.1	23	52
24	45	45	48.4	24	168	168	98.9	24	90	90	78.7	24	52	52	51.5	24	48
25	20	20	19.1	25	150	150	95.9	25	130	130	96.9	25	37	37	38.3	25	37
26	67	67	74.7	26	80	80	67.6	26	62	62	66.6	26	27	27	27.2	26	17
27	7	7	8	27	122	122	91.9	27	80	80	76.7	27	65	65	59.5	27	49
28	55	55	59.5	28	97	97	80.8	28	49	49	58.5	28	130	130	98.9	28	64
29	66	66	73.7	29	195	195	100	29	43	43	47.4	29	10	10	10.1	29	79
30	75	75	78.7	30	52	52	45.4	30	44	44	50.5	30	85	85	80.8	30	25
31	53	53	57.5	31	76	76	65.6	31	65	65	67.6	31	75	75	70.7	31	30
32	90	90	86.8	32	87	87	76.7	32	68	68	68.6	32	34	34	34.3	32	38
33	110	110	92.9	33	87	87	76.7	33	194	194	100	33	35	35	36.3	33	34
34	110	110	92.9	34	105	105	84.8	34	22	22	29.2	34	125	125	96.9	34	25
35	74	74	76.7	35	25	25	16.1	35	35	35	37.3	35	6	6	8	35	29
36	55	55	59.5	36	10	10	3	36	105	105	87.8	36	111	111	94.9	36	98
37	20	20	19.1	37	42	42	32.3	37	45	45	51.5	37	77	77	73.7	37	62
38	48	48	53.5	38	83	83	73.7	38	47	47	57.5	38	152	152	100	38	31
39	65	65	71.7	39	23	23	13.1	39	13	13	19.1	39	45	45	45.4	39	91
40	58	58	64.6	40	20	20	8	40	25	25	30.3	40	95	95	86.8	40	22
41	130	130	98.9	41	55	55	48.4	41	16	16	22.2	41	97	97	89.8	41	18
42	37	37	40.4	42	39	39	29.2	42	45	45	51.5	42	41	41	40.4	42	21
43	75	75	78.7	43	105	105	84.8	43	46	46	55.5	43	87	87	82.8	43	39
44	125	125	97.9	44	25	25	16.1	44	42	42	46.4	44	11	11	11.1	44	68
45	130	130	98.9	45	13	13	5	45	50	50	59.5	45	17	17	18.1	45	46
46	117	117	96.9	46	42	42	32.3	46	82	82	77.7	46	61	61	57.5	46	190
47	90	90	86.8	47	33	33	22.2	47	15	15	20.2	47	69	69	64.6	47	62
48	46	46	50.5	48	150	150	95.9	48	21	21	27.2	48	85	85	80.8	48	29
49	100	100	91.9	49	35	35	24.2	49	41	41	45.4	49	65	65	59.5	49	31
50	115	115	95.9	50	97	97	80.8	50	25	25	30.3	50	42	42	42.4	50	52
51	62	62	68.6	51	65	65	57.5	51	79	79	75.7	51	80	80	76.7	51	122
52	28	28	28.2	52	81	81	69.6	52	74	74	74.7	52	60	60	54.5	52	52
53	14	14	12.1	53	47	47	39.3	53	11	11	15.1	53	80	80	76.7	53	44
54	110	110	92.9	54	145	145	94.9	54	15	15	20.2	54	40	40	39.3	54	84
55	90	90	86.8	55	61	61	53.5	55	43	43	47.4	55	57	57	52.5	55	95
56	28	28	28.2	56	22	22	10.1	56	35	35	37.3	56	45	45	45.4	56	18
57	76	76	81.8	57	35	35	24.2	57	60	60	64.6	57	23	23	23.2	57	47
58	75	75	78.7	58	118	118	90.9	58	92	92	82.8	58	41	41	40.4	58	74
59	92	92	89.8	59	32	32	21.2	59	21	21	27.2	59	80	80	76.7	59	36
60	39	39	42.4	60	58	58	50.5	60	9	9	14.1	60	60	60	54.5	60	120
61	55	55	59.5	61	70	70	62.6	61	57	57	63.6	61	34	34	34.3	61	15
62	30	30	32.3	62	47	47	39.3	62	17	17	23.2	62	57	57	52.5	62	38
63	24	24	25.2	63	95	95	79.7	63	17	17	23.2	63	32	32	30.3	63	70
64	45	45	48.4	64	65	65	57.5	64	31	31	35.3	64	100	100	91.9	64	56
65	97	97	90.9	65	24	24	14.1	65	55	55	61.6	65	20	20	20.2	65	95
66	13	13	11.1	66	31	31	19.1	66	45	45	51.5	66	33	33	32.3	66	92
67	15	15	13.1	67	112	112	87.8	67	43	43	47.4	67	12	12	12.1	67	12
68	30	30	32.3	68	61	61	53.5	68	25	25	30.3	68	35	35	36.3	68	100
69	21	21	21.2	69	72	72	64.6	69	55	55	61.6	69	8	8	9	69	91
70	33	33	36.3	70	82	82	70.7	70	40	40	42.4	70	99	99	90.9	70	38
71	74	74	76.7	71	80	80	67.6	71	35	35	37.3	71	51	51	50.5	71	65
72	40	40	43.4	72	14	14	6	72	8	8	13.1	72	33	33	32.3	72	45
73	18	18	15.1	73	16	16	7	73	36	36	40.4	73	82	82	79.7	73	82
74	28	28	28.2	74	123	123	92.9	74	40	40	42.4	74	21	21	21.2	74	24
75	36	36	39.3	75	43	43	34.3	75	11	11	15.1	75	91	91	84.8	75	73
76	82	82	83.8	76	5	5	1	76	30	30	33.3	76	47	47	48.4	76	95
77	38	38	41.4	77	82	82	70.7	77	69	69	71.7	77	61	61	57.5	77	117
78	54	54	58.5	78	98	98	82.8	78	120	120	95.9	78	60	60	54.5	78	21
79	30	30	32.3	79	115	115	89.8	79	105	105	87.8	79	43	43	44.4	79	32
80	87	87	85.8	80	52	52	45.4	80	45	45	51.5	80	12	12	12.1	80	36
81	34	34	38.3	81	44	44	35.3	81	12	12	18.1	81	16	16	17.1	81	23
82	40	40	43.4	82	40	40	30.3	82	18	18	25.2	82	15	15	15.1	82	23
83	40	40	43.4	83	27	27	18.1	83	113	113	91.9	83	74	74	69.6	83	82
84	82	82	83.8	84	65	65	57.5	84	68	68	68.6	84	66	66	63.6	84	89
85	65	65	71.7	85	65	65	57.5	85	30	30	33.3	85	42	42	42.4	85	32
86	5	5	5	86	76	76	65.6	86	60	60	64.6	86	73	73	67.6	86	43
87	76	76	81.8	87	92	92	78.7	87	40	40	42.4	87	12	12	12.1	87	22
88	51	51	55.5	88	68	68	61.6	88	37	37	41.4	88	76	76	72.7	88	38
89	10	10	9	89	54	54	47.4	89	108	108	89.8	89	25	25	25.2	89	33
90	44	44	47.4	90	60	60	52.5	90	91	91	81.8	90	15	15	15.1	90	22
91	70	70	75.7	91	44	44	35.3	91	32	32	36.3	91	22	22	22.2	91	29
92	64	64	70.7	92	44	44	35.3	92	18	18	25.2	92	32	32	30.3	92	31
93	47	47	51.5	93	49	49	43.4	93	11	11	15.1	93	72	72	66.6	93	9
94	5	5	5	94	24	24	14.1	94	135	135	97.9	94	125	125	96.9	94	68
95	22	22	22.2	95	38	38	27.2	95	113	113	91.9	95	69	69	64.6	95	58
96	25	25	26.2	96	9	9	2	96	103	103	86.8	96	91	91	84.8	96	62
97	48	48	53.5	97	57	57	49.4	97	108	108	89.8	97	65	65	59.5	97	16
98	40	40	43.4	98	50	50	44.4	98	113	113	91.9	98	46	46	47.4	98	21
99	23	23	24.2	99	35	35	24.2	99	71	71	73.7	99	25	25	25.2	99	18
100	11	11	10.1	100	11	11	4	100	155	155	98.9	100	103	103	93.9	100	12

44	14	14	56	-5.5	45	12	11	55	-5.5	34	12	15	66	-5.5	33	7	11	67	-5.5	26	10
30	20	14	70	-6.0	33	18	12	67	-6.0	22	12	12	78	-6.0	26	11	7	74	-6.0	16	10
10	9	20	90	-6.5	15	14	18	85	-6.5	10	10	12	90	-6.5	15	11	11	85	-6.5	6	4
1	1	9	99	-7.0	1	1	14	99	-7.0	0	0	10	100	-7.0	4	3	11	96	-7.0	2	1
0	0	1	100	-7.5	0	0	1	100	-7.5	0	0	0	100	-7.5	1	1	3	99	-7.5	1	1
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	1	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
14	18	-3.0	-3.5	10	16	19	-2.0	-2.5	4	16	17	-2.5	-3.0	6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
18	26	-3.5	-4.0	15	25	30	-3.5	-4.0	11	24	30	-3.5	-4.0	12	#N/A	#N/A	#N/A	#N/A	#N/A	25	28
42	56	-5.0	-5.5	39	44	55	-5.0	-5.5	39	37	51	-4.5	-5.0	31	46	56	-4.5	-5.0	26	50	65
70	90	-6.0	-6.5	70	67	85	-6.0	-6.5	74	66	78	-5.5	-6.0	59	74	85	-6.0	-6.5	66	74	84
70	90	-6.0	-6.5	81	67	85	-6.0	-6.5	88	78	90	-6.0	-6.5	76	74	85	-6.0	-6.5	87	84	94
90	99	-6.5	-7.0	90	85	99	-6.5	-7.0	102	90	100	-6.5	-9.0	90	85	96	-6.5	-7.0	106	84	94

WITH GLOVES

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2
10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2
11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2
12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2
13	35	35	45.4	13	<2	1	0	13	<2	1	0	13	<2	1	0	13	<2
14	43	43	55.5	14	<2	1	0	14	<2	1	0	14	<2	1	0	14	<2
15	63	63	68.6	15	<2	1	0	15	<2	1	0	15	<2	1	0	15	<2
16	95	95	90.9	16	<2	1	0	16	<2	1	0	16	<2	1	0	16	<2
17	38	38	49.4	17	22	22	36.3	17	19	19	31.3	17	<2	1	0	17	40
18	20	20	26.2	18	6	6	19.1	18	35	35	53.5	18	<2	1	0	18	20
19	22	22	28.2	19	17	17	30.3	19	10	10	20.2	19	<2	1	0	19	22
20	100	100	92.9	20	13	13	26.2	20	103	103	93.9	20	<2	1	0	20	26
21	16	16	24.2	21	11	11	23.2	21	34	34	51.5	21	12	12	31.3	21	20
22	50	50	59.5	22	25	25	37.3	22	9	9	17.1	22	9	9	29.2	22	28
23	20	20	26.2	23	95	95	86.8	23	39	39	57.5	23	20	20	41.4	23	50
24	68	68	72.7	24	64	64	66.6	24	114	114	98.9	24	63	63	73.7	24	75
25	15	15	20.2	25	55	55	59.5	25	48	48	66.6	25	33	33	56.5	25	30
26	23	23	30.3	26	75	75	71.7	26	10	10	20.2	26	44	44	65.6	26	18
27	55	55	61.6	27	40	40	51.5	27	32	32	50.5	27	110	110	92.9	27	15
28	15	15	20.2	28	10	10	21.2	28	15	15	25.2	28	20	20	41.4	28	15
29	6	6	13.1	29	33	33	44.4	29	11	11	23.2	29	151	151	97.9	29	75
30	28	28	38.3	30	29	29	40.4	30	24	24	38.3	30	125	125	94.9	30	22
31	108	108	96.9	31	47	47	55.5	31	15	15	25.2	31	132	132	96.9	31	9
32	15	15	20.2	32	90	90	84.8	32	16	16	27.2	32	59	59	72.7	32	57
33	42	42	54.5	33	122	122	97.9	33	9	9	17.1	33	17	17	35.3	33	15
34	14	14	18.1	34	80	80	77.7	34	10	10	20.2	34	35	35	58.5	34	51
35	60	60	63.6	35	75	75	71.7	35	29	29	42.4	35	30	30	51.5	35	51
36	82	82	84.8	36	35	35	47.4	36	31	31	49.4	36	35	35	58.5	36	81
37	33	33	42.4	37	14	14	27.2	37	110	110	94.9	37	80	80	81.8	37	22
38	85	85	85.8	38	60	60	62.6	38	18	18	30.3	38	41	41	64.6	38	10
39	3	3	12.1	39	5	5	16.1	39	90	90	87.8	39	50	50	69.6	39	4
40	15	15	20.2	40	62	62	65.6	40	48	48	66.6	40	120	120	93.9	40	55
41	64	64	69.6	41	120	120	94.9	41	30	30	45.4	41	29	29	50.5	41	44
42	24	24	32.3	42	79	79	75.7	42	50	50	68.6	42	19	19	36.3	42	70
43	47	47	57.5	43	98	98	88.8	43	56	56	72.7	43	45	45	66.6	43	28
44	24	24	32.3	44	110	110	91.9	44	62	62	76.7	44	86	86	84.8	44	36
45	80	80	81.8	45	44	44	53.5	45	37	37	56.5	45	91	91	85.8	45	15
46	25	25	35.3	46	77	77	74.7	46	84	84	84.8	46	80	80	81.8	46	29
47	65	65	70.7	47	150	150	100	47	110	110	94.9	47	30	30	51.5	47	26
48	14	14	18.1	48	79	79	75.7	48	6	6	16.1	48	81	81	83.8	48	39
49	77	77	80.8	49	10	10	21.2	49	9	9	17.1	49	95	95	86.8	49	26
50	34	34	43.4	50	26	26	38.3	50	60	60	73.7	50	19	19	36.3	50	35
51	23	23	30.3	51	55	55	59.5	51	19	19	31.3	51	39	39	62.6	51	14
52	130	130	100	52	122	122	97.9	52	21	21	35.3	52	20	20	41.4	52	3
53	81	81	83.8	53	68	68	67.6	53	22	22	36.3	53	105	105	90.9	53	25
54	46	46	56.5	54	89	89	83.8	54	16	16	27.2	54	31	31	53.5	54	10
55	48	48	58.5	55	40	40	51.5	55	40	40	58.5	55	74	74	77.7	55	6
56	90	90	89.8	56	80	80	77.7	56	35	35	53.5	56	19	19	36.3	56	60
57	85	85	85.8	57	73	73	70.7	57	84	84	84.8	57	95	95	86.8	57	25
58	62	62	66.6	58	21	21	34.3	58	40	40	58.5	58	<2	1	0	58	<2
59	9	9	14.1	59	61	61	64.6	59	16	16	27.2	59	<2	1	0	59	<2
60	39	39	50.5	60	50	50	57.5	60	19	19	31.3	60	<2	1	0	60	<2
61	30	30	39.3	61	11	11	23.2	61	30	30	45.4	61	<2	1	0	61	<2
62	85	85	85.8	62	26	26	38.3	62	115	115	100	62	<2	1	0	62	<2
63	37	37	48.4	63	80	80	77.7	63	93	93	90.9	63	<2	1	0	63	<2
64	30	30	39.3	64	30	30	41.4	64	80	80	83.8	64	40	40	63.6	64	40
65	25	25	35.3	65	111	111	92.9	65	45	45	63.6	65	49	49	68.6	65	49
66	60	60	63.6	66	30	30	41.4	66	29	29	42.4	66	76	76	80.8	66	76
67	70	70	76.7	67	12	12	25.2	67	88	88	86.8	67	67	67	74.7	67	67
68	40	40	51.5	68	60	60	62.6	68	28	28	41.4	68	27	27	49.4	68	27
69	10	10	15.1	69	20	20	32.3	69	43	43	61.6	69	195	195	100	69	195
70	105	105	94.9	70	37	37	49.4	70	30	30	45.4	70	31	31	53.5	70	31
71	10	10	15.1	71	16	16	28.2	71	23	23	37.3	71	55	55	70.7	71	55
72	70	70	76.7	72	71	71	68.6	72	68	68	80.8	72	57	57	71.7	72	57
73	66	66	71.7	73	85	85	82.8	73	90	90	87.8	73	21	21	45.4	73	21
74	60	60	63.6	74	5	5	16.1	74	65	65	78.7	74	15	15	33.3	74	15
75	55	55	61.6	75	56	56	61.6	75	100	100	92.9	75	20	20	41.4	75	20
76	70	70	76.7	76	98	98	88.8	76	110	110	94.9	76	101	101	89.8	76	101
77	86	86	88.8	77	32	32	43.4	77	30	30	45.4	77	69	69	75.7	77	69
78	30	30	39.3	78	97	97	87.8	78	62	62	76.7	78	71	71	76.7	78	71
79	22	22	28.2	79	80	80	77.7	79	70	70	81.8	79	109	109	91.9	79	109
80	52	52	60.6	80	115	115	93.9	80	34	34	51.5	80	152	152	98.9	80	152
81	35	35	45.4	81	39	39	50.5	81	95	95	91.9	81	127	127	95.9	81	127
82	113	113	98.9	82	34	34	45.4	82	40	40	58.5	82	34	34	57.5	82	34
83	25	25	35.3	83	80	80	77.7	83	43	43	61.6	83	75	75	78.7	83	75
84	68	68	72.7	84	44	44	53.5	84	25	25	39.3	84	38	38	61.6	84	38
85	80	80	81.8	85	35	35	47.4	85	12	12	24.2	85	37	37	60.6	85	37
86	16	16	24.2	86	20	20	32.3	86	25	25	39.3	86	25	25	47.4	86	25
87	96	96	91.9	87	16	16	28.2	87	66	66	79.7	87	24	24	46.4	87	24
88	68	68	72.7	88	120	120	94.9	88	55	55	70.7	88	19	19	36.3	88	19
89	10	10	15.1	89	47	47	55.5	89	61	61	75.7	89	9	9	29.2	89	9
90	41	41	53.5	90	51	51	58.5	90	75	75	82.8	90	75	75	78.7	90	75
91	24	24	32.3	91	34	34	45.4	91	45	45	63.6	91	47	47	67.6	91	47
92	75	75	79.7	92	17	17	30.3	92	60	60	73.7	92	14	14	32.3	92	14
93	62	62	66.6	93	93	93	85.8	93	50	50	68.6	93	15	15	33.3	93	15
94	40	40	51.5	94	102	102	90.9	94	90	90	87.8	94	32	32	55.5	94	32
95	105	105	94.9	95	121	121	96.9	95	55	55	70.7	95	25	25	47.4	95	25
96	100	100	92.9	96	6	6	19.1	96	45	45	63.6	96	19	19	36.3	96	19
97	35	35	45.4	97	5	5	16.1	97	36	36	55.5	97	7	7	28.2	97	7
98	34	34	43.4	98	21	21	34.3	98	19	19	31.3	98	6	6	27.2	98	6
99	68	68	72.7	99	72	72	69.6	99	29	29	42.4	99	5	5	26.2	99	5
100	110	110	97.9	100	76	76	73.7	100	110	110	94.9	100	100	100	88.8	100	100

48	13	11	52	-5.5	61	17	9	39	-5.5	50	17	15	50	-5.5	42	14	18	58	-5.5	47	18	14
35	17	13	65	-6.0	44	19	17	56	-6.0	33	16	17	67	-6.0	28	16	14	72	-6.0	29	13	18
18	15	17	82	-6.5	25	17	19	75	-6.5	17	11	16	83	-6.5	12	8	16	88	-6.5	16	13	13
3	3	15	97	-7.0	8	8	17	92	-7.0	6	5	11	94	-7.0	4	4	8	96	-7.0	3	3	13
0	0	3	100	-7.5	0	0	8	100	-7.5	1	1	5	99	-7.5	0	0	4	100	-7.5	0	0	3
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	1	100	-8.0	0	0	0	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
#N/A	#N/A	#N/A	#N/A	#N/A	14	19	-3.5	-4.0	13	15	17	-3.5	-4.0	13	16	17	-1.0	-2.5	2	#N/A	#N/A	
25	28	-3.5	-4.0	11	22	30	-4.5	-5.0	26	24	35	-4.5	-5.0	23	23	30	-4.0	-4.5	18	24	27	
41	52	-5.0	-5.5	42	39	56	-5.5	-6.0	57	50	67	-5.5	-6.0	45	40	58	-5.0	-5.5	39	39	53	
65	82	-6.0	-6.5	78	75	92	-6.5	-7.0	90	67	83	-6.0	-6.5	76	72	88	-6.0	-6.5	68	71	84	
82	97	-6.5	-7.0	94	75	92	-6.5	-7.0	108	83	94	-6.5	-7.0	93	72	88	-6.0	-6.5	83	84	97	
82	97	-6.5	-7.0	109	75	92	-6.5	-7.0	123	83	94	-6.5	-7.0	113	88	96	-6.5	-7.0	98	84	97	

WITH GLOVES

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	<2	1	0	9	15	15	18.1	9	<2	1	0	9	<2	1	0	9	<2
10	<2	1	0	10	130	130	92.9	10	<2	1	0	10	<2	1	0	10	<2
11	<2	1	0	11	102	102	83.8	11	<2	1	0	11	<2	1	0	11	<2
12	<2	1	0	12	32	32	28.2	12	<2	1	0	12	<2	1	0	12	<2
13	<2	1	0	13	11	11	11.1	13	<2	1	0	13	<2	1	0	13	<2
14	<2	1	0	14	51	51	42.4	14	37	37	42.4	14	<2	1	0	14	<2
15	<2	1	0	15	12	12	14.1	15	75	75	72.7	15	<2	1	0	15	<2
16	<2	1	0	16	14	14	17.1	16	120	120	89.8	16	<2	1	0	16	<2
17	<2	1	0	17	170	170	100	17	22	22	23.2	17	66	66	72.7	17	<2
18	24	24	32.3	18	101	101	82.8	18	125	125	92.9	18	28	28	34.3	18	<2
19	37	37	45.4	19	4	4	8	19	130	130	94.9	19	6	6	17.1	19	<2
20	76	76	70.7	20	68	68	59.5	20	140	140	97.9	20	70	70	76.7	20	<2
21	6	6	21.2	21	18	18	19.1	21	20	20	19.1	21	60	60	69.6	21	57
22	90	90	81.8	22	13	13	15.1	22	105	105	86.8	22	21	21	28.2	22	41
23	12	12	25.2	23	130	130	92.9	23	65	65	67.6	23	40	40	50.5	23	38
24	54	54	57.5	24	32	32	28.2	24	170	170	98.9	24	26	26	32.3	24	48
25	45	45	51.5	25	70	70	60.6	25	73	73	70.7	25	46	46	58.5	25	76
26	110	110	88.8	26	66	66	57.5	26	120	120	89.8	26	32	32	37.3	26	41
27	101	101	87.8	27	72	72	64.6	27	49	49	51.5	27	14	14	19.1	27	44
28	70	70	66.6	28	102	102	83.8	28	190	190	100	28	51	51	62.6	28	55
29	30	30	40.4	29	98	98	79.7	29	89	89	80.8	29	55	55	63.6	29	30
30	100	100	85.8	30	56	56	45.4	30	110	110	87.8	30	11	11	18.1	30	36
31	80	80	71.7	31	95	95	78.7	31	31	31	32.3	31	55	55	63.6	31	45
32	98	98	83.8	32	82	82	70.7	32	60	60	60.6	32	38	38	47.4	32	10
33	80	80	71.7	33	140	140	95.9	33	43	43	47.4	33	57	57	67.6	33	21
34	37	37	45.4	34	76	76	68.6	34	20	20	19.1	34	40	40	50.5	34	65
35	26	26	36.3	35	38	38	35.3	35	35	35	37.3	35	75	75	80.8	35	40
36	100	100	85.8	36	24	24	23.2	36	59	59	58.5	36	42	42	52.5	36	55
37	128	128	96.9	37	150	150	97.9	37	78	78	73.7	37	30	30	36.3	37	90
38	88	88	80.8	38	20	20	20.2	38	100	100	84.8	38	64	64	71.7	38	61
39	130	130	97.9	39	105	105	85.8	39	110	110	87.8	39	70	70	76.7	39	25
40	112	112	91.9	40	48	48	40.4	40	55	55	53.5	40	50	50	61.6	40	21
41	110	110	88.8	41	120	120	91.9	41	62	62	65.6	41	19	19	24.2	41	24
42	29	29	38.3	42	27	27	25.2	42	60	60	60.6	42	18	18	23.2	42	51
43	40	40	48.4	43	13	13	15.1	43	32	32	34.3	43	150	150	98.9	43	56
44	62	62	63.6	44	115	115	87.8	44	56	56	55.5	44	80	80	82.8	44	34
45	85	85	77.7	45	9	9	9	45	91	91	83.8	45	72	72	78.7	45	43
46	73	73	69.6	46	58	58	47.4	46	35	35	37.3	46	3	3	16.1	46	90
47	130	130	97.9	47	92	92	76.7	47	65	65	67.6	47	113	113	93.9	47	51
48	130	130	97.9	48	75	75	66.6	48	90	90	82.8	48	29	29	35.3	48	69
49	97	97	82.8	49	59	59	48.4	49	44	44	49.4	49	22	22	29.2	49	52
50	53	53	56.5	50	60	60	49.4	50	71	71	69.6	50	15	15	22.2	50	26
51	120	120	92.9	51	115	115	87.8	51	54	54	52.5	51	38	38	47.4	51	130
52	25	25	33.3	52	112	112	86.8	52	100	100	84.8	52	25	25	31.3	52	95
53	72	72	68.6	53	117	117	89.8	53	55	55	53.5	53	151	151	100	53	48
54	40	40	48.4	54	75	75	66.6	54	27	27	28.2	54	39	39	49.4	54	110
55	57	57	59.5	55	60	60	49.4	55	73	73	70.7	55	14	14	19.1	55	115
56	85	85	77.7	56	38	38	35.3	56	25	25	25.2	56	43	43	54.5	56	61
57	80	80	71.7	57	92	92	76.7	57	21	21	22.2	57	74	74	79.7	57	54
58	33	33	41.4	58	135	135	94.9	58	30	30	30.3	58	32	32	37.3	58	55
59	34	34	42.4	59	65	65	56.5	59	38	38	43.4	59	19	19	24.2	59	104
60	3	3	17.1	60	90	90	74.7	60	56	56	55.5	60	90	90	87.8	60	29
61	22	22	31.3	61	70	70	60.6	61	34	34	36.3	61	23	23	30.3	61	72
62	62	62	63.6	62	60	60	49.4	62	43	43	47.4	62	34	34	40.4	62	160
63	17	17	28.2	63	85	85	71.7	63	61	61	64.6	63	20	20	26.2	63	46
64	10	10	22.2	64	11	11	11.1	64	36	36	40.4	64	120	120	94.9	64	47
65	17	17	28.2	65	71	71	62.6	65	36	36	40.4	65	98	98	90.9	65	120
66	25	25	33.3	66	64	64	53.5	66	41	41	46.4	66	45	45	57.5	66	101
67	47	47	52.5	67	100	100	80.8	67	23	23	24.2	67	26	26	32.3	67	82
68	3	3	17.1	68	89	89	73.7	68	19	19	18.1	68	37	37	45.4	68	65
69	11	11	24.2	69	140	140	95.9	69	20	20	19.1	69	47	47	60.6	69	16
70	69	69	65.6	70	86	86	72.7	70	25	25	25.2	70	35	35	43.4	70	58
71	83	83	75.7	71	71	71	62.6	71	10	10	13.1	71	120	120	94.9	71	120
72	15	15	26.2	72	119	119	90.9	72	80	80	77.7	72	66	66	72.7	72	39
73	10	10	22.2	73	60	60	49.4	73	33	33	35.3	73	20	20	26.2	73	24
74	55	55	58.5	74	155	155	98.9	74	48	48	50.5	74	130	130	96.9	74	25
75	50	50	55.5	75	36	36	32.3	75	89	89	80.8	75	83	83	84.8	75	120
76	25	25	33.3	76	100	100	80.8	76	80	80	77.7	76	55	55	63.6	76	30
77	3	3	17.1	77	35	35	31.3	77	63	63	66.6	77	42	42	52.5	77	110
78	120	120	92.9	78	36	36	32.3	78	78	78	73.7	78	55	55	63.6	78	96
79	98	98	83.8	79	67	67	58.5	79	40	40	44.4	79	85	85	85.8	79	75
80	20	20	30.3	80	80	80	69.6	80	60	60	60.6	80	69	69	74.7	80	45
81	60	60	61.6	81	39	39	37.3	81	59	59	58.5	81	43	43	54.5	81	49
82	127	127	95.9	82	10	10	10.1	82	56	56	55.5	82	36	36	44.4	82	135
83	47	47	52.5	83	40	40	38.3	83	127	127	93.9	83	89	89	86.8	83	20
84	27	27	37.3	84	55	55	44.4	84	17	17	17.1	84	34	34	40.4	84	30
85	85	85	77.7	85	72	72	64.6	85	40	40	44.4	85	78	78	81.8	85	30
86	60	60	61.6	86	29	29	27.2	86	13	13	15.1	86	46	46	58.5	86	105
87	80	80	71.7	87	64	64	53.5	87	11	11	14.1	87	69	69	74.7	87	66
88	40	40	48.4	88	25	25	24.2	88	25	25	25.2	88	34	34	40.4	88	11
89	29	29	38.3	89	36	36	32.3	89	81	81	79.7	89	95	95	88.8	89	54
90	39	39	47.4	90	57	57	46.4	90	120	120	89.8	90	103	103	91.9	90	105
91	70	70	66.6	91	46	46	39.3	91	130	130	94.9	91	82	82	83.8	91	89
92	123	123	94.9	92	23	23	22.2	92	30	30	30.3	92	58	58	68.6	92	80
93	59	59	60.6	93	28	28	26.2	93	60	60	60.6	93	44	44	56.5	93	13
94	5	5	20.2	94	22	22	21.2	94	78	78	73.7	94	108	108	92.9	94	40
95	48	48	54.5	95	91	91	75.7	95	13	13	15.1	95	60	60	69.6	95	45
96	110	110	88.8	96	64	64	53.5	96	35	35	37.3	96	130	130	96.9	96	36
97	83	83	75.7	97	34	34	30.3	97	31	31	32.3	97	95	95	88.8	97	29
98	15	15	26.2	98	49	49	41.4	98	29	29	29.2	98	37	37	45.4	98	107
99	35	35	44.4	99	51	51	42.4	99	78	78	73.7	99	32	32	37.3	99	30
100	34	34	42.4	100	11	11	11.1	100	130	130	94.9	100	14	14	19.1	100	81

35	19	20	65	-5.5	55	15	9	45	-5.5	47	13	14	53	-5.5	45	20	12	55	-5.5	35	19
16	11	19	84	-6.0	40	22	15	60	-6.0	34	21	13	66	-6.0	25	16	20	75	-6.0	16	7
5	3	11	95	-6.5	18	16	22	82	-6.5	13	11	21	87	-6.5	9	7	16	91	-6.5	9	8
2	2	3	98	-7.0	2	2	16	98	-7.0	2	2	11	98	-7.0	2	2	7	98	-7.0	1	1
0	0	2	100	-7.5	0	0	2	100	-7.5	0	0	2	100	-7.5	0	0	2	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
15	19	-3.0	-3.5	9	14	17	-3.5	-4.0	14	#N/A	#N/A	#N/A	#N/A	#N/A	16	17	-3.0	-3.5	8	#N/A	#N/A
19	26	-3.5	-4.0	15	17	26	-4.0	-4.5	22	23	27	-4.0	-4.5	19	25	32	-4.0	-4.5	16	23	28
45	65	-5.0	-5.5	35	45	60	-5.5	-6.0	51	39	53	-5.0	-5.5	42	43	55	-5.0	-5.5	39	36	56
65	84	-5.5	-6.0	54	60	82	-6.0	-6.5	81	66	87	-6.0	-6.5	74	75	91	-6.0	-6.5	64	65	84
84	95	-6.0	-6.5	64	82	98	-6.5	-7.0	94	66	87	-6.0	-6.5	86	75	91	-6.0	-6.5	78	84	91
84	95	-6.0	-6.5	77	82	98	-6.5	-7.0	107	87	98	-6.5	-7.0	99	75	91	-6.0	-6.5	88	84	91

WITH GLOVES

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	9	9	15.1	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	7	7	11.1	9	30	30	34.3	9	<2	1	0	9	<2	1	0	9	<2
10	13	13	20.2	10	20	20	19.1	10	<2	1	0	10	<2	1	0	10	<2
11	27	27	35.3	11	20	20	19.1	11	<2	1	0	11	<2	1	0	11	<2
12	29	29	42.4	12	14	14	15.1	12	<2	1	0	12	<2	1	0	12	<2
13	7	7	11.1	13	11	11	12.1	13	<2	1	0	13	<2	1	0	13	<2
14	12	12	19.1	14	13	13	14.1	14	<2	1	0	14	<2	1	0	14	<2
15	7	7	11.1	15	26	26	30.3	15	<2	1	0	15	<2	1	0	15	<2
16	9	9	15.1	16	25	25	27.2	16	<2	1	0	16	<2	1	0	16	<2
17	20	20	31.3	17	29	29	31.3	17	<2	1	0	17	26	26	34.3	17	<2
18	38	38	50.5	18	50	50	47.4	18	<2	1	0	18	24	24	32.3	18	<2
19	54	54	69.6	19	29	29	31.3	19	<2	1	0	19	13	13	18.1	19	<2
20	28	28	40.4	20	17	17	17.1	20	10	10	19.1	20	27	27	36.3	20	<2
21	60	60	78.7	21	25	25	27.2	21	50	50	54.5	21	25	25	33.3	21	<2
22	8	8	14.1	22	55	55	52.5	22	21	21	25.2	22	15	15	21.2	22	25
23	18	18	28.2	23	25	25	27.2	23	32	32	38.3	23	13	13	18.1	23	17
24	35	35	45.4	24	22	22	24.2	24	20	20	23.2	24	11	11	16.1	24	14
25	125	125	97.9	25	22	22	24.2	25	38	38	43.4	25	15	15	21.2	25	52
26	20	20	31.3	26	41	41	40.4	26	24	24	29.2	26	100	100	93.9	26	78
27	18	18	28.2	27	6	6	8	27	21	21	25.2	27	31	31	40.4	27	26
28	14	14	21.2	28	42	42	41.4	28	90	90	86.8	28	77	77	84.8	28	17
29	55	55	70.7	29	42	42	41.4	29	15	15	21.2	29	63	63	74.7	29	18
30	36	36	47.4	30	35	35	36.3	30	15	15	21.2	30	85	85	87.8	30	15
31	17	17	26.2	31	35	35	36.3	31	24	24	29.2	31	32	32	41.4	31	23
32	40	40	53.5	32	48	48	45.4	32	31	31	35.3	32	47	47	56.5	32	28
33	20	20	31.3	33	52	52	49.4	33	39	39	45.4	33	34	34	45.4	33	17
34	15	15	23.2	34	21	21	23.2	34	45	45	52.5	34	18	18	26.2	34	38
35	10	10	18.1	35	50	50	47.4	35	150	150	100	35	40	40	49.4	35	54
36	32	32	44.4	36	95	95	83.8	36	23	23	27.2	36	62	62	72.7	36	46
37	40	40	53.5	37	45	45	43.4	37	14	14	20.2	37	33	33	43.4	37	42
38	60	60	78.7	38	40	40	39.3	38	59	59	60.6	38	22	22	30.3	38	6
39	5	5	8	39	85	85	70.7	39	86	86	85.8	39	17	17	25.2	39	44
40	15	15	23.2	40	52	52	49.4	40	28	28	33.3	40	27	27	36.3	40	72
41	9	9	15.1	41	120	120	93.9	41	40	40	47.4	41	16	16	24.2	41	50
42	65	65	84.8	42	60	60	55.5	42	35	35	41.4	42	12	12	17.1	42	7
43	76	76	92.9	43	30	30	34.3	43	80	80	75.7	43	72	72	79.7	43	52
44	47	47	65.6	44	106	106	88.8	44	70	70	67.6	44	33	33	43.4	44	24
45	57	57	76.7	45	120	120	93.9	45	70	70	67.6	45	45	45	54.5	45	15
46	44	44	60.6	46	11	11	12.1	46	40	40	47.4	46	48	48	58.5	46	46
47	55	55	70.7	47	85	85	70.7	47	85	85	82.8	47	32	32	41.4	47	24
48	58	58	77.7	48	16	16	16.1	48	80	80	75.7	48	26	26	34.3	48	55
49	70	70	88.8	49	91	91	82.8	49	70	70	67.6	49	14	14	20.2	49	28
50	64	64	83.8	50	76	76	63.6	50	80	80	75.7	50	29	29	38.3	50	25
51	40	40	53.5	51	23	23	26.2	51	78	78	72.7	51	87	87	88.8	51	85
52	75	75	91.9	52	90	90	77.7	52	115	115	96.9	52	39	39	48.4	52	23
53	40	40	53.5	53	45	45	43.4	53	85	85	82.8	53	49	49	59.5	53	28
54	160	160	100	54	122	122	96.9	54	75	75	71.7	54	15	15	21.2	54	17
55	45	45	63.6	55	65	65	60.6	55	80	80	75.7	55	46	46	55.5	55	92
56	60	60	78.7	56	90	90	77.7	56	54	54	57.5	56	54	54	64.6	56	41
57	56	56	75.7	57	20	20	19.1	57	120	120	97.9	57	60	60	70.7	57	117
58	40	40	53.5	58	135	135	98.9	58	100	100	91.9	58	41	41	51.5	58	32
59	44	44	60.6	59	85	85	70.7	59	110	110	94.9	59	50	50	60.6	59	47
60	35	35	45.4	60	110	110	89.8	60	71	71	70.7	60	55	55	65.6	60	46
61	65	65	84.8	61	90	90	77.7	61	93	93	88.8	61	20	20	27.2	61	27
62	140	140	98.9	62	125	125	97.9	62	113	113	95.9	62	82	82	86.8	62	75
63	60	60	78.7	63	84	84	69.6	63	44	44	51.5	63	87	87	88.8	63	95
64	100	100	95.9	64	100	100	86.8	64	60	60	61.6	64	135	135	98.9	64	92
65	120	120	96.9	65	80	80	66.6	65	34	34	40.4	65	95	95	91.9	65	55
66	50	50	66.6	66	96	96	85.8	66	102	102	92.9	66	68	68	76.7	66	32
67	14	14	21.2	67	79	79	65.6	67	29	29	34.3	67	72	72	79.7	67	147
68	3	3	7	68	110	110	89.8	68	36	36	42.4	68	21	21	29.2	68	30
69	78	78	93.9	69	60	60	55.5	69	56	56	59.5	69	41	41	51.5	69	52
70	17	17	26.2	70	49	49	46.4	70	62	62	62.6	70	36	36	47.4	70	47
71	27	27	35.3	71	111	111	92.9	71	31	31	35.3	71	47	47	56.5	71	61
72	38	38	50.5	72	56	56	54.5	72	41	41	49.4	72	50	50	60.6	72	105
73	80	80	94.9	73	36	36	38.3	73	78	78	72.7	73	22	22	30.3	73	43
74	30	30	43.4	74	60	60	55.5	74	23	23	27.2	74	51	51	62.6	74	42
75	40	40	53.5	75	53	53	51.5	75	38	38	43.4	75	55	55	65.6	75	107
76	27	27	35.3	76	80	80	66.6	76	94	94	89.8	76	40	40	49.4	76	29
77	38	38	50.5	77	78	78	64.6	77	80	80	75.7	77	52	52	63.6	77	21
78	45	45	63.6	78	55	55	52.5	78	80	80	75.7	78	79	79	85.8	78	52
79	27	27	35.3	79	60	60	55.5	79	64	64	64.6	79	105	105	94.9	79	24
80	53	53	68.6	80	60	60	55.5	80	136	136	98.9	80	76	76	82.8	80	60
81	36	36	47.4	81	9	9	10.1	81	104	104	93.9	81	72	72	79.7	81	18
82	26	26	34.3	82	141	141	100	82	20	20	23.2	82	61	61	71.7	82	14
83	37	37	49.4	83	66	66	61.6	83	62	62	62.6	83	105	105	94.9	83	45
84	5	5	8	84	87	87	76.7	84	50	50	54.5	84	62	62	72.7	84	30
85	55	55	70.7	85	8	8	9	85	42	42	50.5	85	68	68	76.7	85	28
86	55	55	70.7	86	86	86	75.7	86	31	31	35.3	86	58	58	68.6	86	75
87	70	70	88.8	87	105	105	87.8	87	64	64	64.6	87	135	135	98.9	87	82
88	15	15	23.2	88	90	90	77.7	88	50	50	54.5	88	71	71	78.7	88	29
89	50	50	66.6	89	29	29	31.3	89	97	97	90.9	89	20	20	27.2	89	107
90	6	6	10.1	90	95	95	83.8	90	55	55	58.5	90	65	65	75.7	90	30
91	63	63	82.8	91	10	10	11.1	91	48	48	53.5	91	41	41	51.5	91	60
92	27	27	35.3	92	120	120	93.9	92	24	24	29.2	92	57	57	67.6	92	44
93	55	55	70.7	93	81	81	68.6	93	25	25	32.3	93	90	90	90.9	93	21
94	68	68	86.8	94	85	85	70.7	94	33	33	39.3	94	30	30	39.3	94	64
95	44	44	60.6	95	90	90	77.7	95	79	79	74.7	95	115	115	96.9	95	34
96	19	19	30.3	96	19	19	18.1	96	83	83	81.8	96	120	120	97.9	96	67
97	68	68	86.8	97	110	110	89.8	97	85	85	82.8	97	98	98	92.9	97	103
98	70	70	88.8	98	85	85	70.7	98	39	39	45.4	98	58	58	68.6	98	15
99	28	28	40.4	99	20	20	19.1	99	91	91	87.8	99	76	76	82.8	99	52
100	40	40	53.5	100	69	69	62.6	100	65	65	66.6	100	34	34	45.4	100	61

17	65	-6.0	42	21	20	58	-6.0	42	25	27	58	-6.0	34	22	20	66	-6.0	35	21	18	65	
22	87	-6.5	21	15	21	79	-6.5	17	15	25	83	-6.5	12	10	22	88	-6.5	14	11	21	86	
13	100	-7.0	6	5	15	94	-7.0	2	1	15	98	-7.0	2	2	10	98	-7.0	3	3	11	97	
0	100	-7.5	1	1	5	99	-7.5	1	0	1	99	-7.5	0	0	2	100	-7.5	0	0	3	100	
0	100	-8.0	0	0	1	100	-8.0	1	0	0	99	-8.0	0	0	0	100	-8.0	0	0	0	100	
0	100	-8.5	0	0	0	100	-8.5	1	1	0	99	-8.5	0	0	0	100	-8.5	0	0	0	100	
0	100	-9.0			0	100	-9.0			1	100	-9.0			0	100	-9.0			0	100	
				100					**100**					**100**					**100**			

		Percentile (mm)					Percentile (mm)					Percentile (mm)					Percentile (mm)				
-4.0	-4.5	18	8	17	-4.0	-4.5	22	16	22	-4.5	-5.0	23	16	20	-3.5	-4.0	11	14	23	-4.0	-4.5
-4.5	-5.0	26	23	38	-5.0	-5.5	33	22	31	-5.0	-5.5	36	25	37	-4.5	-5.0	23	23	35	-4.5	-5.0
-5.5	-6.0	47	38	58	-5.5	-6.0	56	31	58	-5.5	-6.0	58	46	66	-5.5	-6.0	48	47	65	-5.5	-6.0
-6.0	-6.5	75	58	79	-6.0	-6.5	84	58	83	-6.0	-6.5	81	66	88	-6.0	-6.5	74	65	86	-6.0	-6.5
-6.0	-6.5	86	79	94	-6.5	-7.0	101	83	98	-6.5	-7.0	92	66	88	-6.0	-6.5	85	65	86	-6.0	-6.5
-6.5	-9.0	134	79	94	-6.5	-7.0	117	83	98	-6.5	-7.0	106	88	98	-6.5	-7.0	97	86	97	-6.5	-7.0

														WITH GLOVES			
Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0
1	0	2	19	19	12.1	2	<2	1	0	2	<2	1	0	2	<2	1	0
1	0	3	82	82	74.7	3	<2	1	0	3	<2	1	0	3	<2	1	0
1	0	4	25	25	18.1	4	<2	1	0	4	<2	1	0	4	<2	1	0
1	0	5	46	46	38.3	5	125	125	97.9	5	<2	1	0	5	<2	1	0
27	26.2	6	105	105	87.8	6	58	58	47.4	6	<2	1	0	6	<2	1	0
50	51.5	7	33	33	23.2	7	9	9	7	7	<2	1	0	7	<2	1	0
15	13.1	8	54	54	50.5	8	15	15	9	8	<2	1	0	8	<2	1	0
50	51.5	9	78	78	71.7	9	8	8	5	9	<2	1	0	9	39	39	43.4
8	5	10	33	33	23.2	10	12	12	8	10	<2	1	0	10	24	24	24.2
25	22.2	11	21	21	14.1	11	82	82	78.7	11	<2	1	0	11	46	46	47.4
67	67.6	12	37	37	29.2	12	50	50	35.3	12	82	82	84.8	12	25	25	25.2
22	17.1	13	18	18	10.1	13	78	78	75.7	13	66	66	69.6	13	50	50	50.5
42	40.4	14	38	38	32.3	14	70	70	61.6	14	14	14	17.1	14	66	66	66.6
110	93.9	15	42	42	33.3	15	60	60	49.4	15	34	34	37.3	15	57	57	58.5
35	32.3	16	60	60	55.5	16	24	24	17.1	16	30	30	33.3	16	20	20	17.1
32	29.2	17	50	50	43.4	17	23	23	16.1	17	14	14	17.1	17	9	9	10.1
62	60.6	18	48	48	40.4	18	5	5	4	18	28	28	28.2	18	6	6	8
120	100	19	68	68	60.6	19	27	27	18.1	19	60	60	54.5	19	98	98	87.8
46	48.4	20	65	65	58.5	20	67	67	59.5	20	30	30	33.3	20	25	25	25.2
90	85.8	21	17	17	8	21	38	38	25.2	21	7	7	11.1	21	72	72	68.6
45	45.4	22	140	140	96.9	22	72	72	67.6	22	78	78	79.7	22	38	38	39.3
75	73.7	23	18	18	10.1	23	34	34	23.2	23	22	22	24.2	23	26	26	28.2
110	93.9	24	15	15	5	24	54	54	40.4	24	8	8	12.1	24	15	15	12.1
58	57.5	25	35	35	27.2	25	70	70	61.6	25	21	21	23.2	25	21	21	18.1
45	45.4	26	5	5	1	26	47	47	33.3	26	42	42	44.4	26	17	17	14.1
66	66.6	27	20	20	13.1	27	110	110	90.9	27	10	10	13.1	27	8	8	9
43	42.4	28	25	25	18.1	28	56	56	45.4	28	58	58	53.5	28	57	57	58.5
20	15.1	29	36	36	28.2	29	41	41	26.2	29	12	12	16.1	29	53	53	52.5
10	7	30	33	33	23.2	30	115	115	92.9	30	55	55	51.5	30	124	124	95.9
35	32.3	31	37	37	29.2	31	52	52	37.3	31	61	61	58.5	31	33	33	35.3
110	93.9	32	27	27	20.2	32	41	41	26.2	32	65	65	66.6	32	59	59	61.6
11	9	33	34	34	26.2	33	61	61	53.5	33	62	62	60.6	33	48	48	49.4
22	17.1	34	21	21	14.1	34	54	54	40.4	34	72	72	73.7	34	62	62	62.6
22	17.1	35	65	65	58.5	35	57	57	46.4	35	65	65	66.6	35	80	80	77.7
11	9	36	105	105	87.8	36	65	65	58.5	36	64	64	65.6	36	19	19	16.1
20	15.1	37	82	82	74.7	37	33	33	22.2	37	38	38	39.3	37	92	92	86.8
25	22.2	38	50	50	43.4	38	72	72	67.6	38	63	63	64.6	38	40	40	44.4
32	29.2	39	43	43	36.3	39	59	59	48.4	39	11	11	15.1	39	21	21	18.1
85	82.8	40	7	7	2	40	74	74	73.7	40	100	100	90.9	40	56	56	57.5
30	28.2	41	130	130	94.9	41	60	60	49.4	41	39	39	41.4	41	54	54	53.5
25	22.2	42	46	46	38.3	42	43	43	28.2	42	82	82	84.8	42	77	77	76.7
52	56.5	43	48	48	40.4	43	34	34	23.2	43	38	38	39.3	43	22	22	20.2
28	27.2	44	57	57	53.5	44	92	92	83.8	44	25	25	27.2	44	75	75	74.7
42	40.4	45	24	24	17.1	45	62	62	54.5	45	140	140	100	45	32	32	33.3
75	73.7	46	180	180	98.9	46	430	430	100	46	60	60	54.5	46	28	28	29.2
110	93.9	47	42	42	33.3	47	46	46	31.3	47	28	28	28.2	47	22	22	20.2
80	78.7	48	27	27	20.2	48	46	46	31.3	48	120	120	96.9	48	83	83	80.8
23	20.2	49	50	50	43.4	49	28	28	19.1	49	60	60	54.5	49	54	54	53.5
62	60.6	50	110	110	89.8	50	110	110	90.9	50	80	80	81.8	50	25	25	25.2
35	32.3	51	70	70	61.6	51	92	92	83.8	51	19	19	21.2	51	32	32	33.3
48	50.5	52	79	79	72.7	52	19	19	12.1	52	41	41	43.4	52	37	37	38.3
94	88.8	53	70	70	61.6	53	82	82	78.7	53	55	55	51.5	53	38	38	39.3
12	11.1	54	15	15	5	54	21	21	15.1	54	62	62	60.6	54	30	30	31.3
73	72.7	55	17	17	8	55	8	8	5	55	31	31	35.3	55	147	147	97.9
50	51.5	56	57	57	53.5	56	98	98	87.8	56	17	17	20.2	56	100	100	88.8
13	12.1	57	125	125	93.9	57	115	115	92.9	57	34	34	37.3	57	88	88	85.8
90	85.8	58	98	98	84.8	58	47	47	33.3	58	115	115	95.9	58	104	104	89.8
38	37.3	59	55	55	52.5	59	50	50	35.3	59	50	50	48.4	59	113	113	92.9
50	51.5	60	9	9	3	60	70	70	61.6	60	75	75	75.7	60	45	45	46.4
80	78.7	61	51	51	48.4	61	55	55	43.4	61	74	74	74.7	61	63	63	64.6
35	32.3	62	42	42	33.3	62	60	60	49.4	62	97	97	88.8	62	110	110	91.9
64	64.6	63	70	70	61.6	63	120	120	95.9	63	29	29	32.3	63	123	123	94.9
10	7	64	160	160	97.9	64	72	72	67.6	64	52	52	49.4	64	34	34	37.3
45	45.4	65	73	73	67.6	65	55	55	43.4	65	60	60	54.5	65	75	75	74.7
37	36.3	66	48	48	40.4	66	30	30	20.2	66	100	100	90.9	66	124	124	95.9
50	51.5	67	70	70	61.6	67	19	19	12.1	67	52	52	49.4	67	72	72	68.6
80	78.7	68	95	95	81.8	68	43	43	28.2	68	20	20	22.2	68	38	38	39.3
26	25.2	69	82	82	74.7	69	88	88	82.8	69	65	65	66.6	69	152	152	98.9
75	73.7	70	60	60	55.5	70	62	62	54.5	70	66	66	69.6	70	105	105	90.9
58	57.5	71	90	90	77.7	71	72	72	67.6	71	70	70	72.7	71	62	62	62.6
17	14.1	72	92	92	80.8	72	94	94	86.8	72	44	44	45.4	72	80	80	77.7
34	31.3	73	50	50	43.4	73	105	105	89.8	73	14	14	17.1	73	165	165	100
115	97.9	74	104	104	86.8	74	78	78	75.7	74	47	47	46.4	74	83	83	80.8
62	60.6	75	54	54	50.5	75	53	53	38.3	75	120	120	96.9	75	82	82	79.7
77	76.7	76	22	22	16.1	76	73	73	72.7	76	24	24	25.2	76	15	15	12.1
9	6	77	110	110	89.8	77	54	54	40.4	77	62	62	60.6	77	85	85	84.8
79	77.7	78	100	100	85.8	78	80	80	77.7	78	89	89	87.8	78	84	84	82.8
62	60.6	79	70	70	61.6	79	84	84	81.8	79	48	48	47.4	79	22	22	20.2
60	59.5	80	95	95	81.8	80	67	67	59.5	80	24	24	25.2	80	74	74	73.7
85	82.8	81	75	75	68.6	81	103	103	88.8	81	62	62	60.6	81	33	33	35.3
100	90.9	82	90	90	77.7	82	120	120	95.9	82	83	83	86.8	82	23	23	23.2
39	38.3	83	91	91	79.7	83	64	64	57.5	83	78	78	79.7	83	84	84	82.8
46	48.4	84	95	95	81.8	84	30	30	20.2	84	28	28	28.2	84	72	72	68.6
80	78.7	85	195	195	100	85	129	129	98.9	85	10	10	13.1	85	50	50	50.5
72	71.7	86	115	115	92.9	86	18	18	10.1	86	108	108	94.9	86	65	65	65.6
70	70.7	87	10	10	4	87	18	18	10.1	87	81	81	83.8	87	46	46	47.4
95	89.8	88	53	53	49.4	88	20	20	14.1	88	40	40	42.4	88	70	70	67.6
44	43.4	89	43	43	36.3	89	70	70	61.6	89	98	98	89.8	89	117	117	93.9
115	97.9	90	130	130	94.9	90	76	76	74.7	90	132	132	98.9	90	31	31	32.3
65	65.6	91	76	76	70.7	91	44	44	30.3	91	28	28	28.2	91	18	18	15.1
23	20.2	92	75	75	68.6	92	70	70	61.6	92	100	100	90.9	92	28	28	29.2
44	43.4	93	27	27	20.2	93	53	53	38.3	93	80	80	81.8	93	54	54	53.5
100	90.9	94	110	110	89.8	94	70	70	61.6	94	61	61	58.5	94	73	73	72.7
41	39.3	95	50	50	43.4	95	72	72	67.6	95	32	32	36.3	95	42	42	45.4
67	67.6	96	63	63	57.5	96	62	62	54.5	96	75	75	75.7	96	38	38	39.3
92	87.8	97	15	15	5	97	92	92	83.8	97	69	69	71.7	97	54	54	53.5
100	90.9	98	37	37	29.2	98	115	115	92.9	98	77	77	78.7	98	72	72	68.6
68	69.6	99	70	70	61.6	99	60	60	49.4	99	105	105	93.9	99	9	9	10.1
85	82.8	100	79	79	72.7	100	83	83	80.8	100	76	76	77.7	100	57	57	58.5

0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
16	23	-3.5	-4.0	11	16	17	-3.0	-3.5	8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
23	35	-4.0	-4.5	17	23	37	-4.0	-4.5	17	24	30	-3.5	-4.0	12	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	74	-5.0	-5.5	32	37	54	-4.5	-5.0	29	39	55	-4.5	-5.0	29	42	55	-4.5	-5.0	28	48	51
74	86	-5.5	-6.0	46	54	81	-5.0	-5.5	42	75	93	-5.5	-6.0	45	72	91	-5.5	-6.0	48	66	79
74	86	-5.5	-6.0	60	81	94	-5.5	-6.0	49	75	93	-5.5	-6.0	54	72	91	-5.5	-6.0	56	79	92
86	100	-6.0	-9.0	116	81	94	-5.5	-6.0	57	75	93	-5.5	-6.0	60	72	91	-5.5	-6.0	63	79	92

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2
10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2
11	21	21	32.3	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2
12	5	5	11.1	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2
13	29	29	44.4	13	<2	1	0	13	<2	1	0	13	<2	1	0	13	<2
14	15	15	18.1	14	<2	1	0	14	<2	1	0	14	<2	1	0	14	<2
15	55	55	80.8	15	<2	1	0	15	<2	1	0	15	<2	1	0	15	<2
16	53	53	79.7	16	<2	1	0	16	<2	1	0	16	<2	1	0	16	<2
17	17	17	23.2	17	39	39	67.6	17	<2	1	0	17	<2	1	0	17	<2
18	20	20	28.2	18	20	20	29.2	18	<2	1	0	18	<2	1	0	18	<2
19	81	81	98.9	19	19	19	25.2	19	<2	1	0	19	<2	1	0	19	<2
20	35	35	53.5	20	10	10	16.1	20	<2	1	0	20	<2	1	0	20	<2
21	28	28	42.4	21	25	25	38.3	21	<2	1	0	21	<2	1	0	21	<2
22	19	19	25.2	22	50	50	84.8	22	<2	1	0	22	<2	1	0	22	<2
23	80	80	95.9	23	34	34	55.5	23	61	61	88.8	23	<2	1	0	23	<2
24	24	24	35.3	24	15	15	21.2	24	28	28	48.4	24	15	15	34.3	24	<2
25	49	49	75.7	25	55	55	91.9	25	25	25	40.4	25	31	31	52.5	25	<2
26	15	15	18.1	26	23	23	37.3	26	40	40	64.6	26	34	34	56.5	26	<2
27	30	30	46.4	27	35	35	57.5	27	28	28	48.4	27	28	28	50.5	27	<2
28	39	39	59.5	28	21	21	34.3	28	9	9	22.2	28	25	25	46.4	28	<2
29	8	8	14.1	29	28	28	45.4	29	39	39	61.6	29	53	53	80.8	29	<2
30	8	8	14.1	30	37	37	66.6	30	48	48	76.7	30	36	36	58.5	30	<2
31	29	29	44.4	31	75	75	97.9	31	26	26	43.4	31	23	23	42.4	31	<2
32	13	13	17.1	32	50	50	84.8	32	21	21	34.3	32	14	14	32.3	32	<2
33	75	75	94.9	33	48	48	82.8	33	78	78	97.9	33	100	100	100	33	<2
34	74	74	93.9	34	80	80	100	34	30	30	51.5	34	42	42	64.6	34	<2
35	32	32	48.4	35	40	40	70.7	35	35	35	57.5	35	51	51	77.7	35	<2
36	80	80	95.9	36	30	30	47.4	36	31	31	53.5	36	42	42	64.6	36	<2
37	19	19	25.2	37	39	39	67.6	37	34	34	56.5	37	73	73	95.9	37	<2
38	45	45	72.7	38	19	19	25.2	38	21	21	34.3	38	37	37	61.6	38	<2
39	43	43	68.6	39	42	42	76.7	39	62	62	91.9	39	62	62	88.8	39	<2
40	55	55	80.8	40	25	25	38.3	40	15	15	27.2	40	83	83	98.9	40	<2
41	86	86	100	41	39	39	67.6	41	36	36	59.5	41	47	47	73.7	41	<2
42	22	22	33.3	42	40	40	70.7	42	19	19	30.3	42	32	32	54.5	42	25
43	72	72	92.9	43	25	25	38.3	43	70	70	94.9	43	16	16	36.3	43	48
44	7	7	12.1	44	25	25	38.3	44	39	39	61.6	44	23	23	42.4	44	100
45	25	25	38.3	45	35	35	57.5	45	30	30	51.5	45	43	43	69.6	45	46
46	35	35	53.5	46	17	17	23.2	46	26	26	43.4	46	56	56	86.8	46	30
47	18	18	24.2	47	13	13	18.1	47	52	52	80.8	47	39	39	63.6	47	21
48	20	20	28.2	48	45	45	79.7	48	40	40	64.6	48	62	62	88.8	48	64
49	69	69	89.8	49	34	34	55.5	49	45	45	72.7	49	50	50	76.7	49	79
50	40	40	60.6	50	70	70	96.9	50	22	22	37.3	50	79	79	96.9	50	22
51	3	3	10.1	51	35	35	57.5	51	55	55	82.8	51	46	46	72.7	51	30
52	52	52	77.7	52	35	35	57.5	52	102	102	100	52	8	8	28.2	52	24
53	46	46	74.7	53	42	42	76.7	53	58	58	84.8	53	54	54	83.8	53	40
54	40	40	60.6	54	67	67	95.9	54	80	80	98.9	54	65	65	91.9	54	90
55	40	40	60.6	55	32	32	52.5	55	31	31	53.5	55	49	49	75.7	55	25
56	40	40	60.6	56	35	35	57.5	56	67	67	93.9	56	70	70	93.9	56	75
57	65	65	86.8	57	20	20	29.2	57	43	43	69.6	57	62	62	88.8	57	34
58	35	35	53.5	58	20	20	29.2	58	42	42	68.6	58	38	38	62.6	58	70
59	35	35	53.5	59	25	25	38.3	59	21	21	34.3	59	82	82	97.9	59	30
60	27	27	41.4	60	20	20	29.2	60	13	13	25.2	60	42	42	64.6	60	50
61	43	43	68.6	61	19	19	25.2	61	12	12	24.2	61	22	22	40.4	61	59
62	69	69	89.8	62	51	51	87.8	62	72	72	96.9	62	53	53	80.8	62	65
63	44	44	71.7	63	25	25	38.3	63	71	71	95.9	63	7	7	26.2	63	46
64	45	45	72.7	64	40	40	70.7	64	52	52	80.8	64	31	31	52.5	64	35
65	33	33	50.5	65	35	35	57.5	65	63	63	92.9	65	33	33	55.5	65	38
66	32	32	48.4	66	31	31	49.4	66	60	60	85.8	66	36	36	58.5	66	56
67	56	56	84.8	67	30	30	47.4	67	44	44	71.7	67	52	52	78.7	67	23
68	56	56	84.8	68	15	15	21.2	68	37	37	60.6	68	22	22	40.4	68	22
69	80	80	95.9	69	55	55	91.9	69	26	26	43.4	69	24	24	44.4	69	37
70	65	65	86.8	70	25	25	38.3	70	33	33	55.5	70	24	24	44.4	70	19
71	24	24	35.3	71	35	35	57.5	71	60	60	85.8	71	29	29	51.5	71	9
72	35	35	53.5	72	12	12	17.1	72	55	55	82.8	72	18	18	38.3	72	44
73	40	40	60.6	73	65	65	94.9	73	46	46	75.7	73	7	7	26.2	73	35
74	25	25	38.3	74	50	50	84.8	74	39	39	61.6	74	<2	1	0	74	<2
75	15	15	18.1	75	51	51	87.8	75	50	50	77.7	75	<2	1	0	75	<2
76	22	22	33.3	76	13	13	18.1	76	26	26	43.4	76	<2	1	0	76	<2
77	40	40	60.6	77	31	31	49.4	77	15	15	27.2	77	43	43	69.6	77	43
78	34	34	51.5	78	32	32	52.5	78	15	15	27.2	78	14	14	32.3	78	14
79	52	52	77.7	79	35	35	57.5	79	41	41	67.6	79	42	42	64.6	79	42
80	43	43	68.6	80	22	22	35.3	80	29	29	50.5	80	16	16	36.3	80	16
81	15	15	18.1	81	45	45	79.7	81	45	45	72.7	81	8	8	28.2	81	8
82	12	12	16.1	82	31	31	49.4	82	60	60	85.8	82	25	25	46.4	82	25
83	37	37	58.5	83	46	46	81.8	83	35	35	57.5	83	66	66	92.9	83	66
84	49	49	75.7	84	41	41	75.7	84	25	25	40.4	84	54	54	83.8	84	54
85	20	20	28.2	85	40	40	70.7	85	26	26	43.4	85	15	15	34.3	85	15
86	40	40	60.6	86	20	20	29.2	86	40	40	64.6	86	47	47	73.7	86	47
87	70	70	91.9	87	14	14	20.2	87	50	50	77.7	87	45	45	71.7	87	45
88	30	30	46.4	88	40	40	70.7	88	50	50	77.7	88	8	8	28.2	88	8
89	25	25	38.3	89	42	42	76.7	89	19	19	30.3	89	42	42	64.6	89	42
90	19	19	25.2	90	28	28	45.4	90	61	61	88.8	90	55	55	85.8	90	55
91	7	7	12.1	91	22	22	35.3	91	20	20	32.3	91	10	10	31.3	91	10
92	28	28	42.4	92	54	54	90.9	92	61	61	88.8	92	72	72	94.9	92	72
93	68	68	88.8	93	79	79	98.9	93	45	45	72.7	93	21	21	39.3	93	21
94	34	34	51.5	94	17	17	23.2	94	22	22	37.3	94	52	52	78.7	94	52
95	55	55	80.8	95	36	36	65.6	95	20	20	32.3	95	26	26	49.4	95	26
96	41	41	67.6	96	59	59	93.9	96	43	43	69.6	96	36	36	58.5	96	36
97	16	16	22.2	97	19	19	25.2	97	25	25	40.4	97	34	34	56.5	97	34
98	20	20	28.2	98	52	52	89.8	98	23	23	39.3	98	61	61	87.8	98	61
99	24	24	35.3	99	48	48	82.8	99	10	10	23.2	99	25	25	46.4	99	25
100	55	55	80.8	100	33	33	54.5	100	14	14	26.2	100	53	53	80.8	100	53

41	16	22	59	-5.5	56	21	12	44	-5.5	44	17	18	56	-5.5	41	19	19	59	-5.5	44	19
25	20	16	75	-6.0	35	27	21	65	-6.0	27	20	17	73	-6.0	22	17	19	78	-6.0	25	16
5	5	20	95	-6.5	8	8	27	92	-6.5	7	7	20	93	-6.5	5	5	17	95	-6.5	9	6
0	0	5	100	-7.0	0	0	8	100	-7.0	0	0	7	100	-7.0	0	0	5	100	-7.0	3	1
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	2	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	2	2
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
10	17	-3.5	-4.0	15	14	19	-4.0	-4.5	18	14	21	-3.5	-4.0	12	16	17	-2.0	-3.0	4	#N/A	#N/A
25	37	-4.5	-5.0	23	19	32	-4.5	-5.0	27	21	26	-4.0	-4.5	21	22	30	-4.0	-4.5	18	22	27
37	59	-5.0	-5.5	39	44	65	-5.5	-6.0	50	38	56	-5.0	-5.5	40	40	59	-5.0	-5.5	38	44	56
75	95	-6.0	-6.5	64	65	92	-6.0	-6.5	73	73	93	-6.0	-6.5	66	59	78	-5.5	-6.0	61	75	91
75	95	-6.0	-6.5	75	65	92	-6.0	-6.5	81	73	93	-6.0	-6.5	77	78	95	-6.0	-6.5	72	75	91
75	95	-6.0	-6.5	83	65	92	-6.0	-6.5	88	73	93	-6.0	-6.5	86	78	95	-6.0	-6.5	81	75	91

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	39	39	50.5	4	32	32	30.3	4	<2	1	0	4	<2	1	0	4	<2
5	44	44	55.5	5	68	68	69.6	5	<2	1	0	5	<2	1	0	5	<2
6	47	47	60.6	6	56	56	58.5	6	<2	1	0	6	<2	1	0	6	<2
7	16	16	14.1	7	70	70	73.7	7	<2	1	0	7	<2	1	0	7	<2
8	37	37	47.4	8	84	84	89.8	8	<2	1	0	8	<2	1	0	8	<2
9	78	78	82.8	9	56	56	58.5	9	<2	1	0	9	<2	1	0	9	<2
10	12	12	10.1	10	17	17	14.1	10	<2	1	0	10	<2	1	0	10	<2
11	47	47	60.6	11	95	95	93.9	11	40	40	48.4	11	<2	1	0	11	<2
12	84	84	90.9	12	13	13	10.1	12	38	38	45.4	12	<2	1	0	12	<2
13	63	63	73.7	13	70	70	73.7	13	79	79	83.8	13	<2	1	0	13	<2
14	50	50	63.6	14	68	68	69.6	14	82	82	87.8	14	<2	1	0	14	<2
15	37	37	47.4	15	85	85	90.9	15	36	36	42.4	15	<2	1	0	15	<2
16	80	80	83.8	16	72	72	80.8	16	70	70	76.7	16	<2	1	0	16	<2
17	24	24	26.2	17	75	75	82.8	17	60	60	70.7	17	75	75	85.8	17	<2
18	15	15	12.1	18	27	27	23.2	18	62	62	71.7	18	35	35	43.4	18	<2
19	38	38	49.4	19	34	34	32.3	19	46	46	56.5	19	39	39	53.5	19	<2
20	87	87	92.9	20	55	55	54.5	20	52	52	64.6	20	18	18	24.2	20	55
21	44	44	55.5	21	15	15	12.1	21	25	25	26.2	21	48	48	60.6	21	46
22	19	19	20.2	22	59	59	61.6	22	110	110	97.9	22	31	31	37.3	22	95
23	40	40	52.5	23	55	55	54.5	23	80	80	85.8	23	37	37	51.5	23	60
24	82	82	87.8	24	81	81	88.8	24	28	28	31.3	24	34	34	40.4	24	69
25	80	80	83.8	25	70	70	73.7	25	34	34	39.3	25	98	98	97.9	25	78
26	29	29	32.3	26	26	26	22.2	26	70	70	76.7	26	35	35	43.4	26	103
27	75	75	80.8	27	128	128	100	27	13	13	14.1	27	60	60	74.7	27	62
28	63	63	73.7	28	75	75	82.8	28	105	105	96.9	28	80	80	87.8	28	52
29	94	94	95.9	29	98	98	95.9	29	120	120	100	29	89	89	92.9	29	111
30	62	62	71.7	30	50	50	51.5	30	15	15	15.1	30	69	69	83.8	30	106
31	34	34	38.3	31	75	75	82.8	31	84	84	89.8	31	60	60	74.7	31	32
32	39	39	50.5	32	117	117	98.9	32	50	50	60.6	32	40	40	55.5	32	41
33	65	65	75.7	33	48	48	47.4	33	76	76	82.8	33	50	50	64.6	33	50
34	3	3	3	34	35	35	33.3	34	85	85	91.9	34	61	61	77.7	34	61
35	35	35	42.4	35	110	110	97.9	35	44	44	51.5	35	36	36	49.4	35	9
36	11	11	9	36	45	45	43.4	36	50	50	60.6	36	99	99	98.9	36	40
37	36	36	46.4	37	42	42	40.4	37	95	95	94.9	37	92	92	95.9	37	90
38	110	110	98.9	38	78	78	85.8	38	34	34	39.3	38	17	17	22.2	38	330
39	98	98	97.9	39	105	105	96.9	39	59	59	68.6	39	80	80	87.8	39	330
40	82	82	87.8	40	80	80	87.8	40	16	16	20.2	40	30	30	34.3	40	65
41	68	68	77.7	41	44	44	42.4	41	26	26	27.2	41	50	50	64.6	41	21
42	32	32	35.3	42	60	60	62.6	42	27	27	30.3	42	87	87	91.9	42	80
43	42	42	53.5	43	31	31	27.2	43	49	49	59.5	43	48	48	60.6	43	65
44	30	30	34.3	44	74	74	81.8	44	46	46	56.5	44	57	57	72.7	44	25
45	20	20	22.2	45	32	32	30.3	45	15	15	15.1	45	59	59	73.7	45	29
46	17	17	17.1	46	29	29	25.2	46	81	81	86.8	46	53	53	70.7	46	27
47	16	16	14.1	47	43	43	41.4	47	45	45	54.5	47	21	21	28.2	47	51
48	28	28	31.3	48	25	25	20.2	48	115	115	98.9	48	16	16	21.2	48	35
49	90	90	94.9	49	24	24	19.1	49	75	75	80.8	49	65	65	78.7	49	65
50	10	10	7	50	37	37	37.3	50	44	44	51.5	50	35	35	43.4	50	32
51	35	35	42.4	51	31	31	27.2	51	11	11	13.1	51	44	44	58.5	51	58
52	10	10	7	52	62	62	63.6	52	67	67	74.7	52	11	11	18.1	52	35
53	13	13	11.1	53	14	14	11.1	53	63	63	72.7	53	21	21	28.2	53	25
54	80	80	83.8	54	12	12	8	54	59	59	68.6	54	66	66	81.8	54	12
55	8	8	6	55	49	49	50.5	55	99	99	95.9	55	40	40	55.5	55	59
56	34	34	38.3	56	20	20	17.1	56	30	30	33.3	56	24	24	30.3	56	55
57	25	25	28.2	57	15	15	12.1	57	68	68	75.7	57	12	12	19.1	57	25
58	17	17	17.1	58	5	5	3	58	82	82	87.8	58	95	95	96.9	58	13
59	3	3	3	59	10	10	6	59	90	90	92.9	59	102	102	100	59	31
60	27	27	29.2	60	5	5	3	60	39	39	47.4	60	68	68	82.8	60	70
61	3	3	3	61	36	36	35.3	61	48	48	58.5	61	51	51	67.6	61	76
62	18	18	19.1	62	30	30	26.2	62	42	42	50.5	62	47	47	59.5	62	100
63	47	47	60.6	63	66	66	67.6	63	38	38	45.4	63	49	49	62.6	63	80
64	58	58	69.6	64	66	66	67.6	64	36	36	42.4	64	50	50	64.6	64	22
65	16	16	14.1	65	70	70	73.7	65	15	15	15.1	65	35	35	43.4	65	42
66	73	73	79.7	66	55	55	54.5	66	51	51	63.6	66	38	38	52.5	66	48
67	35	35	42.4	67	47	47	45.4	67	84	84	89.8	67	90	90	93.9	67	61
68	34	34	38.3	68	17	17	14.1	68	6	6	11.1	68	80	80	87.8	68	38
69	62	62	71.7	69	52	52	52.5	69	32	32	37.3	69	65	65	78.7	69	38
70	22	22	24.2	70	89	89	91.9	70	5	5	10.1	70	30	30	34.3	70	26
71	54	54	67.6	71	39	39	38.3	71	21	21	24.2	71	54	54	71.7	71	90
72	110	110	98.9	72	65	65	65.6	72	31	31	36.3	72	35	35	43.4	72	36
73	87	87	92.9	73	71	71	79.7	73	44	44	51.5	73	34	34	40.4	73	9
74	42	42	53.5	74	46	46	44.4	74	26	26	27.2	74	20	20	26.2	74	21
75	67	67	76.7	75	65	65	65.6	75	50	50	60.6	75	34	34	40.4	75	18
76	15	15	12.1	76	47	47	45.4	76	7	7	12.1	76	52	52	69.6	76	82
77	46	46	59.5	77	70	70	73.7	77	35	35	41.4	77	39	39	53.5	77	20
78	70	70	78.7	78	55	55	54.5	78	15	15	15.1	78	19	19	25.2	78	34
79	29	29	32.3	79	52	52	52.5	79	30	30	33.3	79	30	30	34.3	79	13
80	33	33	37.3	80	78	78	85.8	80	15	15	15.1	80	17	17	22.2	80	68
81	82	82	87.8	81	12	12	8	81	75	75	80.8	81	5	5	16.1	81	56
82	80	80	83.8	82	31	31	27.2	82	92	92	93.9	82	25	25	31.3	82	32
83	95	95	96.9	83	25	25	20.2	83	20	20	22.2	83	79	79	86.8	83	51
84	59	59	70.7	84	68	68	69.6	84	70	70	76.7	84	69	69	83.8	84	95
85	27	27	29.2	85	48	48	47.4	85	30	30	33.3	85	42	42	57.5	85	16
86	50	50	63.6	86	5	5	3	86	26	26	27.2	86	31	31	37.3	86	40
87	85	85	91.9	87	10	10	6	87	19	19	21.2	87	60	60	74.7	87	19
88	24	24	26.2	88	36	36	35.3	88	56	56	67.6	88	25	25	31.3	88	16
89	50	50	63.6	89	97	97	94.9	89	79	79	83.8	89	85	85	90.9	89	9
90	75	75	80.8	90	40	40	39.3	90	53	53	65.6	90	20	20	26.2	90	80
91	53	53	66.6	91	68	68	69.6	91	21	21	24.2	91	35	35	43.4	91	36
92	45	45	57.5	92	21	21	18.1	92	20	20	22.2	92	36	36	49.4	92	61
93	20	20	22.2	93	35	35	33.3	93	70	70	76.7	93	25	25	31.3	93	50
94	23	23	25.2	94	27	27	23.2	94	40	40	48.4	94	90	90	93.9	94	48
95	55	55	68.6	95	17	17	14.1	95	36	36	42.4	95	65	65	78.7	95	74
96	35	35	42.4	96	70	70	73.7	96	65	65	73.7	96	12	12	19.1	96	48
97	45	45	57.5	97	48	48	47.4	97	45	45	54.5	97	31	31	37.3	97	40
98	34	34	38.3	98	58	58	60.6	98	29	29	32.3	98	51	51	67.6	98	130
99	32	32	35.3	99	62	62	63.6	99	33	33	38.3	99	10	10	17.1	99	85
100	19	19	20.2	100	92	92	92.9	100	55	55	66.6	100	49	49	62.6	100	31

29	17	25	71	-5.5	29	20	16	71	-5.5	41	27	16	59	-5.5	35	21	31	65	-5.5	32	22
12	11	17	88	-6.0	9	8	20	91	-6.0	14	13	27	86	-6.0	14	11	21	86	-6.0	10	8
1	0	11	99	-6.5	1	1	8	99	-6.5	1	1	13	99	-6.5	3	3	11	97	-6.5	2	2
1	1	0	99	-7.0	0	0	1	100	-7.0	0	0	1	100	-7.0	0	0	3	100	-7.0	0	0
0	0	1	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
12	28	-4.0	-4.5	17	16	20	-3.5	-4.0	11	12	18	-3.5	-4.0	14	12	17	-4.0	-4.5	21	13	20
12	28	-4.0	-4.5	21	20	33	-4.0	-4.5	18	18	27	-4.0	-4.5	21	17	34	-4.5	-5.0	27	20	26
46	71	-5.0	-5.5	34	33	55	-4.5	-5.0	30	43	59	-5.0	-5.5	37	34	65	-5.0	-5.5	38	49	68
71	88	-5.5	-6.0	49	71	91	-5.5	-6.0	48	59	86	-5.5	-6.0	55	65	86	-5.5	-6.0	53	68	90
71	88	-5.5	-6.0	59	71	91	-5.5	-6.0	57	59	86	-5.5	-6.0	62	65	86	-5.5	-6.0	62	68	90
88	99	-6.0	-7.0	73	71	91	-5.5	-6.0	63	86	99	-6.0	-6.5	71	86	97	-6.0	-6.5	72	90	98

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	7	7	3	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	26	26	36.3	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	32	32	44.4	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	36	36	49.4	5	<2	1	0	5	<2	1	0	5	50	50	69.6	5	<2
6	31	31	41.4	6	<2	1	0	6	73	73	94.9	6	32	32	33.3	6	<2
7	65	65	88.8	7	65	65	91.9	7	14	14	12.1	7	45	45	61.6	7	<2
8	35	35	47.4	8	49	49	72.7	8	20	20	23.2	8	61	61	84.8	8	<2
9	67	67	92.9	9	90	90	98.9	9	46	46	59.5	9	25	25	22.2	9	<2
10	53	53	79.7	10	55	55	79.7	10	67	67	88.8	10	47	47	65.6	10	<2
11	37	37	52.5	11	60	60	85.8	11	47	47	62.6	11	37	37	41.4	11	<2
12	23	23	28.2	12	70	70	95.9	12	3	3	5	12	41	41	50.5	12	<2
13	40	40	56.5	13	60	60	85.8	13	11	11	10.1	13	28	28	26.2	13	50
14	42	42	59.5	14	45	45	69.6	14	16	16	15.1	14	45	45	61.6	14	33
15	58	58	84.8	15	37	37	60.6	15	52	52	74.7	15	70	70	89.8	15	14
16	47	47	71.7	16	85	85	97.9	16	35	35	44.4	16	30	30	28.2	16	25
17	48	48	72.7	17	35	35	57.5	17	21	21	25.2	17	26	26	24.2	17	95
18	37	37	52.5	18	40	40	65.6	18	47	47	62.6	18	55	55	76.7	18	48
19	37	37	52.5	19	44	44	68.6	19	36	36	47.4	19	12	12	10.1	19	98
20	44	44	64.6	20	22	22	31.3	20	11	11	10.1	20	9	9	7	20	18
21	20	20	21.2	21	65	65	91.9	21	10	10	8	21	42	42	52.5	21	16
22	73	73	97.9	22	56	56	84.8	22	16	16	15.1	22	66	66	87.8	22	60
23	69	69	94.9	23	68	68	93.9	23	68	68	92.9	23	49	49	68.6	23	76
24	17	17	12.1	24	55	55	79.7	24	70	70	93.9	24	38	38	43.4	24	21
25	42	42	59.5	25	43	43	67.6	25	49	49	69.6	25	115	115	100	25	21
26	65	65	88.8	26	10	10	11.1	26	21	21	25.2	26	36	36	37.3	26	56
27	21	21	26.2	27	20	20	24.2	27	67	67	88.8	27	58	58	81.8	27	23
28	29	29	38.3	28	28	28	37.3	28	30	30	38.3	28	72	72	90.9	28	53
29	62	62	86.8	29	22	22	31.3	29	65	65	86.8	29	43	43	54.5	29	10
30	42	42	59.5	30	17	17	20.2	30	20	20	23.2	30	22	22	15.1	30	29
31	15	15	8	31	35	35	57.5	31	109	109	100	31	33	33	34.3	31	53
32	65	65	88.8	32	30	30	41.4	32	56	56	81.8	32	43	43	54.5	32	35
33	18	18	16.1	33	28	28	37.3	33	90	90	98.9	33	59	59	82.8	33	10
34	35	35	47.4	34	30	30	41.4	34	67	67	88.8	34	65	65	86.8	34	35
35	69	69	94.9	35	23	23	33.3	35	50	50	70.7	35	8	8	6	35	13
36	20	20	21.2	36	100	100	100	36	45	45	58.5	36	42	42	52.5	36	9
37	50	50	75.7	37	6	6	6	37	28	28	34.3	37	43	43	54.5	37	75
38	9	9	4	38	50	50	75.7	38	60	60	82.8	38	38	38	43.4	38	61
39	17	17	12.1	39	32	32	52.5	39	50	50	70.7	39	11	11	8	39	35
40	30	30	39.3	40	55	55	79.7	40	17	17	18.1	40	90	90	96.9	40	41
41	32	32	44.4	41	10	10	11.1	41	16	16	15.1	41	45	45	61.6	41	33
42	68	68	93.9	42	30	30	41.4	42	74	74	95.9	42	64	64	85.8	42	41
43	43	43	63.6	43	37	37	60.6	43	64	64	85.8	43	22	22	15.1	43	45
44	57	57	83.8	44	60	60	85.8	44	29	29	36.3	44	39	39	47.4	44	50
45	63	63	87.8	45	19	19	22.2	45	37	37	50.5	45	43	43	54.5	45	12
46	39	39	55.5	46	9	9	9	46	48	48	65.6	46	53	53	73.7	46	6
47	56	56	81.8	47	8	8	7	47	32	32	41.4	47	52	52	71.7	47	50
48	42	42	59.5	48	25	25	34.3	48	31	31	40.4	48	35	35	36.3	48	11
49	36	36	49.4	49	14	14	17.1	49	15	15	14.1	49	24	24	18.1	49	55
50	31	31	41.4	50	8	8	7	50	42	42	54.5	50	36	36	37.3	50	14
51	50	50	75.7	51	50	50	75.7	51	66	66	87.8	51	52	52	71.7	51	20
52	48	48	72.7	52	28	28	37.3	52	39	39	52.5	52	110	110	98.9	52	10
53	24	24	31.3	53	48	48	71.7	53	53	53	77.7	53	48	48	66.6	53	41
54	28	28	37.3	54	30	30	41.4	54	48	48	65.6	54	25	25	22.2	54	45
55	44	44	64.6	55	25	25	34.3	55	55	55	79.7	55	43	43	54.5	55	44
56	25	25	33.3	56	49	49	72.7	56	38	38	51.5	56	76	76	92.9	56	25
57	30	30	39.3	57	30	30	41.4	57	46	46	59.5	57	18	18	12.1	57	15
58	31	31	41.4	58	12	12	16.1	58	78	78	96.9	58	59	59	82.8	58	32
59	33	33	46.4	59	21	21	29.2	59	36	36	47.4	59	31	31	31.3	59	38
60	44	44	64.6	60	49	49	72.7	60	55	55	79.7	60	75	75	91.9	60	26
61	16	16	11.1	61	30	30	41.4	61	42	42	54.5	61	38	38	43.4	61	46
62	50	50	75.7	62	30	30	41.4	62	17	17	18.1	62	36	36	37.3	62	23
63	80	80	98.9	63	9	9	9	63	36	36	47.4	63	76	76	92.9	63	64
64	20	20	21.2	64	31	31	51.5	64	46	46	59.5	64	55	55	76.7	64	46
65	20	20	21.2	65	50	50	75.7	65	52	52	74.7	65	26	26	24.2	65	26
66	40	40	56.5	66	27	27	36.3	66	6	6	6	66	24	24	18.1	66	34
67	19	19	19.1	67	20	20	24.2	67	25	25	28.2	67	85	85	95.9	67	66
68	24	24	31.3	68	60	60	85.8	68	47	47	62.6	68	7	7	4	68	30
69	23	23	28.2	69	39	39	63.6	69	42	42	54.5	69	38	38	43.4	69	28
70	25	25	33.3	70	30	30	41.4	70	19	19	21.2	70	21	21	14.1	70	25
71	19	19	19.1	71	60	60	85.8	71	51	51	73.7	71	43	43	54.5	71	33
72	45	45	67.6	72	20	20	24.2	72	14	14	12.1	72	43	43	54.5	72	28
73	45	45	67.6	73	32	32	52.5	73	41	41	53.5	73	33	33	34.3	73	68
74	15	15	8	74	20	20	24.2	74	33	33	43.4	74	36	36	37.3	74	70
75	17	17	12.1	75	37	37	60.6	75	54	54	78.7	75	50	50	69.6	75	30
76	15	15	8	76	69	69	94.9	76	27	27	33.3	76	56	56	80.8	76	31
77	22	22	27.2	77	32	32	52.5	77	8	8	7	77	41	41	50.5	77	34
78	18	18	16.1	78	40	40	65.6	78	61	61	83.8	78	24	24	18.1	78	49
79	25	25	33.3	79	60	60	85.8	79	35	35	44.4	79	81	81	94.9	79	51
80	10	10	5	80	71	71	96.9	80	63	63	84.8	80	31	31	31.3	80	31
81	17	17	12.1	81	52	52	78.7	81	19	19	21.2	81	23	23	17.1	81	49
82	45	45	67.6	82	20	20	24.2	82	67	67	88.8	82	53	53	73.7	82	45
83	11	11	6	83	18	18	21.2	83	48	48	65.6	83	28	28	26.2	83	60
84	50	50	75.7	84	11	11	14.1	84	42	42	54.5	84	39	39	47.4	84	24
85	20	20	21.2	85	11	11	14.1	85	24	24	27.2	85	92	92	97.9	85	70
86	23	23	28.2	86	30	30	41.4	86	26	26	31.3	86	30	30	28.2	86	83
87	53	53	79.7	87	29	29	40.4	87	29	29	36.3	87	30	30	28.2	87	62
88	71	71	96.9	88	55	55	79.7	88	17	17	18.1	88	7	7	4	88	64
89	56	56	81.8	89	34	34	56.5	89	48	48	65.6	89	39	39	47.4	89	50
90	49	49	74.7	90	19	19	22.2	90	25	25	28.2	90	55	55	76.7	90	33
91	36	36	49.4	91	30	30	41.4	91	52	52	74.7	91	37	37	41.4	91	48
92	41	41	58.5	92	45	45	69.6	92	25	25	28.2	92	55	55	76.7	92	22
93	3	3	1	93	35	35	57.5	93	78	78	96.9	93	18	18	12.1	93	19
94	66	66	91.9	94	33	33	55.5	94	32	32	41.4	94	14	14	11.1	94	19
95	45	45	67.6	95	39	39	63.6	95	50	50	70.7	95	69	69	88.8	95	11
96	130	130	100	96	15	15	19.1	96	26	26	31.3	96	48	48	66.6	96	10
97	5	5	2	97	14	14	17.1	97	10	10	8	97	53	53	73.7	97	74
98	18	18	16.1	98	10	10	11.1	98	28	28	34.3	98	45	45	61.6	98	49
99	59	59	85.8	99	55	55	79.7	99	35	35	44.4	99	11	11	8	99	41
100	11	11	6	100	21	21	29.2	100	30	30	38.3	100	24	24	18.1	100	35

-5.5	25	19	17	75	-5.5	17	10	25	83	-5.5	13	6	21	87	-5.5	25	16	19	75	-5.5	18
-6.0	6	6	19	94	-6.0	7	4	10	93	-6.0	7	5	6	93	-6.0	9	7	16	91	-6.0	7
-6.5	0	0	6	100	-6.5	3	1	4	97	-6.5	2	1	5	98	-6.5	2	2	7	98	-6.5	1
-7.0	0	0	0	100	-7.0	2	2	1	98	-7.0	1	1	1	99	-7.0	0	0	2	100	-7.0	0
-7.5	0	0	0	100	-7.5	0	0	2	100	-7.5	0	0	1	100	-7.5	0	0	0	100	-7.5	0
-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0
-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0
-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0	
		100					**100**					**100**					**100**				
s					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**	
	16	26	-3.5	-4.0	11	10	20	-3.5	-4.0	14	9	17	-3.0	-3.5	11	11	21	-3.5	-4.0	13	#N/A
	16	26	-3.5	-4.0	15	20	40	-4.0	-4.5	17	17	28	-3.5	-4.0	15	21	30	-4.0	-4.5	19	23
	37	58	-4.5	-5.0	28	40	58	-4.5	-5.0	27	41	66	-4.5	-5.0	26	30	56	-4.5	-5.0	30	46
	75	94	-5.5	-6.0	45	58	83	-5.0	-5.5	40	66	87	-5.0	-5.5	37	75	91	-5.5	-6.0	45	67
	75	94	-5.5	-6.0	53	83	93	-5.5	-6.0	47	66	87	-5.0	-5.5	43	75	91	-5.5	-6.0	55	82
	75	94	-5.5	-6.0	59	83	93	-5.5	-6.0	58	87	93	-5.5	-6.0	54	75	91	-5.5	-6.0	63	82

paste group of 6
ew location to

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cle sizes in green
at row 30.
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an 311 particles.

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2
3	60	60	89.8	3	13	13	13.1	3	<2	1	0	3	48	48	76.7	3
4	69	69	97.9	4	50	50	84.8	4	<2	1	0	4	30	30	48.4	4
5	62	62	93.9	5	61	61	92.9	5	<2	1	0	5	14	14	16.1	5
6	50	50	80.8	6	53	53	86.8	6	<2	1	0	6	42	42	67.6	6
7	43	43	71.7	7	5	5	2	7	<2	1	0	7	25	25	33.3	7
8	67	67	95.9	8	140	140	100	8	<2	1	0	8	42	42	67.6	8
9	60	60	89.8	9	22	22	37.3	9	25	25	45.4	9	27	27	43.4	9
10	25	25	39.3	10	11	11	8	10	28	28	55.5	10	6	6	3	10
11	25	25	39.3	11	17	17	20.2	11	45	45	86.8	11	9	9	7	11
12	20	20	29.2	12	13	13	13.1	12	18	18	30.3	12	29	29	47.4	12
13	32	32	56.5	13	11	11	8	13	14	14	21.2	13	16	16	20.2	13
14	35	35	60.6	14	33	33	58.5	14	16	16	25.2	14	44	44	71.7	14
15	20	20	29.2	15	41	41	74.7	15	10	10	12.1	15	15	15	17.1	15
16	10	10	9	16	32	32	56.5	16	9	9	9	16	35	35	61.6	16
17	43	43	71.7	17	32	32	56.5	17	6	6	8	17	33	33	56.5	17
18	21	21	32.3	18	34	34	62.6	18	18	18	30.3	18	45	45	72.7	18
19	5	5	3	19	43	43	77.7	19	16	16	25.2	19	27	27	43.4	19
20	26	26	43.4	20	17	17	20.2	20	36	36	74.7	20	8	8	5	20
21	35	35	60.6	21	23	23	40.4	21	34	34	68.6	21	33	33	56.5	21
22	10	10	9	22	19	19	27.2	22	24	24	43.4	22	22	22	25.2	22
23	70	70	98.9	23	15	15	18.1	23	31	31	61.6	23	25	25	33.3	23
24	14	14	17.1	24	22	22	37.3	24	25	25	45.4	24	8	8	5	24
25	31	31	54.5	25	35	35	66.6	25	18	18	30.3	25	6	6	3	25
26	40	40	65.6	26	12	12	10.1	26	33	33	66.6	26	12	12	11.1	26
27	50	50	80.8	27	45	45	80.8	27	24	24	43.4	27	9	9	7	27
28	42	42	68.6	28	45	45	80.8	28	14	14	21.2	28	33	33	56.5	28
29	31	31	54.5	29	12	12	10.1	29	53	53	89.8	29	65	65	91.9	29
30	46	46	75.7	30	19	19	27.2	30	23	23	41.4	30	31	31	51.5	30
31	51	51	85.8	31	25	25	42.4	31	12	12	17.1	31	31	31	51.5	31
32	16	16	21.2	32	27	27	46.4	32	10	10	12.1	32	22	22	25.2	32
33	47	47	77.7	33	34	34	62.6	33	12	12	17.1	33	60	60	86.8	33
34	41	41	67.6	34	20	20	31.3	34	13	13	19.1	34	95	95	98.9	34
35	18	18	27.2	35	20	20	31.3	35	16	16	25.2	35	12	12	11.1	35
36	28	28	47.4	36	36	36	67.6	36	26	26	49.4	36	30	30	48.4	36
37	11	11	15.1	37	33	33	58.5	37	41	41	80.8	37	57	57	84.8	37
38	35	35	60.6	38	21	21	36.3	38	19	19	33.3	38	25	25	33.3	38
39	7	7	5	39	45	45	80.8	39	22	22	39.3	39	61	61	87.8	39
40	30	30	50.5	40	20	20	31.3	40	14	14	21.2	40	43	43	70.7	40
41	26	26	43.4	41	19	19	27.2	41	23	23	41.4	41	57	57	84.8	41
42	19	19	28.2	42	52	52	85.8	42	26	26	49.4	42	62	62	89.8	42
43	10	10	9	43	17	17	20.2	43	42	42	81.8	43	95	95	98.9	43
44	16	16	21.2	44	27	27	46.4	44	27	27	53.5	44	35	35	61.6	44
45	16	16	21.2	45	14	14	16.1	45	42	42	81.8	45	25	25	33.3	45
46	50	50	80.8	46	38	38	71.7	46	17	17	28.2	46	34	34	59.5	46
47	50	50	80.8	47	47	47	83.8	47	33	33	66.6	47	61	61	87.8	47
48	46	46	75.7	48	20	20	31.3	48	19	19	33.3	48	73	73	94.9	48
49	17	17	26.2	49	30	30	51.5	49	13	13	19.1	49	51	51	81.8	49
50	30	30	50.5	50	30	30	51.5	50	28	28	55.5	50	50	50	79.7	50
51	10	10	9	51	6	6	3	51	60	60	92.9	51	23	23	30.3	51
52	40	40	65.6	52	25	25	42.4	52	10	10	12.1	52	34	34	59.5	52
53	5	5	3	53	36	36	67.6	53	44	44	84.8	53	46	46	75.7	53
54	22	22	35.3	54	41	41	74.7	54	9	9	9	54	41	41	65.6	54
55	30	30	50.5	55	40	40	73.7	55	27	27	53.5	55	31	31	51.5	55
56	20	20	29.2	56	27	27	46.4	56	31	31	61.6	56	25	25	33.3	56
57	8	8	7	57	15	15	18.1	57	53	53	89.8	57	55	55	83.8	57
58	45	45	74.7	58	137	137	98.9	58	34	34	68.6	58	42	42	67.6	58
59	25	25	39.3	59	73	73	95.9	59	22	22	39.3	59	45	45	72.7	59
60	33	33	58.5	60	18	18	26.2	60	9	9	9	60	25	25	33.3	60
61	16	16	21.2	61	56	56	87.8	61	26	26	49.4	61	72	72	93.9	61
62	25	25	39.3	62	30	30	51.5	62	31	31	61.6	62	25	25	33.3	62
63	34	34	59.5	63	60	60	91.9	63	25	25	45.4	63	20	20	22.2	63
64	7	7	5	64	31	31	55.5	64	29	29	57.5	64	26	26	42.4	64
65	29	29	49.4	65	36	36	67.6	65	29	29	57.5	65	15	15	17.1	65
66	35	35	60.6	66	58	58	89.8	66	66	66	93.9	66	22	22	25.2	66
67	24	24	38.3	67	29	29	50.5	67	43	43	83.8	67	24	24	31.3	67
68	10	10	9	68	17	17	20.2	68	26	26	49.4	68	31	31	51.5	68
69	26	26	43.4	69	59	59	90.9	69	32	32	65.6	69	12	12	11.1	69
70	23	23	37.3	70	43	43	77.7	70	11	11	16.1	70	22	22	25.2	70
71	12	12	16.1	71	7	7	6	71	31	31	61.6	71	20	20	22.2	71
72	3	3	2	72	33	33	58.5	72	20	20	37.3	72	27	27	43.4	72
73	27	27	46.4	73	19	19	27.2	73	34	34	68.6	73	21	21	24.2	73
74	21	21	32.3	74	8	8	7	74	10	10	12.1	74	70	70	92.9	74
75	8	8	7	75	57	57	88.8	75	19	19	33.3	75	15	15	17.1	75
76	15	15	18.1	76	41	41	74.7	76	14	14	21.2	76	24	24	31.3	76
77	43	43	71.7	77	20	20	31.3	77	50	50	87.8	77	27	27	43.4	77
78	56	56	87.8	78	33	33	58.5	78	67	67	94.9	78	49	49	77.7	78
79	65	65	94.9	79	25	25	42.4	79	39	39	75.7	79	45	45	72.7	79
80	15	15	18.1	80	14	14	16.1	80	40	40	77.7	80	13	13	15.1	80
81	52	52	86.8	81	6	6	3	81	34	34	68.6	81	75	75	95.9	81
82	16	16	21.2	82	12	12	10.1	82	39	39	75.7	82	32	32	55.5	82
83	30	30	50.5	83	39	39	72.7	83	35	35	72.7	83	35	35	61.6	83
84	21	21	32.3	84	43	43	77.7	84	150	150	100	84	76	76	97.9	84
85	15	15	18.1	85	30	30	51.5	85	52	52	88.8	85	63	63	90.9	85
86	42	42	68.6	86	34	34	62.6	86	44	44	84.8	86	49	49	77.7	86
87	47	47	77.7	87	22	22	37.3	87	21	21	38.3	87	19	19	21.2	87
88	22	22	35.3	88	70	70	94.9	88	56	56	91.9	88	75	75	95.9	88
89	67	67	95.9	89	26	26	45.4	89	17	17	28.2	89	3	3	2	89
90	42	42	68.6	90	23	23	40.4	90	35	35	72.7	90	9	9	7	90
91	10	10	9	91	6	6	3	91	29	29	57.5	91	25	25	33.3	91
92	60	60	89.8	92	103	103	97.9	92	19	19	33.3	92	41	41	65.6	92
93	70	70	98.9	93	13	13	13.1	93	40	40	77.7	93	11	11	10.1	93
94	28	28	47.4	94	17	17	20.2	94	115	115	98.9	94	22	22	25.2	94
95	59	59	88.8	95	73	73	95.9	95	85	85	96.9	95	50	50	79.7	95
96	47	47	77.7	96	34	34	62.6	96	25	25	45.4	96	53	53	82.8	96
97	32	32	56.5	97	17	17	20.2	97	30	30	60.6	97	35	35	61.6	97
98	60	60	89.8	98	65	65	93.9	98	40	40	77.7	98	12	12	11.1	98
99	50	50	80.8	99	28	28	49.4	99	86	86	97.9	99	30	30	48.4	99
100	35	35	60.6	100	36	36	67.6	100	81	81	95.9	100	25	25	33.3	100

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13	6	11	87	-5.5	18	9	17	82	-5.5	10	5	8	90	-5.5	6	3	3	94	-5.5	5	3
7	6	6	93	-6.0	9	9	9	91	-6.0	5	2	5	95	-6.0	3	3	3	97	-6.0	2	2
1	1	6	99	-6.5	0	0	9	100	-6.5	3	3	2	97	-6.5	0	0	3	100	-6.5	0	0
0	0	1	100	-7.0	0	0	0	100	-7.0	0	0	3	100	-7.0	0	0	0	100	-7.0	0	0
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
#N/A	#N/A	#N/A	#N/A	#N/A	15	27	-2.5	-3.0	6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
23	28	-2.5	-3.0	7	15	27	-2.5	-3.0	8	25	42	-3.5	-4.0	11	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
49	61	-4.0	-4.5	16	44	54	-4.0	-4.5	20	42	64	-4.0	-4.5	18	43	53	-3.0	-3.5	10	45	51
61	76	-4.5	-5.0	31	65	82	-5.0	-5.5	39	64	82	-4.5	-5.0	28	75	91	-4.5	-5.0	23	65	77
76	87	-5.0	-5.5	41	82	91	-5.5	-6.0	49	82	90	-5.0	-5.5	35	75	91	-4.5	-5.0	27	77	85
87	93	-5.5	-6.0	54	82	91	-5.5	-6.0	62	90	95	-5.5	-6.0	45	75	91	-4.5	-5.0	31	85	95

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2
10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2
11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2
12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2
13	<2	1	0	13	22	22	52.5	13	<2	1	0	13	<2	1	0	13	<2
14	<2	1	0	14	40	40	76.7	14	<2	1	0	14	<2	1	0	14	<2
15	<2	1	0	15	49	49	82.8	15	<2	1	0	15	<2	1	0	15	<2
16	<2	1	0	16	57	57	86.8	16	<2	1	0	16	<2	1	0	16	<2
17	<2	1	0	17	10	10	27.2	17	<2	1	0	17	<2	1	0	17	<2
18	<2	1	0	18	22	22	52.5	18	<2	1	0	18	<2	1	0	18	<2
19	15	15	44.4	19	25	25	57.5	19	<2	1	0	19	<2	1	0	19	<2
20	5	5	20.2	20	10	10	27.2	20	16	16	37.3	20	<2	1	0	20	<2
21	32	32	75.7	21	36	36	71.7	21	19	19	43.4	21	<2	1	0	21	<2
22	8	8	25.2	22	10	10	27.2	22	29	29	75.7	22	<2	1	0	22	<2
23	10	10	29.2	23	16	16	43.4	23	19	19	43.4	23	<2	1	0	23	<2
24	5	5	20.2	24	7	7	18.1	24	46	46	90.9	24	<2	1	0	24	<2
25	16	16	48.4	25	30	30	59.5	25	15	15	34.3	25	<2	1	0	25	<2
26	15	15	44.4	26	37	37	72.7	26	20	20	49.4	26	<2	1	0	26	<2
27	31	31	74.7	27	15	15	41.4	27	12	12	25.2	27	<2	1	0	27	<2
28	15	15	44.4	28	10	10	27.2	28	61	61	94.9	28	<2	1	0	28	<2
29	77	77	98.9	29	5	5	13.1	29	96	96	100	29	<2	1	0	29	<2
30	20	20	54.5	30	6	6	15.1	30	12	12	25.2	30	<2	1	0	30	<2
31	25	25	64.6	31	44	44	81.8	31	15	15	34.3	31	<2	1	0	31	<2
32	45	45	84.8	32	55	55	84.8	32	19	19	43.4	32	<2	1	0	32	<2
33	10	10	29.2	33	7	7	18.1	33	9	9	22.2	33	31	31	87.8	33	<2
34	34	34	77.7	34	65	65	91.9	34	26	26	71.7	34	8	8	41.4	34	<2
35	23	23	61.6	35	30	30	59.5	35	16	16	37.3	35	10	10	48.4	35	<2
36	65	65	93.9	36	35	35	67.6	36	5	5	19.1	36	3	3	32.3	36	<2
37	23	23	61.6	37	5	5	13.1	37	19	19	43.4	37	25	25	79.7	37	<2
38	33	33	76.7	38	7	7	18.1	38	12	12	25.2	38	8	8	41.4	38	<2
39	10	10	29.2	39	20	20	45.4	39	14	14	29.2	39	24	24	76.7	39	5
40	11	11	38.3	40	85	85	96.9	40	24	24	65.6	40	17	17	63.6	40	10
41	3	3	18.1	41	31	31	63.6	41	94	94	97.9	41	5	5	36.3	41	9
42	70	70	95.9	42	30	30	59.5	42	8	8	21.2	42	10	10	48.4	42	38
43	20	20	54.5	43	35	35	67.6	43	38	38	83.8	43	12	12	53.5	43	8
44	50	50	87.8	44	8	8	24.2	44	30	30	76.7	44	14	14	54.5	44	13
45	34	34	77.7	45	87	87	98.9	45	24	24	65.6	45	43	43	91.9	45	10
46	22	22	59.5	46	6	6	15.1	46	68	68	96.9	46	18	18	65.6	46	4
47	14	14	43.4	47	11	11	33.3	47	52	52	92.9	47	9	9	43.4	47	9
48	25	25	64.6	48	10	10	27.2	48	67	67	95.9	48	22	22	73.7	48	17
49	64	64	92.9	49	7	7	18.1	49	39	39	86.8	49	19	19	67.6	49	26
50	18	18	49.4	50	40	40	76.7	50	39	39	86.8	50	23	23	75.7	50	20
51	9	9	28.2	51	70	70	92.9	51	22	22	59.5	51	5	5	36.3	51	14
52	8	8	25.2	52	39	39	74.7	52	27	27	73.7	52	75	75	97.9	52	15
53	22	22	59.5	53	13	13	37.3	53	16	16	37.3	53	17	17	63.6	53	70
54	24	24	63.6	54	20	20	45.4	54	20	20	49.4	54	26	26	81.8	54	27
55	40	40	82.8	55	23	23	54.5	55	20	20	49.4	55	59	59	96.9	55	30
56	5	5	20.2	56	8	8	24.2	56	30	30	76.7	56	45	45	93.9	56	46
57	38	38	79.7	57	73	73	93.9	57	24	24	65.6	57	24	24	76.7	57	34
58	11	11	38.3	58	25	25	57.5	58	14	14	29.2	58	80	80	98.9	58	21
59	74	74	97.9	59	6	6	15.1	59	14	14	29.2	59	9	9	43.4	59	19
60	50	50	87.8	60	60	60	88.8	60	24	24	65.6	60	9	9	43.4	60	41
61	19	19	52.5	61	14	14	38.3	61	14	14	29.2	61	15	15	56.5	61	9
62	30	30	71.7	62	60	60	88.8	62	10	10	23.2	62	5	5	36.3	62	14
63	27	27	69.6	63	7	7	18.1	63	39	39	86.8	63	43	43	91.9	63	23
64	8	8	25.2	64	90	90	100	64	95	95	98.9	64	48	48	95.9	64	13
65	10	10	29.2	65	15	15	41.4	65	32	32	80.8	65	10	10	48.4	65	38
66	18	18	49.4	66	11	11	33.3	66	21	21	54.5	66	29	29	86.8	66	20
67	30	30	71.7	67	43	43	80.8	67	22	22	59.5	67	4	4	34.3	67	12
68	7	7	23.2	68	59	59	87.8	68	19	19	43.4	68	16	16	61.6	68	5
69	21	21	57.5	69	23	23	54.5	69	21	21	54.5	69	4	4	34.3	69	8
70	13	13	41.4	70	14	14	38.3	70	23	23	64.6	70	9	9	43.4	70	42
71	39	39	81.8	71	40	40	76.7	71	16	16	37.3	71	10	10	48.4	71	12
72	29	29	70.7	72	11	11	33.3	72	21	21	54.5	72	15	15	56.5	72	39
73	13	13	41.4	73	21	21	47.4	73	20	20	49.4	73	7	7	39.3	73	15
74	70	70	95.9	74	21	21	47.4	74	22	22	59.5	74	15	15	56.5	74	16
75	10	10	29.2	75	31	31	63.6	75	25	25	70.7	75	3	3	32.3	75	4
76	10	10	29.2	76	73	73	93.9	76	18	18	42.4	76	46	46	94.9	76	41
77	30	30	71.7	77	10	10	27.2	77	34	34	82.8	77	20	20	71.7	77	21
78	19	19	52.5	78	76	76	95.9	78	38	38	83.8	78	14	14	54.5	78	10
79	25	25	64.6	79	61	61	90.9	79	26	26	71.7	79	19	19	67.6	79	35
80	15	15	44.4	80	49	49	82.8	80	19	19	43.4	80	16	16	61.6	80	51
81	50	50	87.8	81	33	33	65.6	81	27	27	73.7	81	15	15	56.5	81	42
82	40	40	82.8	82	24	24	56.5	82	55	55	93.9	82	22	22	73.7	82	32
83	26	26	67.6	83	85	85	96.9	83	30	30	76.7	83	83	83	100	83	13
84	100	100	100	84	7	7	18.1	84	20	20	49.4	84	11	11	52.5	84	12
85	26	26	67.6	85	12	12	36.3	85	15	15	34.3	85	21	21	72.7	85	19
86	3	3	18.1	86	21	21	47.4	86	11	11	24.2	86	15	15	56.5	86	66
87	18	18	49.4	87	21	21	47.4	87	30	30	76.7	87	31	31	87.8	87	23
88	7	7	23.2	88	14	14	38.3	88	38	38	83.8	88	26	26	81.8	88	23
89	50	50	87.8	89	8	8	24.2	89	14	14	29.2	89	28	28	85.8	89	43
90	21	21	57.5	90	18	18	44.4	90	21	21	54.5	90	32	32	89.8	90	21
91	10	10	29.2	91	21	21	47.4	91	32	32	80.8	91	24	24	76.7	91	12
92	20	20	54.5	92	4	4	12.1	92	49	49	91.9	92	25	25	79.7	92	18
93	45	45	84.8	93	40	40	76.7	93	16	16	37.3	93	26	26	81.8	93	32
94	45	45	84.8	94	35	35	67.6	94	24	24	65.6	94	27	27	84.8	94	17
95	38	38	79.7	95	30	30	59.5	95	21	21	54.5	95	9	9	43.4	95	21
96	10	10	29.2	96	37	37	72.7	96	7	7	20.2	96	19	19	67.6	96	8
97	11	11	38.3	97	39	39	74.7	97	13	13	28.2	97	18	18	65.6	97	63
98	60	60	91.9	98	33	33	65.6	98	22	22	59.5	98	7	7	39.3	98	15
99	10	10	29.2	99	56	56	85.8	99	22	22	59.5	99	19	19	67.6	99	15
100	65	65	93.9	100	35	35	67.6	100	42	42	89.8	100	32	32	89.8	100	19

35	19	16	65	-5.5	33	16	17	67	-5.5	30	19	13	70	-5.5	28	15	15	72	-5.5	31	14	13
16	13	19	84	-6.0	17	12	16	83	-6.0	11	9	19	89	-6.0	13	9	15	87	-6.0	17	12	14
3	3	13	97	-6.5	5	5	12	95	-6.5	2	2	9	98	-6.5	4	4	9	96	-6.5	5	4	12
0	0	3	100	-7.0	0	0	5	100	-7.0	0	0	2	100	-7.0	0	0	4	100	-7.0	1	1	4
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	1
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
16	23	-3.5	-4.0	11	15	20	-3.0	-3.5	9	16	22	-3.0	-3.5	8	16	17	-1.0	-2.5	2	#N/A	#N/A	#N/
23	31	-4.0	-4.5	17	24	32	-4.0	-4.5	17	22	26	-3.5	-4.0	15	19	27	-3.5	-4.0	15	#N/A	#N/A	#N/
49	65	-5.0	-5.5	33	50	67	-5.0	-5.5	32	33	57	-4.5	-5.0	29	39	57	-4.5	-5.0	28	49	56	-4.5
65	84	-5.5	-6.0	54	67	83	-5.5	-6.0	54	70	89	-5.5	-6.0	49	72	87	-5.5	-6.0	48	69	83	-5.5
84	97	-6.0	-6.5	64	83	95	-6.0	-6.5	66	70	89	-5.5	-6.0	58	72	87	-5.5	-6.0	60	83	95	-6.0
84	97	-6.0	-6.5	75	83	95	-6.0	-6.5	78	89	98	-6.0	-6.5	66	87	96	-6.0	-6.5	72	83	95	-6.0

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (m repla "<2" w 1
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1
6	41	41	57.5	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1
7	79	79	87.8	7	7	7	10.1	7	<2	1	0	7	<2	1	0	7	<2	1
8	63	63	82.8	8	48	48	70.7	8	<2	1	0	8	<2	1	0	8	<2	1
9	47	47	65.6	9	21	21	26.2	9	<2	1	0	9	<2	1	0	9	<2	1
10	8	8	10.1	10	25	25	34.3	10	<2	1	0	10	68	68	87.8	10	<2	1
11	30	30	38.3	11	52	52	74.7	11	<2	1	0	11	18	18	27.2	11	<2	1
12	62	62	79.7	12	39	39	60.6	12	<2	1	0	12	50	50	76.7	12	<2	1
13	30	30	38.3	13	69	69	85.8	13	<2	1	0	13	39	39	64.6	13	<2	1
14	28	28	35.3	14	45	45	65.6	14	<2	1	0	14	91	91	96.9	14	<2	1
15	7	7	9	15	24	24	32.3	15	<2	1	0	15	38	38	61.6	15	<2	1
16	8	8	10.1	16	28	28	37.3	16	<2	1	0	16	30	30	50.5	16	<2	1
17	86	86	93.9	17	57	57	78.7	17	62	62	87.8	17	27	27	47.4	17	<2	1
18	16	16	21.2	18	4	4	6	18	69	69	89.8	18	19	19	29.2	18	<2	1
19	35	35	51.5	19	9	9	15.1	19	57	57	80.8	19	29	29	48.4	19	<2	1
20	32	32	46.4	20	37	37	55.5	20	33	33	57.5	20	13	13	19.1	20	<2	1
21	84	84	92.9	21	65	65	83.8	21	70	70	91.9	21	31	31	51.5	21	<2	1
22	28	28	35.3	22	13	13	21.2	22	19	19	29.2	22	16	16	25.2	22	<2	1
23	17	17	23.2	23	7	7	10.1	23	110	110	100	23	19	19	29.2	23	<2	1
24	45	45	60.6	24	32	32	47.4	24	32	32	54.5	24	45	45	69.6	24	<2	1
25	59	59	78.7	25	39	39	60.6	25	75	75	94.9	25	14	14	20.2	25	<2	1
26	17	17	23.2	26	29	29	40.4	26	10	10	16.1	26	51	51	78.7	26	<2	1
27	62	62	79.7	27	30	30	43.4	27	35	35	59.5	27	32	32	54.5	27	<2	1
28	47	47	65.6	28	22	22	29.2	28	29	29	46.4	28	8	8	17.1	28	<2	1
29	19	19	26.2	29	31	31	45.4	29	13	13	23.2	29	38	38	61.6	29	<2	1
30	62	62	79.7	30	4	4	6	30	26	26	36.3	30	24	24	40.4	30	55	55
31	90	90	96.9	31	20	20	25.2	31	59	59	83.8	31	24	24	40.4	31	46	46
32	40	40	55.5	32	11	11	18.1	32	60	60	85.8	32	77	77	93.9	32	14	14
33	44	44	58.5	33	21	21	26.2	33	52	52	76.7	33	35	35	59.5	33	49	49
34	87	87	95.9	34	19	19	24.2	34	51	51	74.7	34	14	14	20.2	34	6	6
35	45	45	60.6	35	14	14	22.2	35	16	16	24.2	35	90	90	95.9	35	7	7
36	57	57	74.7	36	70	70	87.8	36	55	55	77.7	36	50	50	76.7	36	30	30
37	30	30	38.3	37	84	84	93.9	37	11	11	19.1	37	31	31	51.5	37	15	15
38	55	55	70.7	38	31	31	45.4	38	41	41	66.6	38	26	26	46.4	38	19	19
39	39	39	54.5	39	41	41	64.6	39	72	72	92.9	39	58	58	85.8	39	75	75
40	80	80	89.8	40	91	91	95.9	40	26	26	36.3	40	70	70	89.8	40	15	15
41	79	79	87.8	41	10	10	17.1	41	50	50	73.7	41	39	39	64.6	41	94	94
42	25	25	32.3	42	55	55	77.7	42	30	30	49.4	42	55	55	81.8	42	65	65
43	81	81	90.9	43	38	38	58.5	43	58	58	81.8	43	49	49	75.7	43	34	34
44	9	9	13.1	44	37	37	55.5	44	26	26	36.3	44	72	72	91.9	44	35	35
45	32	32	46.4	45	53	53	75.7	45	11	11	19.1	45	33	33	57.5	45	74	74
46	45	45	60.6	46	28	28	37.3	46	24	24	34.3	46	21	21	33.3	46	120	120
47	64	64	83.8	47	115	115	100	47	12	12	22.2	47	38	38	61.6	47	17	17
48	12	12	16.1	48	40	40	62.6	48	28	28	45.4	48	29	29	48.4	48	22	22
49	66	66	84.8	49	4	4	6	49	30	30	49.4	49	22	22	35.3	49	60	60
50	35	35	51.5	50	25	25	34.3	50	27	27	40.4	50	52	52	79.7	50	7	7
51	17	17	23.2	51	21	21	26.2	51	30	30	49.4	51	24	24	40.4	51	4	4
52	33	33	49.4	52	9	9	15.1	52	43	43	68.6	52	25	25	45.4	52	72	72
53	58	58	76.7	53	16	16	23.2	53	59	59	83.8	53	70	70	89.8	53	80	80
54	29	29	37.3	54	47	47	68.6	54	32	32	54.5	54	32	32	54.5	54	10	10
55	54	54	69.6	55	32	32	47.4	55	23	23	33.3	55	45	45	69.6	55	70	70
56	55	55	70.7	56	24	24	32.3	56	16	16	24.2	56	22	22	35.3	56	60	60
57	22	22	30.3	57	36	36	53.5	57	87	87	96.9	57	22	22	35.3	57	69	69
58	58	58	76.7	58	77	77	90.9	58	37	37	61.6	58	22	22	35.3	58	110	110
59	34	34	50.5	59	65	65	83.8	59	39	39	65.6	59	33	33	57.5	59	70	70
60	3	3	5	60	25	25	34.3	60	69	69	89.8	60	15	15	23.2	60	15	15
61	97	97	98.9	61	64	64	82.8	61	82	82	95.9	61	23	23	39.3	61	55	55
62	3	3	5	62	11	11	18.1	62	20	20	31.3	62	41	41	67.6	62	39	39
63	6	6	8	63	7	7	10.1	63	18	18	27.2	63	57	57	82.8	63	10	10
64	21	21	28.2	64	62	62	81.8	64	38	38	64.6	64	<2	1	0	64	62	62
65	38	38	53.5	65	79	79	92.9	65	37	37	61.6	65	<2	1	0	65	26	26
66	47	47	65.6	66	28	28	37.3	66	61	61	86.8	66	<2	1	0	66	57	57
67	100	100	100	67	37	37	55.5	67	89	89	97.9	67	<2	1	0	67	19	19
68	86	86	93.9	68	47	47	68.6	68	30	30	49.4	68	<2	1	0	68	52	52
69	5	5	7	69	75	75	89.8	69	27	27	40.4	69	<2	1	0	69	60	60
70	91	91	97.9	70	86	86	94.9	70	18	18	27.2	70	<2	1	0	70	75	75
71	13	13	17.1	71	98	98	97.9	71	32	32	54.5	71	72	72	91.9	71	41	41
72	32	32	46.4	72	6	6	9	72	37	37	61.6	72	57	57	82.8	72	90	90
73	21	21	28.2	73	100	100	98.9	73	27	27	40.4	73	16	16	25.2	73	60	60
74	20	20	27.2	74	95	95	96.9	74	55	55	77.7	74	19	19	29.2	74	26	26
75	45	45	60.6	75	12	12	20.2	75	17	17	26.2	75	14	14	20.2	75	50	50
76	68	68	86.8	76	69	69	85.8	76	10	10	16.1	76	24	24	40.4	76	90	90
77	31	31	41.4	77	30	30	43.4	77	27	27	40.4	77	57	57	82.8	77	35	35
78	31	31	41.4	78	29	29	40.4	78	29	29	46.4	78	37	37	60.6	78	51	51
79	10	10	14.1	79	45	45	65.6	79	27	27	40.4	79	24	24	40.4	79	79	79
80	55	55	70.7	80	60	60	80.8	80	74	74	93.9	80	103	103	98.9	80	50	50
81	67	67	85.8	81	22	22	29.2	81	55	55	77.7	81	95	95	97.9	81	35	35
82	57	57	74.7	82	77	77	90.9	82	21	21	32.3	82	40	40	66.6	82	35	35
83	11	11	15.1	83	8	8	14.1	83	33	33	57.5	83	21	21	33.3	83	37	37
84	16	16	21.2	84	34	34	51.5	84	24	24	34.3	84	54	54	80.8	84	25	25
85	31	31	41.4	85	50	50	73.7	85	10	10	16.1	85	45	45	69.6	85	39	39
86	26	26	33.3	86	40	40	62.6	86	36	36	60.6	86	108	108	100	86	38	38
87	15	15	18.1	87	49	49	71.7	87	31	31	53.5	87	46	46	72.7	87	38	38
88	50	50	68.6	88	53	53	75.7	88	95	95	98.9	88	47	47	73.7	88	105	105
89	31	31	41.4	89	49	49	71.7	89	19	19	29.2	89	31	31	51.5	89	38	38
90	44	44	58.5	90	36	36	53.5	90	29	29	46.4	90	4	4	16.1	90	31	31
91	31	31	41.4	91	7	7	10.1	91	26	26	36.3	91	11	11	18.1	91	130	130
92	45	45	60.6	92	22	22	29.2	92	46	46	70.7	92	48	48	74.7	92	24	24
93	27	27	34.3	93	38	38	58.5	93	42	42	67.6	93	42	42	68.6	93	8	8
94	8	8	10.1	94	33	33	50.5	94	51	51	74.7	94	32	32	54.5	94	21	21
95	24	24	31.3	95	32	32	47.4	95	49	49	72.7	95	15	15	23.2	95	7	7
96	55	55	70.7	96	29	29	40.4	96	45	45	69.6	96	18	18	27.2	96	4	4
97	15	15	18.1	97	46	46	67.6	97	11	11	19.1	97	20	20	32.3	97	43	43
98	40	40	55.5	98	34	34	51.5	98	64	64	88.8	98	87	87	94.9	98	9	9
99	81	81	90.9	99	59	59	79.7	99	58	58	81.8	99	68	68	87.8	99	26	26
100	15	15	18.1	100	73	73	88.8	100	46	46	70.7	100	58	58	85.8	100	9	9

30	14	24	70	-5.5	31	19	19	69	-5.5	36	18	16	64	-5.5	26	21	15	74	-5.5	18	12	
16	14	14	84	-6.0	12	11	19	88	-6.0	18	15	18	82	-6.0	5	4	21	95	-6.0	6	5	
2	2	14	98	-6.5	1	1	11	99	-6.5	3	3	15	97	-6.5	1	1	4	99	-6.5	1	1	
0	0	2	100	-7.0	0	0	1	100	-7.0	0	0	3	100	-7.0	0	0	1	100	-7.0	0	0	
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
11	17	-2.5	-3.0	8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#
22	27	-3.5	-4.0	14	25	30	-3.0	-3.5	8	23	32	-3.5	-4.0	12	25	29	-2.5	-3.0	6	#N/A	#N/A	#
46	70	-5.0	-5.5	34	50	69	-5.0	-5.5	32	48	64	-5.0	-5.5	33	46	59	-4.5	-5.0	25	48	55	-
70	84	-5.5	-6.0	51	69	88	-5.5	-6.0	50	64	82	-5.5	-6.0	56	74	95	-5.5	-6.0	46	72	82	-
84	98	-6.0	-6.5	64	69	88	-5.5	-6.0	59	82	97	-6.0	-6.5	67	74	95	-5.5	-6.0	53	82	94	-
84	98	-6.0	-6.5	74	88	99	-6.0	-6.5	68	82	97	-6.0	-6.5	77	74	95	-5.5	-6.0	59	82	94	-

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	110	110	98.9	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2
10	19	19	27.2	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2
11	77	77	91.9	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2
12	38	38	54.5	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2
13	62	62	83.8	13	<2	1	0	13	<2	1	0	13	<2	1	0	13	<2
14	65	65	84.8	14	<2	1	0	14	<2	1	0	14	<2	1	0	14	<2
15	79	79	92.9	15	<2	1	0	15	<2	1	0	15	<2	1	0	15	<2
16	23	23	33.3	16	<2	1	0	16	<2	1	0	16	<2	1	0	16	<2
17	39	39	55.5	17	<2	1	0	17	<2	1	0	17	<2	1	0	17	<2
18	56	56	77.7	18	<2	1	0	18	102	102	98.9	18	<2	1	0	18	<2
19	75	75	90.9	19	<2	1	0	19	11	11	22.2	19	<2	1	0	19	<2
20	16	16	26.2	20	<2	1	0	20	52	52	71.7	20	<2	1	0	20	<2
21	70	70	86.8	21	<2	1	0	21	6	6	17.1	21	<2	1	0	21	<2
22	8	8	13.1	22	<2	1	0	22	34	34	48.4	22	<2	1	0	22	<2
23	40	40	58.5	23	<2	1	0	23	82	82	93.9	23	21	21	45.4	23	<2
24	15	15	24.2	24	40	40	60.6	24	12	12	23.2	24	32	32	58.5	24	<2
25	52	52	74.7	25	38	38	57.5	25	15	15	29.2	25	12	12	36.3	25	<2
26	81	81	93.9	26	70	70	90.9	26	95	95	97.9	26	28	28	52.5	26	<2
27	43	43	66.6	27	65	65	88.8	27	27	27	39.3	27	10	10	30.3	27	<2
28	12	12	22.2	28	50	50	69.6	28	28	28	41.4	28	43	43	72.7	28	<2
29	20	20	28.2	29	20	20	35.3	29	29	29	43.4	29	34	34	60.6	29	<2
30	90	90	97.9	30	71	71	92.9	30	36	36	51.5	30	41	41	69.6	30	<2
31	40	40	58.5	31	50	50	69.6	31	36	36	51.5	31	19	19	43.4	31	<2
32	45	45	69.6	32	50	50	69.6	32	59	59	79.7	32	52	52	80.8	32	<2
33	20	20	28.2	33	65	65	88.8	33	42	42	61.6	33	28	28	52.5	33	<2
34	41	41	64.6	34	80	80	96.9	34	53	53	73.7	34	11	11	34.3	34	<2
35	70	70	86.8	35	56	56	80.8	35	55	55	75.7	35	39	39	62.6	35	<2
36	20	20	28.2	36	39	39	58.5	36	29	29	43.4	36	17	17	42.4	36	<2
37	32	32	43.4	37	22	22	39.3	37	40	40	56.5	37	55	55	84.8	37	<2
38	35	35	47.4	38	26	26	46.4	38	20	20	34.3	38	33	33	59.5	38	<2
39	9	9	17.1	39	35	35	51.5	39	30	30	45.4	39	39	39	62.6	39	<2
40	3	3	8	40	36	36	53.5	40	7	7	18.1	40	52	52	80.8	40	<2
41	3	3	8	41	62	62	86.8	41	30	30	45.4	41	50	50	76.7	41	<2
42	43	43	66.6	42	45	45	64.6	42	20	20	34.3	42	95	95	100	42	<2
43	50	50	72.7	43	51	51	75.7	43	28	28	41.4	43	54	54	83.8	43	<2
44	61	61	81.8	44	45	45	64.6	44	10	10	20.2	44	41	41	69.6	44	50
45	72	72	88.8	45	32	32	48.4	45	40	40	56.5	45	7	7	27.2	45	53
46	57	57	79.7	46	16	16	32.3	46	16	16	30.3	46	3	3	22.2	46	60
47	48	48	71.7	47	55	55	78.7	47	35	35	49.4	47	52	52	80.8	47	60
48	10	10	20.2	48	5	5	23.2	48	83	83	95.9	48	39	39	62.6	48	12
49	36	36	51.5	49	14	14	30.3	49	72	72	87.8	49	5	5	24.2	49	15
50	47	47	70.7	50	52	52	76.7	50	62	62	81.8	50	4	4	23.2	50	6
51	36	36	51.5	51	40	40	60.6	51	10	10	20.2	51	59	59	90.9	51	35
52	25	25	34.3	52	36	36	53.5	52	12	12	23.2	52	57	57	88.8	52	22
53	61	61	81.8	53	11	11	29.2	53	18	18	32.3	53	49	49	74.7	53	27
54	39	39	55.5	54	35	35	51.5	54	76	76	90.9	54	50	50	76.7	54	110
55	35	35	47.4	55	22	22	39.3	55	82	82	93.9	55	6	6	25.2	55	33
56	8	8	13.1	56	50	50	69.6	56	68	68	83.8	56	39	39	62.6	56	35
57	9	9	17.1	57	21	21	37.3	57	9	9	19.1	57	30	30	57.5	57	22
58	65	65	84.8	58	32	32	48.4	58	90	90	96.9	58	72	72	97.9	58	35
59	8	8	13.1	59	24	24	43.4	59	56	56	76.7	59	62	62	93.9	59	26
60	35	35	47.4	60	45	45	64.6	60	115	115	100	60	67	67	96.9	60	40
61	30	30	39.3	61	9	9	25.2	61	12	12	23.2	61	28	28	52.5	61	19
62	42	42	65.6	62	60	60	83.8	62	14	14	26.2	62	39	39	62.6	62	41
63	33	33	46.4	63	23	23	42.4	63	14	14	26.2	63	14	14	38.3	63	50
64	56	56	77.7	64	110	110	100	64	58	58	78.7	64	28	28	52.5	64	51
65	40	40	58.5	65	62	62	86.8	65	54	54	74.7	65	55	55	84.8	65	7
66	6	6	11.1	66	60	60	83.8	66	49	49	67.6	66	24	24	48.4	66	11
67	10	10	20.2	67	56	56	80.8	67	39	39	55.5	67	61	61	92.9	67	7
68	9	9	17.1	68	34	34	50.5	68	46	46	64.6	68	10	10	30.3	68	72
69	31	31	42.4	69	36	36	53.5	69	52	52	71.7	69	15	15	39.3	69	36
70	25	25	34.3	70	80	80	96.9	70	50	50	69.6	70	15	15	39.3	70	13
71	40	40	58.5	71	14	14	30.3	71	36	36	51.5	71	11	11	34.3	71	9
72	53	53	75.7	72	42	42	63.6	72	27	27	39.3	72	40	40	68.6	72	70
73	40	40	58.5	73	50	50	69.6	73	16	16	30.3	73	64	64	94.9	73	11
74	25	25	34.3	74	74	74	93.9	74	74	74	89.8	74	42	42	71.7	74	11
75	83	83	95.9	75	18	18	33.3	75	18	18	32.3	75	50	50	76.7	75	82
76	6	6	11.1	76	70	70	90.9	76	26	26	38.3	76	9	9	29.2	76	9
77	36	36	51.5	77	19	19	34.3	77	49	49	67.6	77	23	23	46.4	77	23
78	15	15	24.2	78	78	78	95.9	78	35	35	49.4	78	8	8	28.2	78	8
79	110	110	98.9	79	50	50	69.6	79	69	69	85.8	79	20	20	44.4	79	20
80	20	20	28.2	80	26	26	46.4	80	73	73	88.8	80	29	29	56.5	80	29
81	39	39	55.5	81	22	22	39.3	81	71	71	86.8	81	16	16	41.4	81	16
82	32	32	43.4	82	9	9	25.2	82	56	56	76.7	82	56	56	87.8	82	56
83	43	43	66.6	83	45	45	64.6	83	41	41	58.5	83	13	13	37.3	83	13
84	55	55	76.7	84	24	24	43.4	84	77	77	91.9	84	10	10	30.3	84	10
85	30	30	39.3	85	75	75	94.9	85	30	30	45.4	85	10	10	30.3	85	10
86	32	32	43.4	86	21	21	37.3	86	68	68	83.8	86	23	23	46.4	86	23
87	12	12	22.2	87	40	40	60.6	87	37	37	54.5	87	24	24	48.4	87	24
88	81	81	93.9	88	55	55	78.7	88	14	14	26.2	88	44	44	73.7	88	44
89	21	21	32.3	89	9	9	25.2	89	25	25	37.3	89	58	58	89.8	89	58
90	59	59	80.8	90	81	81	98.9	90	46	46	64.6	90	50	50	76.7	90	50
91	4	4	10.1	91	54	54	77.7	91	22	22	36.3	91	66	66	95.9	91	66
92	27	27	38.3	92	39	39	58.5	92	46	46	64.6	92	49	49	74.7	92	49
93	50	50	72.7	93	5	5	23.2	93	41	41	58.5	93	59	59	90.9	93	59
94	86	86	96.9	94	10	10	28.2	94	43	43	62.6	94	83	83	98.9	94	83
95	35	35	47.4	95	60	60	83.8	95	61	61	80.8	95	6	6	25.2	95	6
96	30	30	39.3	96	45	45	64.6	96	44	44	63.6	96	24	24	48.4	96	24
97	40	40	58.5	97	56	56	80.8	97	80	80	92.9	97	39	39	62.6	97	39
98	25	25	34.3	98	25	25	45.4	98	65	65	82.8	98	35	35	61.6	98	35
99	73	73	89.8	99	37	37	56.5	99	41	41	58.5	99	55	55	84.8	99	55
100	8	8	13.1	100	20	20	35.3	100	51	51	70.7	100	24	24	48.4	100	24

37	-4.5	62	10	6	38	-4.5	63	13	7	37	-4.5	61	16	5	39	-4.5	54	16	6	46
53	-5.0	52	27	10	48	-5.0	50	20	13	50	-5.0	45	21	16	55	-5.0	38	15	16	62
69	-5.5	25	14	27	75	-5.5	30	21	20	70	-5.5	24	16	21	76	-5.5	23	15	15	77
84	-6.0	11	11	14	89	-6.0	9	8	21	91	-6.0	8	7	16	92	-6.0	8	8	15	92
98	-6.5	0	0	11	100	-6.5	1	1	8	99	-6.5	1	1	7	99	-6.5	0	0	8	100
100	-7.0	0	0	0	100	-7.0	0	0	1	100	-7.0	0	0	1	100	-7.0	0	0	0	100
100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100
100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100
100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100
100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100
			100					100					100					100		

	Percentile (mm)					Percentile (mm)					Percentile (mm)					Percentile (mm)				
-3.0	6	14	17	-1.0	-2.0	3	16	21	-3.0	-3.5	8	#N/A	#N/A	#N/A	#N/A	#N/A	16	18	-1.0	-2.0
-4.0	11	24	32	-3.5	-4.0	12	21	30	-3.5	-4.0	13	22	26	-3.0	-3.5	10	22	33	-3.0	-3.5
-5.0	30	48	75	-5.0	-5.5	33	50	70	-5.0	-5.5	32	39	55	-4.5	-5.0	29	46	62	-4.5	-5.0
-6.0	52	75	89	-5.5	-6.0	45	70	91	-5.5	-6.0	49	55	76	-5.0	-5.5	44	62	77	-5.0	-5.5
-6.5	64	75	89	-5.5	-6.0	56	70	91	-5.5	-6.0	57	76	92	-5.5	-6.0	54	77	92	-5.5	-6.0
-6.5	74	89	100	-6.0	-9.0	77	70	91	-5.5	-6.0	63	76	92	-5.5	-6.0	61	77	92	-5.5	-6.0

Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Perce Ran
0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0
0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0
0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0
0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0
0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0
0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0
0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0
0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0
0	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1	0
0	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1	0
0	11	<2	1	0	11	55	55	83.8	11	<2	1	0	11	<2	1	0
92.9	12	<2	1	0	12	15	15	24.2	12	<2	1	0	12	<2	1	0
56.5	13	<2	1	0	13	6	6	12.1	13	<2	1	0	13	<2	1	0
72.7	14	<2	1	0	14	51	51	77.7	14	<2	1	0	14	<2	1	0
57.5	15	33	33	48.4	15	81	81	98.9	15	<2	1	0	15	<2	1	0
88.8	16	17	17	32.3	16	36	36	52.5	16	<2	1	0	16	<2	1	0
97.9	17	14	14	26.2	17	5	5	10.1	17	<2	1	0	17	3	3	16.1
67.6	18	43	43	66.6	18	49	49	74.7	18	<2	1	0	18	58	58	86.8
92.9	19	44	44	68.6	19	25	25	39.3	19	<2	1	0	19	10	10	25.2
48.4	20	43	43	66.6	20	8	8	15.1	20	43	43	69.6	20	22	22	45.4
94.9	21	32	32	46.4	21	22	22	36.3	21	36	36	63.6	21	24	24	46.4
69.6	22	62	62	87.8	22	14	14	22.2	22	76	76	96.9	22	52	52	82.8
38.3	23	36	36	53.5	23	17	17	30.3	23	55	55	85.8	23	30	30	54.5
88.8	24	78	78	97.9	24	29	29	44.4	24	50	50	80.8	24	32	32	60.6
84.8	25	49	49	78.7	25	23	23	37.3	25	34	34	61.6	25	13	13	35.3
81.8	26	46	46	75.7	26	47	47	70.7	26	60	60	89.8	26	19	19	40.4
86.8	27	54	54	82.8	27	15	15	24.2	27	45	45	72.7	27	11	11	27.2
59.5	28	6	6	18.1	28	20	20	32.3	28	68	68	94.9	28	10	10	25.2
54.5	29	63	63	88.8	29	16	16	27.2	29	100	100	100	29	4	4	17.1
59.5	30	45	45	71.7	30	43	43	63.6	30	31	31	52.5	30	19	19	40.4
81.8	31	40	40	58.5	31	36	36	52.5	31	45	45	72.7	31	71	71	95.9
98.9	32	61	61	86.8	32	71	71	97.9	32	36	36	63.6	32	20	20	42.4
51.5	33	40	40	58.5	33	55	55	83.8	33	40	40	68.6	33	25	25	48.4
98.9	34	37	37	56.5	34	9	9	16.1	34	55	55	85.8	34	41	41	69.6
78.7	35	34	34	49.4	35	25	25	39.3	35	39	39	67.6	35	65	65	92.9
83.8	36	66	66	89.8	36	55	55	83.8	36	31	31	52.5	36	26	26	50.5
64.6	37	44	44	68.6	37	9	9	16.1	37	51	51	81.8	37	43	43	73.7
66.6	38	79	79	98.9	38	61	61	88.8	38	58	58	88.8	38	51	51	81.8
40.4	39	36	36	53.5	39	48	48	73.7	39	45	45	72.7	39	11	11	27.2
48.4	40	41	41	64.6	40	70	70	96.9	40	78	78	97.9	40	5	5	18.1
40.4	41	35	35	50.5	41	44	44	65.6	41	26	26	44.4	41	76	76	98.9
40.4	42	30	30	41.4	42	25	25	39.3	42	21	21	37.3	42	44	44	76.7
31.3	43	83	83	100	43	42	42	60.6	43	60	60	89.8	43	57	57	85.8
40.4	44	67	67	92.9	44	7	7	14.1	44	51	51	81.8	44	34	34	62.6
51.5	45	32	32	46.4	45	17	17	30.3	45	68	68	94.9	45	40	40	66.6
46.4	46	45	45	71.7	46	61	61	88.8	46	30	30	49.4	46	8	8	20.2
32.3	47	45	45	71.7	47	49	49	74.7	47	36	36	63.6	47	12	12	33.3
34.3	48	14	14	26.2	48	31	31	46.4	48	24	24	40.4	48	41	41	69.6
13.1	49	72	72	94.9	49	52	52	79.7	49	53	53	84.8	49	31	31	57.5
29.2	50	21	21	35.3	50	45	45	67.6	50	19	19	35.3	50	66	66	93.9
25.2	51	26	26	38.3	51	5	5	10.1	51	51	51	81.8	51	37	37	65.6
91.9	52	58	58	85.8	52	51	51	77.7	52	45	45	72.7	52	60	60	87.8
73.7	53	18	18	33.3	53	100	100	100	53	17	17	34.3	53	30	30	54.5
69.6	54	5	5	17.1	54	32	32	47.4	54	28	28	46.4	54	62	62	90.9
94.9	55	4	4	15.1	55	42	42	60.6	55	23	23	39.3	55	41	41	69.6
37.3	56	40	40	58.5	56	45	45	67.6	56	33	33	55.5	56	12	12	33.3
28.2	57	72	72	94.9	57	12	12	21.2	57	33	33	55.5	57	43	43	73.7
11.1	58	75	75	96.9	58	68	68	95.9	58	14	14	27.2	58	30	30	54.5
22.2	59	6	6	18.1	59	14	14	22.2	59	66	66	92.9	59	40	40	66.6
48.4	60	12	12	24.2	60	20	20	32.3	60	29	29	48.4	60	25	25	48.4
15.1	61	30	30	41.4	61	47	47	70.7	61	7	7	20.2	61	46	46	77.7
35.3	62	31	31	44.4	62	42	42	60.6	62	9	9	22.2	62	9	9	22.2
33.3	63	15	15	29.2	63	30	30	45.4	63	7	7	20.2	63	16	16	37.3
25.2	64	44	44	68.6	64	52	52	79.7	64	10	10	23.2	64	11	11	27.2
22.2	65	11	11	22.2	65	54	54	82.8	65	14	14	27.2	65	9	9	22.2
12.1	66	4	4	15.1	66	45	45	67.6	66	38	38	66.6	66	31	31	57.5
16.1	67	9	9	20.2	67	47	47	70.7	67	15	15	29.2	67	60	60	87.8
16.1	68	41	41	64.6	68	38	38	56.5	68	16	16	33.3	68	52	52	82.8
24.2	69	14	14	26.2	69	32	32	47.4	69	10	10	23.2	69	21	21	43.4
18.1	70	21	21	35.3	70	65	65	91.9	70	30	30	49.4	70	63	63	91.9
19.1	71	39	39	57.5	71	53	53	81.8	71	33	33	55.5	71	60	60	87.8
29.2	72	28	28	39.3	72	15	15	24.2	72	15	15	29.2	72	52	52	82.8
40.4	73	71	71	93.9	73	6	6	12.1	73	27	27	45.4	73	75	75	97.9
25.2	74	40	40	58.5	74	10	10	18.1	74	64	64	91.9	74	73	73	96.9
45.4	75	12	12	24.2	75	20	20	32.3	75	33	33	55.5	75	6	6	19.1
76.7	76	46	46	75.7	76	32	32	47.4	76	22	22	38.3	76	46	46	77.7
19.1	77	15	15	29.2	77	41	41	59.5	77	44	44	71.7	77	9	9	22.2
59.5	78	66	66	89.8	78	60	60	87.8	78	20	20	36.3	78	16	16	37.3
19.1	79	10	10	21.2	79	16	16	27.2	79	30	30	49.4	79	40	40	66.6
53.5	80	55	55	83.8	80	65	65	91.9	80	10	10	23.2	80	50	50	79.7
38.3	81	57	57	84.8	81	59	59	86.8	81	33	33	55.5	81	35	35	63.6
54.5	82	36	36	53.5	82	26	26	42.4	82	78	78	97.9	82	76	76	98.9
35.3	83	18	18	33.3	83	61	61	88.8	83	6	6	19.1	83	24	24	46.4
69.6	84	35	35	50.5	84	20	20	32.3	84	33	33	55.5	84	50	50	79.7
64.6	85	31	31	44.4	85	65	65	91.9	85	35	35	62.6	85	11	11	27.2
57.5	86	52	52	81.8	86	39	39	57.5	86	28	28	46.4	86	8	8	20.2
46.4	87	22	22	37.3	87	10	10	18.1	87	15	15	29.2	87	16	16	37.3
76.7	88	47	47	77.7	88	50	50	76.7	88	46	46	76.7	88	11	11	27.2
73.7	89	51	51	80.8	89	67	67	94.9	89	15	15	29.2	89	35	35	63.6

39	19	14	61	-5.5	35	16	19	65	-5.5	39	23	24	61	-5.5	34	20	20	66	-5.5	39	18	19
20	17	19	80	-6.0	19	14	16	81	-6.0	16	9	23	84	-6.0	14	12	20	86	-6.0	21	18	18
3	2	17	97	-6.5	5	5	14	95	-6.5	7	7	9	93	-6.5	2	2	12	98	-6.5	3	3	18
1	1	2	99	-7.0	0	0	5	100	-7.0	0	0	7	100	-7.0	0	0	2	100	-7.0	0	0	3
0	0	1	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
14	25	-3.5	-4.0	12	13	22	-3.5	-4.0	13	10	19	-3.5	-4.0	14	13	18	-3.0	-3.5	10	14	17	-2.5
25	29	-4.0	-4.5	16	22	30	-4.0	-4.5	18	23	37	-4.5	-5.0	24	18	28	-3.5	-4.0	14	23	26	-3.5
47	61	-5.0	-5.5	34	46	65	-5.0	-5.5	34	37	61	-5.0	-5.5	38	46	66	-5.0	-5.5	34	42	61	-5.0
61	80	-5.5	-6.0	58	65	81	-5.5	-6.0	56	61	84	-5.5	-6.0	56	66	86	-5.5	-6.0	53	61	79	-5.5
80	97	-6.0	-6.5	69	81	95	-6.0	-6.5	69	84	93	-6.0	-6.5	64	66	86	-5.5	-6.0	62	79	97	-6.0
80	97	-6.0	-6.5	78	81	95	-6.0	-6.5	80	84	93	-6.0	-6.5	80	86	98	-6.0	-6.5	72	79	97	-6.0

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm replac "<2" wi 1
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1
7	<2	1	0	7	<2	1	0	7	35	35	43.4	7	62	62	84.8	7	<2	1
8	<2	1	0	8	50	50	68.6	8	24	24	25.2	8	29	29	40.4	8	<2	1
9	51	51	64.6	9	45	45	63.6	9	25	25	27.2	9	55	55	72.7	9	<2	1
10	15	15	16.1	10	42	42	60.6	10	14	14	13.1	10	9	9	13.1	10	<2	1
11	38	38	52.5	11	21	21	27.2	11	17	17	19.1	11	11	11	15.1	11	<2	1
12	60	60	71.7	12	15	15	15.1	12	10	10	7	12	41	41	59.5	12	<2	1
13	83	83	94.9	13	28	28	38.3	13	12	12	10.1	13	73	73	94.9	13	<2	1
14	47	47	62.6	14	48	48	65.6	14	112	112	98.9	14	25	25	35.3	14	25	25
15	75	75	85.8	15	50	50	68.6	15	15	15	17.1	15	71	71	93.9	15	49	49
16	30	30	39.3	16	14	14	13.1	16	3	3	6	16	12	12	18.1	16	40	40
17	76	76	89.8	17	100	100	96.9	17	17	17	19.1	17	8	8	7	17	11	11
18	14	14	15.1	18	14	14	13.1	18	36	36	47.4	18	32	32	45.4	18	20	20
19	70	70	80.8	19	16	16	21.2	19	46	46	61.6	19	38	38	56.5	19	32	32
20	21	21	27.2	20	70	70	85.8	20	24	24	25.2	20	19	19	29.2	20	36	36
21	30	30	39.3	21	32	32	45.4	21	35	35	43.4	21	98	98	98.9	21	6	6
22	7	7	10.1	22	41	41	58.5	22	46	46	61.6	22	68	68	90.9	22	10	10
23	130	130	100	23	5	5	8	23	14	14	13.1	23	10	10	14.1	23	49	49
24	40	40	54.5	24	9	9	11.1	24	11	11	8	24	48	48	67.6	24	50	50
25	11	11	11.1	25	25	25	32.3	25	34	34	40.4	25	60	60	81.8	25	9	9
26	62	62	74.7	26	15	15	15.1	26	45	45	58.5	26	38	38	56.5	26	11	11
27	17	17	25.2	27	40	40	51.5	27	29	29	30.3	27	62	62	84.8	27	11	11
28	24	24	31.3	28	48	48	65.6	28	109	109	97.9	28	59	59	80.8	28	66	66
29	26	26	35.3	29	110	110	98.9	29	32	32	34.3	29	45	45	63.6	29	4	4
30	23	23	29.2	30	41	41	58.5	30	43	43	56.5	30	55	55	72.7	30	61	61
31	75	75	85.8	31	110	110	98.9	31	45	45	58.5	31	28	28	38.3	31	26	26
32	78	78	90.9	32	6	6	9	32	46	46	61.6	32	49	49	69.6	32	30	30
33	21	21	27.2	33	18	18	22.2	33	56	56	73.7	33	87	87	97.9	33	35	35
34	45	45	59.5	34	50	50	68.6	34	90	90	92.9	34	34	34	48.4	34	50	50
35	51	51	64.6	35	15	15	15.1	35	40	40	50.5	35	58	58	79.7	35	72	72
36	100	100	97.9	36	33	33	46.4	36	60	60	78.7	36	78	78	96.9	36	34	34
37	55	55	68.6	37	40	40	51.5	37	14	14	13.1	37	55	55	72.7	37	16	16
38	15	15	16.1	38	15	15	15.1	38	12	12	10.1	38	65	65	86.8	38	70	70
39	64	64	76.7	39	18	18	22.2	39	25	25	27.2	39	21	21	30.3	39	26	26
40	30	30	39.3	40	40	40	51.5	40	35	35	43.4	40	55	55	72.7	40	66	66
41	4	4	8	41	45	45	63.6	41	39	39	49.4	41	31	31	43.4	41	80	80
42	23	23	29.2	42	30	30	42.4	42	36	36	47.4	42	14	14	22.2	42	30	30
43	62	62	74.7	43	39	39	50.5	43	40	40	50.5	43	37	37	54.5	43	16	16
44	64	64	76.7	44	56	56	77.7	44	54	54	70.7	44	26	26	37.3	44	80	80
45	31	31	44.4	45	29	29	40.4	45	41	41	53.5	45	44	44	62.6	45	19	19
46	11	11	11.1	46	86	86	93.9	46	52	52	67.6	46	18	18	28.2	46	10	10
47	46	46	61.6	47	40	40	51.5	47	23	23	23.2	47	33	33	46.4	47	46	46
48	64	64	76.7	48	53	53	72.7	48	45	45	58.5	48	8	8	7	48	71	71
49	15	15	16.1	49	60	60	79.7	49	12	12	10.1	49	56	56	77.7	49	45	45
50	15	15	16.1	50	40	40	51.5	50	14	14	13.1	50	5	5	6	50	83	83
51	29	29	38.3	51	43	43	61.6	51	98	98	94.9	51	30	30	42.4	51	30	30
52	42	42	58.5	52	3	3	7	52	46	46	61.6	52	31	31	43.4	52	35	35
53	53	53	67.6	53	80	80	90.9	53	57	57	75.7	53	21	21	30.3	53	40	40
54	15	15	16.1	54	26	26	35.3	54	34	34	40.4	54	13	13	21.2	54	55	55
55	71	71	83.8	55	56	56	77.7	55	52	52	67.6	55	24	24	34.3	55	20	20
56	30	30	39.3	56	55	55	75.7	56	55	55	71.7	56	8	8	7	56	35	35
57	35	35	49.4	57	54	54	73.7	57	16	16	18.1	57	70	70	91.9	57	22	22
58	52	52	66.6	58	50	50	68.6	58	62	62	81.8	58	29	29	40.4	58	85	85
59	78	78	90.9	59	15	15	15.1	59	44	44	57.5	59	66	66	88.8	59	60	60
60	25	25	32.3	60	69	69	83.8	60	17	17	19.1	60	47	47	66.6	60	46	46
61	34	34	47.4	61	75	75	88.8	61	65	65	84.8	61	16	16	26.2	61	81	81
62	61	61	73.7	62	26	26	35.3	62	100	100	95.9	62	74	74	95.9	62	37	37
63	45	45	59.5	63	15	15	15.1	63	56	56	73.7	63	14	14	22.2	63	99	99
64	35	35	49.4	64	23	23	30.3	64	94	94	93.9	64	70	70	91.9	64	59	59
65	15	15	16.1	65	66	66	82.8	65	33	33	37.3	65	55	55	72.7	65	59	59
66	34	34	47.4	66	85	85	92.9	66	75	75	89.8	66	12	12	18.1	66	60	60
67	35	35	49.4	67	40	40	51.5	67	52	52	67.6	67	60	60	81.8	67	37	37
68	32	32	45.4	68	55	55	75.7	68	18	18	22.2	68	21	21	30.3	68	57	57
69	80	80	92.9	69	29	29	40.4	69	30	30	32.3	69	60	60	81.8	69	75	75
70	15	15	16.1	70	65	65	81.8	70	33	33	37.3	70	11	11	15.1	70	85	85
71	70	70	80.8	71	49	49	67.6	71	34	34	40.4	71	53	53	71.7	71	41	41
72	58	58	69.6	72	10	10	12.1	72	62	62	81.8	72	45	45	63.6	72	27	27
73	120	120	98.9	73	81	81	91.9	73	35	35	43.4	73	50	50	70.7	73	69	69
74	64	64	76.7	74	92	92	95.9	74	25	25	27.2	74	16	16	26.2	74	40	40
75	25	25	32.3	75	28	28	38.3	75	58	58	77.7	75	25	25	35.3	75	38	38
76	11	11	11.1	76	20	20	24.2	76	57	57	75.7	76	36	36	50.5	76	35	35
77	32	32	45.4	77	70	70	85.8	77	60	60	78.7	77	8	8	7	77	59	59
78	40	40	54.5	78	37	37	49.4	78	50	50	66.6	78	11	11	15.1	78	100	100
79	28	28	36.3	79	100	100	96.9	79	42	42	54.5	79	14	14	22.2	79	55	55
80	71	71	83.8	80	24	24	31.3	80	115	115	100	80	15	15	25.2	80	40	40
81	28	28	36.3	81	76	76	89.8	81	70	70	88.8	81	40	40	58.5	81	68	68
82	80	80	92.9	82	25	25	32.3	82	104	104	96.9	82	57	57	78.7	82	39	39
83	59	59	70.7	83	40	40	51.5	83	30	30	32.3	83	35	35	49.4	83	78	78
84	41	41	57.5	84	36	36	48.4	84	46	46	61.6	84	41	41	59.5	84	58	58
85	87	87	96.9	85	20	20	24.2	85	11	11	8	85	23	23	33.3	85	96	96
86	13	13	14.1	86	20	20	24.2	86	40	40	50.5	86	42	42	61.6	86	44	44
87	16	16	24.2	87	21	21	27.2	87	33	33	37.3	87	100	100	100	87	40	40
88	75	75	85.8	88	70	70	85.8	88	68	68	86.8	88	45	45	63.6	88	60	60
89	70	70	80.8	89	26	26	35.3	89	32	32	34.3	89	8	8	7	89	19	19
90	19	19	26.2	90	6	6	9	90	42	42	54.5	90	36	36	50.5	90	28	28
91	25	25	32.3	91	25	25	32.3	91	68	68	86.8	91	36	36	50.5	91	6	6
92	30	30	39.3	92	22	22	29.2	92	32	32	34.3	92	67	67	89.8	92	76	76
93	5	5	9	93	35	35	47.4	93	23	23	23.2	93	37	37	54.5	93	16	16
94	75	75	85.8	94	43	43	61.6	94	29	29	30.3	94	8	8	7	94	30	30
95	60	60	71.7	95	54	54	73.7	95	85	85	91.9	95	65	65	86.8	95	6	6
96	15	15	16.1	96	90	90	94.9	96	80	80	90.9	96	28	28	38.3	96	21	21
97	40	40	54.5	97	62	62	80.8	97	55	55	71.7	97	12	12	18.1	97	78	78
98	39	39	53.5	98	69	69	83.8	98	65	65	84.8	98	48	48	67.6	98	51	51
99	83	83	94.9	99	31	31	43.4	99	63	63	83.8	99	33	33	46.4	99	45	45
100	50	50	63.6	100	31	31	43.4	100	60	60	78.7	100	36	36	50.5	100	69	69

10	7	17	90	-5.5	14	10	9	86	-5.5	15	6	19	85	-5.5	14	6	12	86	-5.5	13	4
3	3	7	97	-6.0	4	4	10	96	-6.0	9	5	6	91	-6.0	8	5	6	92	-6.0	9	5
0	0	3	100	-6.5	0	0	4	100	-6.5	4	3	5	96	-6.5	3	3	5	97	-6.5	4	4
0	0	0	100	-7.0	0	0	0	100	-7.0	1	1	3	99	-7.0	0	0	3	100	-7.0	0	0
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	1	100	-7.5	0	0	0	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
11	21	-2.5	-3.0	7	16	19	-2.0	-2.5	4	16	19	-2.0	-2.5	4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
25	43	-3.5	-4.0	11	25	31	-3.0	-3.5	8	23	31	-3.0	-3.5	9	20	26	-2.5	-3.0	8	25	28
43	58	-4.0	-4.5	19	42	55	-4.0	-4.5	20	38	52	-4.0	-4.5	22	50	59	-4.0	-4.5	16	49	66
73	90	-5.0	-5.5	33	55	77	-4.5	-5.0	31	66	85	-5.0	-5.5	38	74	86	-5.0	-5.5	33	66	78
73	90	-5.0	-5.5	40	77	86	-5.0	-5.5	42	66	85	-5.0	-5.5	44	74	86	-5.0	-5.5	43	78	87
90	97	-5.5	-6.0	45	86	96	-5.5	-6.0	52	85	91	-5.5	-6.0	60	86	92	-5.5	-6.0	57	87	91

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	8	8	18.1	8	<2	1	0	8	<2	1	0	8	6	6	20.2	8	<2
9	3	3	7	9	<2	1	0	9	<2	1	0	9	14	14	40.4	9	<2
10	14	14	34.3	10	<2	1	0	10	<2	1	0	10	16	16	48.4	10	<2
11	42	42	84.8	11	<2	1	0	11	<2	1	0	11	14	14	40.4	11	<2
12	12	12	25.2	12	<2	1	0	12	<2	1	0	12	14	14	40.4	12	<2
13	10	10	22.2	13	7	7	20.2	13	<2	1	0	13	7	7	21.2	13	<2
14	42	42	84.8	14	12	12	31.3	14	<2	1	0	14	7	7	21.2	14	7
15	19	19	49.4	15	8	8	22.2	15	<2	1	0	15	17	17	50.5	15	20
16	51	51	93.9	16	11	11	28.2	16	25	25	53.5	16	27	27	64.6	16	20
17	13	13	32.3	17	3	3	12.1	17	34	34	67.6	17	10	10	28.2	17	6
18	11	11	23.2	18	10	10	25.2	18	10	10	26.2	18	9	9	26.2	18	10
19	19	19	49.4	19	10	10	25.2	19	6	6	19.1	19	15	15	45.4	19	34
20	14	14	34.3	20	3	3	12.1	20	4	4	15.1	20	32	32	71.7	20	19
21	40	40	82.8	21	30	30	69.6	21	10	10	26.2	21	17	17	50.5	21	21
22	27	27	60.6	22	23	23	55.5	22	9	9	23.2	22	11	11	31.3	22	22
23	22	22	57.5	23	32	32	73.7	23	7	7	20.2	23	30	30	69.6	23	10
24	27	27	60.6	24	72	72	98.9	24	26	26	58.5	24	33	33	74.7	24	32
25	25	25	58.5	25	22	22	52.5	25	8	8	21.2	25	11	11	31.3	25	10
26	12	12	25.2	26	36	36	77.7	26	35	35	71.7	26	8	8	24.2	26	5
27	18	18	46.4	27	26	26	61.6	27	5	5	16.1	27	37	37	80.8	27	20
28	5	5	10.1	28	22	22	52.5	28	11	11	28.2	28	11	11	31.3	28	3
29	14	14	34.3	29	5	5	16.1	29	15	15	33.3	29	24	24	60.6	29	10
30	4	4	8	30	13	13	35.3	30	14	14	31.3	30	34	34	77.7	30	3
31	9	9	21.2	31	41	41	82.8	31	34	34	67.6	31	25	25	61.6	31	13
32	6	6	11.1	32	26	26	61.6	32	19	19	40.4	32	15	15	45.4	32	3
33	6	6	11.1	33	68	68	96.9	33	11	11	28.2	33	5	5	19.1	33	10
34	8	8	18.1	34	87	87	100	34	21	21	48.4	34	32	32	71.7	34	20
35	44	44	87.8	35	28	28	64.6	35	45	45	82.8	35	11	11	31.3	35	16
36	18	18	46.4	36	51	51	90.9	36	9	9	23.2	36	8	8	24.2	36	14
37	21	21	54.5	37	28	28	64.6	37	19	19	40.4	37	35	35	79.7	37	40
38	12	12	25.2	38	50	50	89.8	38	15	15	33.3	38	12	12	37.3	38	13
39	17	17	43.4	39	47	47	86.8	39	17	17	38.3	39	9	9	26.2	39	26
40	26	26	59.5	40	13	13	35.3	40	11	11	28.2	40	7	7	21.2	40	38
41	53	53	94.9	41	23	23	55.5	41	26	26	58.5	41	25	25	61.6	41	100
42	6	6	11.1	42	19	19	45.4	42	14	14	31.3	42	22	22	57.5	42	38
43	14	14	34.3	43	21	21	50.5	43	39	39	77.7	43	14	14	40.4	43	30
44	28	28	64.6	44	53	53	91.9	44	36	36	73.7	44	17	17	50.5	44	15
45	42	42	84.8	45	12	12	31.3	45	5	5	16.1	45	16	16	48.4	45	15
46	34	34	73.7	46	28	28	64.6	46	5	5	16.1	46	37	37	80.8	46	26
47	38	38	81.8	47	32	32	73.7	47	39	39	77.7	47	33	33	74.7	47	14
48	37	37	79.7	48	14	14	38.3	48	19	19	40.4	48	38	38	82.8	48	32
49	27	27	60.6	49	56	56	93.9	49	21	21	48.4	49	12	12	37.3	49	25
50	30	30	67.6	50	16	16	40.4	50	26	26	58.5	50	10	10	28.2	50	17
51	75	75	100	51	49	49	88.8	51	35	35	71.7	51	62	62	90.9	51	20
52	55	55	95.9	52	30	30	69.6	52	19	19	40.4	52	47	47	86.8	52	22
53	19	19	49.4	53	28	28	64.6	53	20	20	47.4	53	29	29	67.6	53	17
54	6	6	11.1	54	20	20	47.4	54	34	34	67.6	54	23	23	59.5	54	34
55	11	11	23.2	55	7	7	20.2	55	52	52	86.8	55	33	33	74.7	55	35
56	69	69	97.9	56	30	30	69.6	56	34	34	67.6	56	27	27	64.6	56	12
57	19	19	49.4	57	40	40	78.7	57	19	19	40.4	57	42	42	84.8	57	28
58	37	37	79.7	58	17	17	42.4	58	19	19	40.4	58	14	14	40.4	58	20
59	35	35	76.7	59	48	48	87.8	59	56	56	88.8	59	18	18	55.5	59	17
60	13	13	32.3	60	55	55	92.9	60	16	16	36.3	60	28	28	66.6	60	28
61	32	32	70.7	61	30	30	69.6	61	21	21	48.4	61	<2	1	0	61	<2
62	28	28	64.6	62	28	28	64.6	62	26	26	58.5	62	<2	1	0	62	<2
63	50	50	91.9	63	4	4	15.1	63	36	36	73.7	63	<2	1	0	63	<2
64	12	12	25.2	64	11	11	28.2	64	23	23	52.5	64	<2	1	0	64	<2
65	34	34	73.7	65	17	17	42.4	65	42	42	79.7	65	<2	1	0	65	<2
66	14	14	34.3	66	20	20	47.4	66	8	8	21.2	66	<2	1	0	66	<2
67	30	30	67.6	67	12	12	31.3	67	25	25	53.5	67	<2	1	0	67	<2
68	45	45	88.8	68	60	60	94.9	68	95	95	96.9	68	<2	1	0	68	<2
69	12	12	25.2	69	32	32	73.7	69	69	69	93.9	69	<2	1	0	69	<2
70	64	64	96.9	70	32	32	73.7	70	30	30	64.6	70	<2	1	0	70	<2
71	32	32	70.7	71	40	40	78.7	71	65	65	91.9	71	<2	1	0	71	<2
72	48	48	90.9	72	44	44	85.8	72	60	60	90.9	72	<2	1	0	72	<2
73	21	21	54.5	73	17	17	42.4	73	31	31	65.6	73	63	63	91.9	73	63
74	12	12	25.2	74	24	24	58.5	74	56	56	88.8	74	41	41	83.8	74	41
75	15	15	40.4	75	20	20	47.4	75	19	19	40.4	75	21	21	56.5	75	21
76	7	7	15.1	76	22	22	52.5	76	25	25	53.5	76	72	72	93.9	76	72
77	20	20	53.5	77	3	3	12.1	77	16	16	36.3	77	61	61	89.8	77	61
78	34	34	73.7	78	8	8	22.2	78	112	112	98.9	78	51	51	87.8	78	51
79	14	14	34.3	79	40	40	78.7	79	66	66	92.9	79	32	32	71.7	79	32
80	50	50	91.9	80	19	19	45.4	80	55	55	87.8	80	26	26	63.6	80	26
81	16	16	42.4	81	8	8	22.2	81	44	44	81.8	81	29	29	67.6	81	29
82	21	21	54.5	82	12	12	31.3	82	88	88	95.9	82	58	58	88.8	82	58
83	29	29	66.6	83	21	21	50.5	83	100	100	97.9	83	22	22	57.5	83	22
84	35	35	76.7	84	13	13	35.3	84	76	76	94.9	84	15	15	45.4	84	15
85	27	27	60.6	85	5	5	16.1	85	18	18	39.3	85	125	125	100	85	125
86	40	40	82.8	86	23	23	55.5	86	33	33	66.6	86	90	90	96.9	86	90
87	74	74	98.9	87	11	11	28.2	87	15	15	33.3	87	98	98	98.9	87	98
88	32	32	70.7	88	16	16	40.4	88	29	29	63.6	88	97	97	97.9	88	97
89	12	12	25.2	89	24	24	58.5	89	25	25	53.5	89	71	71	92.9	89	71
90	18	18	46.4	90	6	6	19.1	90	28	28	62.6	90	82	82	94.9	90	82
91	31	31	69.6	91	26	26	61.6	91	45	45	82.8	91	17	17	50.5	91	17
92	35	35	76.7	92	10	10	25.2	92	21	21	48.4	92	82	82	94.9	92	82
93	17	17	43.4	93	15	15	39.3	93	45	45	82.8	93	13	13	39.3	93	13
94	4	4	8	94	5	5	16.1	94	37	37	75.7	94	44	44	85.8	94	44
95	7	7	15.1	95	40	40	78.7	95	130	130	100	95	10	10	28.2	95	10
96	7	7	15.1	96	41	41	82.8	96	42	42	79.7	96	34	34	77.7	96	34
97	15	15	40.4	97	25	25	60.6	97	50	50	85.8	97	31	31	70.7	97	31
98	17	17	43.4	98	64	64	95.9	98	9	9	23.2	98	17	17	50.5	98	17
99	8	8	18.1	99	42	42	84.8	99	37	37	75.7	99	11	11	31.3	99	11
100	45	45	88.8	100	70	70	97.9	100	25	25	53.5	100	11	11	31.3	100	11

6	6	7	94	-5.5	6	4	14	94	-5.5	7	6	9	93	-5.5	10	3	7	90	-5.5	6	4	5
0	0	6	100	-6.0	2	1	4	98	-6.0	1	1	6	99	-6.0	7	5	3	93	-6.0	2	2	4
0	0	0	100	-6.5	1	1	1	99	-6.5	0	0	1	100	-6.5	2	2	5	98	-6.5	0	0	2
0	0	0	100	-7.0	0	0	1	100	-7.0	0	0	0	100	-7.0	0	0	2	100	-7.0	0	0	0
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
41	51	-3.0	-3.5	11	50	53	-2.5	-3.0	6	#N/A	#N/A	#N/A	#N/A	#N/A	50	53	-2.5	-3.0	6	#N/A	#N/A	#N/A
64	77	-4.0	-4.5	21	66	80	-4.5	-5.0	28	74	84	-4.5	-5.0	23	70	83	-4.5	-5.0	26	70	79	-3.5
77	87	-4.5	-5.0	29	80	94	-5.0	-5.5	35	84	93	-5.0	-5.5	32	83	90	-5.0	-5.5	34	83	89	-4.5
87	94	-5.0	-5.5	37	80	94	-5.0	-5.5	41	84	93	-5.0	-5.5	40	90	93	-5.5	-6.0	45	89	94	-5.0

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	<2	1	0
35	<2	1	0
36	<2	1	0
37	<2	1	0
38	<2	1	0
39	16	16	60.6
40	26	26	82.8
41	55	55	98.9
42	24	24	79.7
43	12	12	51.5
44	18	18	65.6
45	18	18	65.6
46	20	20	70.7
47	11	11	48.4
48	10	10	42.4
49	12	12	51.5
50	43	43	91.9
51	14	14	54.5
52	10	10	42.4
53	10	10	42.4
54	11	11	48.4
55	45	45	92.9
56	20	20	70.7
57	11	11	48.4
58	10	10	42.4
59	20	20	70.7
60	14	14	54.5
61	18	18	65.6
62	22	22	75.7
63	24	24	79.7
64	23	23	77.7
65	14	14	54.5
66	30	30	84.8
67	17	17	64.6
68	22	22	75.7
69	20	20	70.7
70	34	34	87.8
71	40	40	88.8
72	48	48	94.9
73	18	18	65.6
74	40	40	88.8
75	30	30	84.8
76	12	12	51.5
77	10	10	42.4
78	8	8	40.4
79	28	28	83.8
80	50	50	95.9
81	23	23	77.7
82	45	45	92.9
83	31	31	86.8
84	52	52	97.9
85	25	25	81.8
86	15	15	57.5
87	40	40	88.8
88	20	20	70.7
89	16	16	60.6
90	16	16	60.6
91	16	16	60.6
92	15	15	57.5
93	56	56	100
94	10	10	42.4
95	9	9	41.4
96	18	18	65.6
97	51	51	96.9
98	7	7	39.3
99	15	15	57.5
100	4	4	38.3

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	<2	1	0
35	<2	1	0
36	<2	1	0
37	<2	1	0
38	<2	1	0
39	<2	1	0
40	<2	1	0
41	<2	1	0
42	<2	1	0
43	<2	1	0
44	<2	1	0
45	<2	1	0
46	<2	1	0
47	<2	1	0
48	<2	1	0
49	<2	1	0
50	<2	1	0
51	10	10	53.5
52	16	16	59.5
53	40	40	87.8
54	44	44	90.9
55	29	29	75.7
56	22	22	64.6
57	55	55	97.9
58	13	13	55.5
59	36	36	85.8
60	30	30	76.7
61	35	35	82.8
62	44	44	90.9
63	35	35	82.8
64	90	90	98.9
65	15	15	57.5
66	25	25	68.6
67	14	14	56.5
68	45	45	92.9
69	50	50	94.9
70	23	23	66.6
71	18	18	60.6
72	26	26	71.7
73	40	40	87.8
74	39	39	86.8
75	21	21	63.6
76	23	23	66.6
77	31	31	78.7
78	20	20	61.6
79	33	33	80.8
80	26	26	71.7
81	35	35	82.8
82	100	100	100
83	34	34	81.8
84	50	50	94.9
85	28	28	74.7
86	11	11	54.5
87	45	45	92.9
88	27	27	73.7
89	6	6	50.5
90	53	53	96.9
91	22	22	64.6
92	25	25	68.6
93	41	41	89.8
94	31	31	78.7
95	6	6	50.5
96	7	7	52.5
97	30	30	76.7
98	25	25	68.6
99	15	15	57.5
100	20	20	61.6

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	<2	1	0
35	<2	1	0
36	<2	1	0
37	<2	1	0
38	<2	1	0
39	<2	1	0
40	<2	1	0
41	<2	1	0
42	<2	1	0
43	<2	1	0
44	<2	1	0
45	<2	1	0
46	<2	1	0
47	<2	1	0
48	<2	1	0
49	<2	1	0
50	<2	1	0
51	<2	1	0
52	<2	1	0
53	<2	1	0
54	<2	1	0
55	<2	1	0
56	<2	1	0
57	<2	1	0
58	<2	1	0
59	28	28	78.7
60	10	10	58.5
61	14	14	61.6
62	20	20	68.6
63	30	30	81.8
64	21	21	72.7
65	23	23	74.7
66	39	39	88.8
67	22	22	73.7
68	19	19	66.6
69	19	19	66.6
70	34	34	84.8
71	36	36	86.8
72	11	11	59.5
73	15	15	63.6
74	64	64	98.9
75	26	26	77.7
76	20	20	68.6
77	29	29	79.7
78	24	24	75.7
79	25	25	76.7
80	45	45	92.9
81	49	49	93.9
82	41	41	90.9
83	20	20	68.6
84	29	29	79.7
85	49	49	93.9
86	32	32	82.8
87	60	60	97.9
88	36	36	86.8
89	34	34	84.8
90	50	50	96.9
91	14	14	61.6
92	49	49	93.9
93	66	66	100
94	41	41	90.9
95	32	32	82.8
96	15	15	63.6
97	16	16	65.6
98	20	20	68.6
99	12	12	60.6
100	39	39	88.8

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	<2	1	0
35	<2	1	0
36	<2	1	0
37	<2	1	0
38	<2	1	0
39	<2	1	0
40	<2	1	0
41	<2	1	0
42	<2	1	0
43	<2	1	0
44	<2	1	0
45	<2	1	0
46	<2	1	0
47	<2	1	0
48	<2	1	0
49	25	25	71.7
50	16	16	60.6
51	35	35	85.8
52	25	25	71.7
53	13	13	56.5
54	45	45	89.8
55	27	27	74.7
56	31	31	82.8
57	38	38	87.8
58	29	29	78.7
59	10	10	53.5
60	29	29	78.7
61	24	24	70.7
62	16	16	60.6
63	72	72	93.9
64	80	80	96.9
65	27	27	74.7
66	105	105	98.9
67	76	76	94.9
68	34	34	84.8
69	19	19	62.6
70	48	48	91.9
71	15	15	58.5
72	110	110	100
73	46	46	90.9
74	42	42	88.8
75	20	20	63.6
76	35	35	85.8
77	33	33	83.8
78	21	21	65.6
79	29	29	78.7
80	28	28	76.7
81	28	28	76.7
82	21	21	65.6
83	21	21	65.6
84	14	14	57.5
85	29	29	78.7
86	55	55	92.9
87	6	6	50.5
88	7	7	51.5
89	12	12	55.5
90	5	5	49.4
91	4	4	48.4
92	15	15	58.5
93	20	20	63.6
94	10	10	53.5
95	80	80	96.9
96	22	22	68.6
97	26	26	73.7
98	76	76	94.9
99	22	22	68.6
100	8	8	52.5

count	size (mm)	Size (m repla "<2" w 1
1	<2	1
2	<2	1
3	<2	1
4	<2	1
5	<2	1
6	<2	1
7	<2	1
8	<2	1
9	<2	1
10	<2	1
11	<2	1
12	<2	1
13	<2	1
14	<2	1
15	<2	1
16	<2	1
17	<2	1
18	<2	1
19	<2	1
20	<2	1
21	<2	1
22	<2	1
23	<2	1
24	<2	1
25	<2	1
26	<2	1
27	<2	1
28	<2	1
29	<2	1
30	<2	1
31	<2	1
32	<2	1
33	<2	1
34	<2	1
35	<2	1
36	<2	1
37	<2	1
38	<2	1
39	<2	1
40	<2	1
41	<2	1
42	<2	1
43	<2	1
44	<2	1
45	<2	1
46	<2	1
47	<2	1
48	<2	1
49	<2	1
50	<2	1
51	<2	1
52	<2	1
53	<2	1
54	<2	1
55	<2	1
56	<2	1
57	<2	1
58	<2	1
59	<2	1
60	<2	1
61	<2	1
62	<2	1
63	<2	1
64	<2	1
65	<2	1
66	<2	1
67	32	32
68	25	25
69	12	12
70	9	9
71	12	12
72	22	22
73	8	8
74	16	16
75	19	19
76	12	12
77	10	10
78	26	26
79	16	16
80	14	14
81	20	20
82	28	28
83	15	15
84	68	68
85	40	40
86	60	60
87	19	19
88	62	62
89	71	71
90	38	38
91	36	36
92	46	46
93	50	50
94	41	41
95	25	25
96	16	16
97	12	12
98	35	35
99	30	30
100	10	10

42	19	11	58	-5.5	37	18	11	63	-5.5	39	20	11	61	-5.5	34	15	11	66	-5.5	38	19	12
23	15	19	77	-6.0	19	8	18	81	-6.0	19	12	20	81	-6.0	19	6	15	81	-6.0	19	7	19
8	2	15	92	-6.5	11	4	8	89	-6.5	7	4	12	93	-6.5	13	8	6	87	-6.5	12	6	7
6	3	2	94	-7.0	7	3	4	93	-7.0	3	3	4	97	-7.0	5	1	8	95	-7.0	6	2	6
3	1	3	97	-7.5	4	2	3	96	-7.5	0	0	3	100	-7.5	4	3	1	96	-7.5	4	4	2
2	1	1	98	-8.0	2	2	2	98	-8.0	0	0	0	100	-8.0	1	0	3	99	-8.0	0	0	4
1	1	1	99	-8.5	0	0	2	100	-8.5	0	0	0	100	-8.5	1	1	0	99	-8.5	0	0	0
		1	100	-9.0			0	100	-9.0			0	100	-9.0			1	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
14	17	-2.5	-3.0	7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/
25	36	-4.0	-4.5	16	24	28	-1.0	-2.0	2	25	27	-3.0	-3.5	8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/
47	58	-5.0	-5.5	35	49	52	-4.5	-5.0	25	50	61	-5.0	-5.5	32	47	55	-4.5	-5.0	26	50	62	-5.0
58	77	-5.5	-6.0	62	63	81	-5.5	-6.0	57	61	81	-5.5	-6.0	58	66	81	-5.5	-6.0	56	62	81	-5.5
77	92	-6.0	-6.5	75	81	89	-6.0	-6.5	73	81	93	-6.0	-6.5	70	81	87	-6.0	-6.5	76	81	88	-6.0
77	92	-6.0	-6.5	86	89	93	-6.5	-7.0	98	81	93	-6.0	-6.5	83	87	95	-6.5	-7.0	103	88	94	-6.5

count	**size (mm)**	**Size (mm) replace "<2" with 1**	**Percent Rank**
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	48	48	63.6
15	70	70	84.8
16	85	85	89.8
17	56	56	69.6
18	46	46	58.5
19	30	30	43.4
20	62	62	75.7
21	21	21	33.3
22	34	34	48.4
23	19	19	29.2
24	36	36	50.5
25	59	59	73.7
26	20	20	31.3
27	29	29	40.4
28	425	425	100
29	42	42	53.5
30	170	170	96.9
31	69	69	83.8
32	50	50	65.6
33	84	84	88.8
34	9	9	17.1
35	9	9	17.1
36	12	12	21.2
37	47	47	61.6
38	22	22	35.3
39	38	38	51.5
40	74	74	86.8
41	43	43	54.5
42	32	32	45.4
43	34	34	48.4
44	14	14	23.2
45	250	250	97.9
46	47	47	61.6
47	6	6	14.1
48	140	140	94.9
49	90	90	91.9
50	290	290	98.9
51	61	61	74.7
52	46	46	58.5
53	68	68	78.7
54	17	17	25.2
55	10	10	20.2
56	68	68	78.7
57	30	30	43.4
58	18	18	27.2
59	21	21	33.3
60	32	32	45.4
61	68	68	78.7
62	45	45	55.5
63	68	68	78.7
64	13	13	22.2
65	45	45	55.5
66	46	46	58.5
67	95	95	92.9
68	140	140	94.9
69	19	19	29.2
70	29	29	40.4
71	125	125	93.9
72	85	85	89.8
73	4	4	13.1
74	23	23	36.3
75	52	52	67.6
76	33	33	47.4
77	27	27	39.3
78	66	66	77.7
79	57	57	70.7
80	20	20	31.3
81	26	26	38.3
82	6	6	14.1
83	45	45	55.5
84	49	49	64.6
85	15	15	24.2
86	68	68	78.7
87	54	54	68.6
88	50	50	65.6
89	9	9	17.1
90	40	40	52.5
91	71	71	85.8
92	57	57	70.7
93	18	18	27.2
94	23	23	36.3
95	58	58	72.7
96	62	62	75.7
97	75	75	87.8
98	7	7	16.1
99	17	17	25.2
100	29	29	40.4

count	**size (mm)**	**Size (mm) replace "<2" with 1**	**Percent Rank**
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	44	44	61.6
26	66	66	82.8
27	74	74	86.8
28	22	22	45.4
29	9	9	32.3
30	33	33	52.5
31	62	62	80.8
32	60	60	77.7
33	11	11	35.3
34	5	5	28.2
35	47	47	63.6
36	70	70	84.8
37	55	55	73.7
38	7	7	30.3
39	60	60	77.7
40	32	32	51.5
41	34	34	53.5
42	49	49	66.6
43	10	10	33.3
44	22	22	45.4
45	340	340	100
46	37	37	56.5
47	4	4	27.2
48	50	50	68.6
49	12	12	38.3
50	50	50	68.6
51	3	3	24.2
52	8	8	31.3
53	69	69	83.8
54	60	60	77.7
55	5	5	28.2
56	85	85	88.8
57	22	22	45.4
58	72	72	85.8
59	160	160	95.9
60	16	16	40.4
61	37	37	56.5
62	140	140	93.9
63	35	35	55.5
64	58	58	76.7
65	55	55	73.7
66	28	28	49.4
67	95	95	89.8
68	115	115	91.9
69	120	120	92.9
70	78	78	87.8
71	240	240	97.9
72	21	21	42.4
73	43	43	60.6
74	140	140	93.9
75	11	11	35.3
76	34	34	53.5
77	3	3	24.2
78	28	28	49.4
79	38	38	58.5
80	50	50	68.6
81	310	310	98.9
82	49	49	66.6
83	190	190	96.9
84	45	45	62.6
85	110	110	90.9
86	21	21	42.4
87	15	15	39.3
88	10	10	33.3
89	48	48	64.6
90	50	50	68.6
91	3	3	24.2
92	56	56	75.7
93	22	22	45.4
94	21	21	42.4
95	65	65	81.8
96	17	17	41.4
97	48	48	64.6
98	11	11	35.3
99	50	50	68.6
100	40	40	59.5

count	**size (mm)**	**Size (mm) replace "<2" with 1**	**Percent Rank**
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	82	82	88.8
24	60	60	76.7
25	71	71	85.8
26	48	48	63.6
27	24	24	43.4
28	23	23	41.4
29	19	19	36.3
30	46	46	61.6
31	56	56	73.7
32	34	34	50.5
33	53	53	68.6
34	24	24	43.4
35	83	83	89.8
36	46	46	61.6
37	115	115	95.9
38	35	35	52.5
39	38	38	54.5
40	18	18	35.3
41	42	42	59.5
42	72	72	86.8
43	88	88	91.9
44	89	89	92.9
45	53	53	68.6
46	16	16	30.3
47	41	41	57.5
48	9	9	25.2
49	175	175	100
50	4	4	22.2
51	155	155	98.9
52	55	55	71.7
53	28	28	45.4
54	43	43	60.6
55	20	20	37.3
56	29	29	47.4
57	20	20	37.3
58	54	54	70.7
59	65	65	81.8
60	11	11	26.2
61	16	16	30.3
62	62	62	78.7
63	69	69	83.8
64	64	64	80.8
65	102	102	94.9
66	66	66	82.8
67	28	28	45.4
68	93	93	93.9
69	40	40	56.5
70	72	72	86.8
71	34	34	50.5
72	51	51	65.6
73	16	16	30.3
74	8	8	24.2
75	87	87	90.9
76	70	70	84.8
77	52	52	67.6
78	125	125	96.9
79	32	32	48.4
80	17	17	33.3
81	6	6	23.2
82	41	41	57.5
83	135	135	97.9
84	17	17	33.3
85	15	15	28.2
86	55	55	71.7
87	57	57	74.7
88	12	12	27.2
89	21	21	39.3
90	32	32	48.4
91	60	60	76.7
92	23	23	41.4
93	22	22	40.4
94	35	35	52.5
95	62	62	78.7
96	51	51	65.6
97	15	15	28.2
98	58	58	75.7
99	50	50	64.6
100	38	38	54.5

count	**size (mm)**	**Size (mm) replace "<2" with 1**	**Percent Rank**
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	<2	1	0
35	<2	1	0
36	<2	1	0
37	135	135	95.9
38	63	63	78.7
39	25	25	47.4
40	105	105	90.9
41	198	198	96.9
42	240	240	98.9
43	108	108	92.9
44	109	109	93.9
45	27	27	50.5
46	46	46	66.6
47	41	41	58.5
48	85	85	86.8
49	103	103	89.8
50	230	230	97.9
51	75	75	84.8
52	59	59	75.7
53	18	18	43.4
54	42	42	60.6
55	20	20	45.4
56	53	53	71.7
57	73	73	83.8
58	31	31	52.5
59	55	55	73.7
60	48	48	67.6
61	60	60	76.7
62	75	75	84.8
63	45	45	63.6
64	14	14	40.4
65	51	51	70.7
66	43	43	61.6
67	64	64	79.7
68	102	102	88.8
69	18	18	43.4
70	64	64	79.7
71	12	12	38.3
72	45	45	63.6
73	12	12	38.3
74	16	16	42.4
75	67	67	81.8
76	95	95	87.8
77	34	34	55.5
78	21	21	46.4
79	40	40	57.5
80	36	36	56.5
81	120	120	94.9
82	480	480	100
83	14	14	40.4
84	43	43	61.6
85	105	105	90.9
86	25	25	47.4
87	41	41	58.5
88	62	62	77.7
89	45	45	63.6
90	11	11	37.3
91	48	48	67.6
92	27	27	50.5
93	50	50	69.6
94	8	8	36.3
95	31	31	52.5
96	26	26	49.4
97	54	54	72.7
98	70	70	82.8
99	57	57	74.7
100	32	32	54.5

count	**size (mm)**	**Size (m repla "<2" w 1**
1	<2	1
2	<2	1
3	<2	1
4	<2	1
5	<2	1
6	<2	1
7	<2	1
8	<2	1
9	<2	1
10	<2	1
11	<2	1
12	<2	1
13	<2	1
14	<2	1
15	<2	1
16	<2	1
17	<2	1
18	<2	1
19	<2	1
20	<2	1
21	<2	1
22	<2	1
23	<2	1
24	<2	1
25	<2	1
26	<2	1
27	<2	1
28	<2	1
29	<2	1
30	<2	1
31	<2	1
32	<2	1
33	<2	1
34	68	68
35	92	92
36	63	63
37	62	62
38	68	68
39	38	38
40	33	33
41	59	59
42	64	64
43	80	80
44	60	60
45	5	5
46	55	55
47	83	83
48	63	63
49	48	48
50	11	11
51	9	9
52	26	26
53	9	9
54	210	210
55	100	100
56	48	48
57	31	31
58	5	5
59	41	41
60	35	35
61	40	40
62	46	46
63	43	43
64	19	19
65	54	54
66	40	40
67	43	43
68	9	9
69	60	60
70	130	130
71	38	38
72	44	44
73	13	13
74	50	50
75	29	29
76	9	9
77	87	87
78	40	40
79	52	52
80	52	52
81	55	55
82	30	30
83	<2	1
84	135	135
85	63	63
86	25	25
87	105	105
88	198	198
89	240	240
90	108	108
91	109	109
92	27	27
93	46	46
94	41	41
95	85	85
96	103	103
97	230	230
98	75	75
99	59	59
100	18	18

-5.5	46	16	8	54	-5.5	32	13	13	68	-5.5	46	16	10	54	-5.5	28	6	12	72	-5.5	32
-6.0	30	12	16	70	-6.0	19	12	13	81	-6.0	30	16	16	70	-6.0	22	6	6	78	-6.0	15
-6.5	18	7	12	82	-6.5	7	3	12	93	-6.5	14	7	16	86	-6.5	16	8	6	84	-6.5	8
-7.0	11	6	7	89	-7.0	4	2	3	96	-7.0	7	4	7	93	-7.0	8	7	8	92	-7.0	3
-7.5	5	5	6	95	-7.5	2	2	2	98	-7.5	3	3	4	97	-7.5	1	1	7	99	-7.5	0
-8.0	0	0	5	100	-8.0	0	0	2	100	-8.0	0	0	3	100	-8.0	0	0	1	100	-8.0	0
-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0
-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0	
		100					**100**					**100**					**100**				
les					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**	
	15	19	-2.5	-3.0	6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	21	29	-3.5	-4.0	13	#N/A	#N/A	#N/A	#N/A	#N/A	25	29	-3.5	-4.0	11	#N/A	#N/A	#N/A	#N/A	#N/A	23
	46	54	-5.0	-5.5	38	50	55	-4.5	-5.0	23	44	54	-5.0	-5.5	39	46	60	-4.5	-5.0	25	46
	70	82	-6.0	-6.5	74	68	81	-5.5	-6.0	54	70	86	-6.0	-6.5	71	72	78	-5.5	-6.0	54	68
	82	89	-6.5	-7.0	100	81	93	-6.0	-6.5	70	70	86	-6.0	-6.5	86	84	92	-6.5	-7.0	90	68
	89	95	-7.0	-7.5	135	81	93	-6.0	-6.5	83	86	93	-6.5	-7.0	110	84	92	-6.5	-7.0	117	85

:
d paste group of 6
new location to

olumns A and B

rticle sizes in green
ng at row 30.
for particles
n 2 mm, they are
th 1's in the next
different "less than"
used, some things
be changed.
ve more than 100
ou need to fill down
s to the right of the
column to match.
ve fewer than 100,
o clear all contents
elow the last
ue.
ges are needed to
ormulas, unless you
than 311 particles.

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8
9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1	0	9
10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1	0	10
11	50	50	57.5	11	<2	1	0	11	<2	1	0	11	<2	1	0	11
12	17	17	29.2	12	<2	1	0	12	<2	1	0	12	<2	1	0	12
13	140	140	91.9	13	<2	1	0	13	<2	1	0	13	<2	1	0	13
14	70	70	76.7	14	<2	1	0	14	<2	1	0	14	<2	1	0	14
15	5	5	11.1	15	<2	1	0	15	<2	1	0	15	<2	1	0	15
16	55	55	65.6	16	<2	1	0	16	<2	1	0	16	<2	1	0	16
17	10	10	20.2	17	<2	1	0	17	<2	1	0	17	<2	1	0	17
18	22	22	35.3	18	<2	1	0	18	85	85	84.8	18	<2	1	0	18
19	94	94	82.8	19	<2	1	0	19	49	49	55.5	19	<2	1	0	19
20	60	60	66.6	20	<2	1	0	20	35	35	45.4	20	<2	1	0	20
21	240	240	100	21	<2	1	0	21	52	52	60.6	21	<2	1	0	21
22	12	12	21.2	22	<2	1	0	22	40	40	48.4	22	<2	1	0	22
23	33	33	46.4	23	<2	1	0	23	115	115	89.8	23	<2	1	0	23
24	130	130	89.8	24	<2	1	0	24	75	75	76.7	24	<2	1	0	24
25	16	16	27.2	25	<2	1	0	25	113	113	88.8	25	<2	1	0	25
26	67	67	73.7	26	<2	1	0	26	42	42	51.5	26	<2	1	0	26
27	47	47	55.5	27	<2	1	0	27	22	22	35.3	27	<2	1	0	27
28	19	19	30.3	28	<2	1	0	28	45	45	52.5	28	28	28	50.5	28
29	30	30	43.4	29	90	90	91.9	29	91	91	86.8	29	43	43	70.7	29
30	46	46	54.5	30	33	33	55.5	30	71	71	74.7	30	85	85	79.7	30
31	105	105	84.8	31	19	19	45.4	31	78	78	78.7	31	46	46	72.7	31
32	100	100	83.8	32	42	42	65.6	32	78	78	78.7	32	52	52	77.7	32
33	45	45	52.5	33	41	41	63.6	33	120	120	91.9	33	21	21	43.4	33
34	64	64	69.6	34	50	50	69.6	34	50	50	57.5	34	6	6	28.2	34
35	5	5	11.1	35	25	25	50.5	35	140	140	95.9	35	35	35	60.6	35
36	12	12	21.2	36	90	90	91.9	36	187	187	97.9	36	15	15	34.3	36
37	5	5	11.1	37	65	65	81.8	37	56	56	63.6	37	183	183	100	37
38	130	130	89.8	38	215	215	100	38	130	130	93.9	38	89	89	82.8	38
39	12	12	21.2	39	40	40	62.6	39	14	14	26.2	39	25	25	47.4	39
40	20	20	32.3	40	61	61	77.7	40	137	137	94.9	40	50	50	74.7	40
41	6	6	15.1	41	20	20	46.4	41	20	20	32.3	41	110	110	88.8	41
42	65	65	70.7	42	35	35	57.5	42	85	85	84.8	42	5	5	27.2	42
43	25	25	40.4	43	35	35	57.5	43	16	16	28.2	43	128	128	91.9	43
44	51	51	61.6	44	140	140	96.9	44	17	17	29.2	44	31	31	58.5	44
45	5	5	11.1	45	41	41	63.6	45	150	150	96.9	45	9	9	29.2	45
46	9	9	19.1	46	85	85	89.8	46	4	4	18.1	46	36	36	63.6	46
47	15	15	26.2	47	64	64	79.7	47	48	48	54.5	47	85	85	79.7	47
48	31	31	45.4	48	22	22	48.4	48	3	3	17.1	48	41	41	68.6	48
49	75	75	77.7	49	30	30	52.5	49	75	75	76.7	49	141	141	94.9	49
50	85	85	81.8	50	52	52	72.7	50	115	115	89.8	50	16	16	37.3	50
51	115	115	86.8	51	10	10	32.3	51	25	25	37.3	51	130	130	92.9	51
52	24	24	38.3	52	11	11	34.3	52	68	68	70.7	52	36	36	63.6	52
53	144	144	92.9	53	33	33	55.5	53	35	35	45.4	53	132	132	93.9	53
54	38	38	49.4	54	10	10	32.3	54	10	10	23.2	54	12	12	31.3	54
55	230	230	98.9	55	15	15	37.3	55	41	41	49.4	55	40	40	67.6	55
56	7	7	16.1	56	3	3	28.2	56	41	41	49.4	56	28	28	50.5	56
57	8	8	18.1	57	13	13	35.3	57	50	50	57.5	57	87	87	81.8	57
58	24	24	38.3	58	13	13	35.3	58	70	70	71.7	58	66	66	78.7	58
59	50	50	57.5	59	80	80	86.8	59	20	20	32.3	59	175	175	98.9	59
60	84	84	80.8	60	81	81	87.8	60	45	45	52.5	60	14	14	33.3	60
61	210	210	96.9	61	65	65	81.8	61	81	81	82.8	61	107	107	87.8	61
62	120	120	87.8	62	75	75	84.8	62	82	82	83.8	62	50	50	74.7	62
63	210	210	96.9	63	20	20	46.4	63	19	19	31.3	63	24	24	46.4	63
64	40	40	50.5	64	45	45	66.6	64	25	25	37.3	64	21	21	43.4	64
65	60	60	66.6	65	17	17	44.4	65	6	6	19.1	65	28	28	50.5	65
66	80	80	79.7	66	37	37	61.6	66	110	110	87.8	66	18	18	39.3	66
67	67	67	73.7	67	8	8	31.3	67	240	240	98.9	67	30	30	55.5	67
68	14	14	25.2	68	93	93	93.9	68	55	55	61.6	68	49	49	73.7	68
69	7	7	16.1	69	7	7	30.3	69	60	60	65.6	69	9	9	29.2	69
70	20	20	32.3	70	16	16	41.4	70	6	6	19.1	70	20	20	41.4	70
71	45	45	52.5	71	32	32	54.5	71	32	32	42.4	71	16	16	37.3	71
72	22	22	35.3	72	5	5	29.2	72	22	22	35.3	72	150	150	95.9	72
73	75	75	77.7	73	89	89	90.9	73	80	80	80.8	73	27	27	49.4	73
74	65	65	70.7	74	22	22	48.4	74	21	21	34.3	74	35	35	60.6	74
75	49	49	56.5	75	192	192	98.9	75	30	30	39.3	75	21	21	43.4	75
76	52	52	62.6	76	61	61	77.7	76	32	32	42.4	76	105	105	86.8	76
77	19	19	30.3	77	75	75	84.8	77	35	35	45.4	77	38	38	65.6	77
78	50	50	57.5	78	16	16	41.4	78	6	6	19.1	78	20	20	41.4	78
79	4	4	10.1	79	25	25	50.5	79	64	64	69.6	79	29	29	54.5	79
80	44	44	51.5	80	150	150	97.9	80	50	50	57.5	80	120	120	90.9	80
81	54	54	63.6	81	45	45	66.6	81	63	63	68.6	81	100	100	85.8	81
82	26	26	42.4	82	15	15	37.3	82	70	70	71.7	82	30	30	55.5	82
83	68	68	75.7	83	66	66	83.8	83	62	62	67.6	83	15	15	34.3	83
84	16	16	27.2	84	30	30	52.5	84	12	12	25.2	84	110	110	88.8	84
85	125	125	88.8	85	53	53	73.7	85	61	61	66.6	85	42	42	69.6	85
86	25	25	40.4	86	15	15	37.3	86	17	17	29.2	86	28	28	50.5	86
87	110	110	85.8	87	36	36	60.6	87	15	15	27.2	87	50	50	74.7	87
88	181	181	95.9	88	50	50	69.6	88	80	80	80.8	88	15	15	34.3	88
89	50	50	57.5	89	64	64	79.7	89	49	49	55.5	89	92	92	84.8	89
90	30	30	43.4	90	16	16	41.4	90	31	31	40.4	90	39	39	66.6	90
91	22	22	35.3	91	93	93	93.9	91	34	34	44.4	91	30	30	55.5	91
92	54	54	63.6	92	35	35	57.5	92	55	55	61.6	92	26	26	48.4	92
93	60	60	66.6	93	15	15	37.3	93	74	74	75.7	93	170	170	97.9	93
94	150	150	93.9	94	50	50	69.6	94	70	70	71.7	94	35	35	60.6	94
95	35	35	48.4	95	120	120	95.9	95	31	31	40.4	95	150	150	95.9	95
96	12	12	21.2	96	47	47	68.6	96	8	8	22.2	96	12	12	31.3	96
97	180	180	94.9	97	81	81	87.8	97	123	123	92.9	97	19	19	40.4	97
98	21	21	34.3	98	55	55	74.7	98	242	242	100	98	90	90	83.8	98
99	66	66	72.7	99	55	55	74.7	99	10	10	23.2	99	32	32	59.5	99
100	33	33	46.4	100	60	60	76.7	100	58	58	64.6	100	45	45	71.7	100

25	15	17	75	-5.5	28	13	16	72	-5.5	48	19	23	52	-5.5	31	19	23	69	-5.5	33	18	19
10	6	15	90	-6.0	15	10	13	85	-6.0	29	20	19	71	-6.0	12	7	19	88	-6.0	15	10	18
4	3	6	96	-6.5	5	4	10	95	-6.5	9	6	20	91	-6.5	5	4	7	95	-6.5	5	5	10
1	1	3	99	-7.0	1	1	4	99	-7.0	3	3	6	97	-7.0	1	1	4	99	-7.0	0	0	5
0	0	1	100	-7.5	0	0	1	100	-7.5	0	0	3	100	-7.5	0	0	1	100	-7.5	0	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
9	21	-3.0	-3.5	10	13	17	-2.5	-3.0	7	13	17	-3.5	-4.0	15	15	22	-3.0	-3.5	8	15	18	-3.0
21	30	-3.5	-4.0	13	22	28	-3.5	-4.0	13	20	29	-4.5	-5.0	27	25	31	-4.0	-4.5	16	23	28	-4.0
43	58	-4.5	-5.0	27	38	56	-4.5	-5.0	28	29	52	-5.0	-5.5	44	46	69	-5.0	-5.5	34	48	67	-5.0
75	90	-5.5	-6.0	45	72	85	-5.5	-6.0	49	71	91	-6.0	-6.5	69	69	88	-5.5	-6.0	50	67	85	-5.5
75	90	-5.5	-6.0	56	72	85	-5.5	-6.0	62	71	91	-6.0	-6.5	80	69	88	-5.5	-6.0	59	67	85	-5.5
90	96	-6.0	-6.5	64	85	95	-6.0	-6.5	76	71	91	-6.0	-6.5	88	88	95	-6.0	-6.5	71	85	95	-6.0

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	30	30	52.5
7	40	40	70.7
8	70	70	91.9
9	40	40	70.7
10	45	45	74.7
11	70	70	91.9
12	47	47	75.7
13	68	68	90.9
14	13	13	22.2
15	47	47	75.7
16	38	38	67.6
17	35	35	63.6
18	30	30	52.5
19	27	27	48.4
20	60	60	84.8
21	23	23	43.4
22	40	40	70.7
23	32	32	57.5
24	70	70	91.9
25	58	58	83.8
26	19	19	31.3
27	89	89	95.9
28	20	20	34.3
29	15	15	25.2
30	18	18	30.3
31	97	97	96.9
32	16	16	28.2
33	37	37	64.6
34	50	50	78.7
35	128	128	98.9
36	4	4	5
37	28	28	49.4
38	57	57	82.8
39	155	155	100
40	33	33	58.5
41	23	23	43.4
42	9	9	9
43	10	10	12.1
44	34	34	59.5
45	11	11	16.1
46	54	54	80.8
47	24	24	46.4
48	5	5	6
49	11	11	16.1
50	47	47	75.7
51	10	10	12.1
52	63	63	88.8
53	20	20	34.3
54	38	38	67.6
55	19	19	31.3
56	24	24	46.4
57	28	28	49.4
58	10	10	12.1
59	5	5	6
60	16	16	28.2
61	21	21	38.3
62	22	22	39.3
63	23	23	43.4
64	15	15	25.2
65	22	22	39.3
66	100	100	97.9
67	31	31	56.5
68	34	34	59.5
69	11	11	16.1
70	37	37	64.6
71	15	15	25.2
72	11	11	16.1
73	30	30	52.5
74	13	13	22.2
75	7	7	8
76	37	37	64.6
77	28	28	49.4
78	12	12	21.2
79	20	20	34.3
80	70	70	91.9
81	60	60	84.8
82	10	10	12.1
83	11	11	16.1
84	19	19	31.3
85	34	34	59.5
86	14	14	24.2
87	9	9	9
88	38	38	67.6
89	60	60	84.8
90	63	63	88.8
91	20	20	34.3
92	34	34	59.5
93	9	9	9
94	55	55	81.8
95	50	50	78.7
96	60	60	84.8
97	22	22	39.3
98	30	30	52.5
99	22	22	39.3
100	42	42	73.7

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	69	69	87.8
14	71	71	89.8
15	40	40	63.6
16	8	8	14.1
17	65	65	85.8
18	103	103	96.9
19	53	53	76.7
20	38	38	61.6
21	34	34	57.5
22	26	26	42.4
23	22	22	36.3
24	17	17	28.2
25	30	30	47.4
26	25	25	41.4
27	24	24	38.3
28	10	10	20.2
29	29	29	45.4
30	54	54	78.7
31	40	40	63.6
32	7	7	13.1
33	54	54	78.7
34	8	8	14.1
35	59	59	84.8
36	105	105	97.9
37	58	58	83.8
38	50	50	73.7
39	72	72	90.9
40	86	86	93.9
41	32	32	53.5
42	19	19	30.3
43	16	16	25.2
44	20	20	32.3
45	16	16	25.2
46	14	14	23.2
47	24	24	38.3
48	20	20	32.3
49	44	44	71.7
50	24	24	38.3
51	30	30	47.4
52	87	87	94.9
53	12	12	22.2
54	30	30	47.4
55	32	32	53.5
56	78	78	91.9
57	35	35	58.5
58	8	8	14.1
59	9	9	17.1
60	53	53	76.7
61	31	31	51.5
62	27	27	43.4
63	22	22	36.3
64	54	54	78.7
65	152	152	100
66	84	84	92.9
67	46	46	72.7
68	95	95	95.9
69	40	40	63.6
70	30	30	47.4
71	51	51	74.7
72	40	40	63.6
73	43	43	68.6
74	16	16	25.2
75	114	114	98.9
76	4	4	12.1
77	15	15	24.2
78	11	11	21.2
79	9	9	17.1
80	19	19	30.3
81	43	43	68.6
82	33	33	56.5
83	40	40	63.6
84	43	43	68.6
85	35	35	58.5
86	35	35	58.5
87	21	21	35.3
88	27	27	43.4
89	67	67	86.8
90	32	32	53.5
91	20	20	32.3
92	18	18	29.2
93	29	29	45.4
94	9	9	17.1
95	52	52	75.7
96	39	39	62.6
97	31	31	51.5
98	55	55	81.8
99	69	69	87.8
100	56	56	82.8

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	41	41	42.4
12	65	65	71.7
13	46	46	52.5
14	100	100	91.9
15	36	36	36.3
16	20	20	17.1
17	45	45	47.4
18	45	45	47.4
19	140	140	98.9
20	80	80	87.8
21	60	60	63.6
22	4	4	10.1
23	44	44	45.4
24	50	50	55.5
25	38	38	37.3
26	54	54	59.5
27	10	10	11.1
28	79	79	85.8
29	40	40	39.3
30	105	105	92.9
31	70	70	76.7
32	85	85	89.8
33	125	125	96.9
34	16	16	16.1
35	68	68	75.7
36	40	40	39.3
37	56	56	61.6
38	46	46	52.5
39	41	41	42.4
40	25	25	21.2
41	50	50	55.5
42	130	130	97.9
43	15	15	14.1
44	15	15	14.1
45	14	14	13.1
46	60	60	63.6
47	34	34	29.2
48	63	63	70.7
49	24	24	20.2
50	35	35	34.3
51	34	34	29.2
52	39	39	38.3
53	27	27	25.2
54	35	35	34.3
55	60	60	63.6
56	50	50	55.5
57	60	60	63.6
58	45	45	47.4
59	45	45	47.4
60	34	34	29.2
61	110	110	94.9
62	62	62	69.6
63	25	25	21.2
64	140	140	98.9
65	80	80	87.8
66	72	72	83.8
67	60	60	63.6
68	74	74	84.8
69	42	42	44.4
70	25	25	21.2
71	55	55	60.6
72	65	65	71.7
73	110	110	94.9
74	90	90	90.9
75	70	70	76.7
76	34	34	29.2
77	60	60	63.6
78	10	10	11.1
79	71	71	81.8
80	50	50	55.5
81	65	65	71.7
82	70	70	76.7
83	49	49	54.5
84	45	45	47.4
85	59	59	62.6
86	40	40	39.3
87	25	25	21.2
88	30	30	27.2
89	66	66	74.7
90	20	20	17.1
91	27	27	25.2
92	70	70	76.7
93	70	70	76.7
94	34	34	29.2
95	22	22	19.1
96	44	44	45.4
97	30	30	27.2
98	71	71	81.8
99	79	79	85.8
100	105	105	92.9

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	27	27	36.3
16	51	51	75.7
17	80	80	93.9
18	22	22	29.2
19	48	48	71.7
20	9	9	15.1
21	10	10	16.1
22	42	42	61.6
23	14	14	22.2
24	10	10	16.1
25	20	20	25.2
26	61	61	83.8
27	38	38	51.5
28	36	36	50.5
29	54	54	79.7
30	34	34	46.4
31	42	42	61.6
32	49	49	72.7
33	68	68	89.8
34	32	32	42.4
35	39	39	52.5
36	35	35	47.4
37	178	178	100
38	16	16	24.2
39	10	10	16.1
40	40	40	54.5
41	40	40	54.5
42	35	35	47.4
43	40	40	54.5
44	51	51	75.7
45	32	32	42.4
46	35	35	47.4
47	42	42	61.6
48	55	55	81.8
49	43	43	65.6
50	53	53	77.7
51	39	39	52.5
52	30	30	38.3
53	22	22	29.2
54	11	11	20.2
55	57	57	82.8
56	11	11	20.2
57	25	25	34.3
58	53	53	77.7
59	49	49	72.7
60	32	32	42.4
61	25	25	34.3
62	46	46	69.6
63	15	15	23.2
64	20	20	25.2
65	10	10	16.1
66	21	21	28.2
67	20	20	25.2
68	79	79	92.9
69	<2	1	0
70	31	31	41.4
71	54	54	79.7
72	24	24	32.3
73	45	45	67.6
74	43	43	65.6
75	30	30	38.3
76	62	62	85.8
77	27	27	36.3
78	106	106	98.9
79	96	96	95.9
80	84	84	94.9
81	32	32	42.4
82	66	66	88.8
83	40	40	54.5
84	61	61	83.8
85	40	40	54.5
86	50	50	74.7
87	102	102	97.9
88	41	41	60.6
89	23	23	31.3
90	98	98	96.9
91	63	63	87.8
92	42	42	61.6
93	72	72	90.9
94	62	62	85.8
95	73	73	91.9
96	46	46	69.6
97	24	24	32.3
98	40	40	54.5
99	30	30	38.3
100	45	45	67.6

count	size (mm)	Size (m replac "<2" wi 1
1	<2	1
2	<2	1
3	<2	1
4	<2	1
5	<2	1
6	<2	1
7	<2	1
8	<2	1
9	<2	1
10	18	18
11	12	12
12	44	44
13	41	41
14	27	27
15	42	42
16	10	10
17	8	8
18	38	38
19	12	12
20	9	9
21	23	23
22	19	19
23	5	5
24	5	5
25	36	36
26	31	31
27	27	27
28	20	20
29	13	13
30	31	31
31	9	9
32	5	5
33	50	50
34	15	15
35	15	15
36	61	61
37	30	30
38	46	46
39	21	21
40	64	64
41	39	39
42	85	85
43	41	41
44	50	50
45	58	58
46	8	8
47	62	62
48	74	74
49	35	35
50	25	25
51	60	60
52	30	30
53	64	64
54	28	28
55	32	32
56	72	72
57	38	38
58	89	89
59	86	86
60	47	47
61	30	30
62	26	26
63	53	53
64	21	21
65	80	80
66	110	110
67	45	45
68	39	39
69	<2	1
70	31	31
71	54	54
72	24	24
73	45	45
74	43	43
75	30	30
76	62	62
77	27	27
78	106	106
79	96	96
80	84	84
81	32	32
82	66	66
83	40	40
84	61	61
85	40	40
86	50	50
87	102	102
88	41	41
89	23	23
90	98	98
91	63	63
92	42	42
93	72	72
94	62	62
95	73	73
96	46	46
97	24	24
98	40	40
99	30	30
100	45	45

30	16	13	70	-5.5	28	8	11	72	-5.5	36	20	8	64	-5.5	21	13	13	79	-5.5	12	8	15
14	6	16	86	-6.0	20	10	8	80	-6.0	16	16	20	84	-6.0	8	7	13	92	-6.0	4	2	8
8	6	6	92	-6.5	10	7	10	90	-6.5	0	0	16	100	-6.5	1	0	7	99	-6.5	2	0	2
2	2	6	98	-7.0	3	3	7	97	-7.0	0	0	0	100	-7.0	1	1	0	99	-7.0	2	2	0
0	0	2	100	-7.5	0	0	3	100	-7.5	0	0	0	100	-7.5	0	0	1	100	-7.5	0	0	2
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
15	21	-3.0	-3.5	8	15	18	-3.0	-3.5	9	14	19	-2.5	-3.0	7	14	17	-2.5	-3.0	7	#N/A	#N/A	#N/
21	32	-3.5	-4.0	13	18	32	-3.5	-4.0	13	23	31	-3.5	-4.0	12	22	38	-3.5	-4.0	12	#N/A	#N/A	#N/
39	57	-4.5	-5.0	28	41	61	-4.5	-5.0	26	42	56	-4.5	-5.0	28	50	66	-4.5	-5.0	23	48	59	-4.
70	86	-5.5	-6.0	50	72	80	-5.5	-6.0	51	64	84	-5.5	-6.0	55	66	79	-5.0	-5.5	41	73	88	-5.
70	86	-5.5	-6.0	61	80	90	-6.0	-6.5	73	84	100	-6.0	-9.0	64	79	92	-5.5	-6.0	52	73	88	-5.
86	92	-6.0	-6.5	80	90	97	-6.5	-7.0	90	84	100	-6.0	-9.0	140	79	92	-5.5	-6.0	61	88	96	-5.

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (repla "<2" w 1
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1
7	35	35	58.5	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1
8	18	18	32.3	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1
9	25	25	43.4	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1
10	29	29	49.4	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1
11	9	9	15.1	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2	1
12	16	16	30.3	12	20	20	34.3	12	<2	1	0	12	<2	1	0	12	<2	1
13	8	8	12.1	13	29	29	53.5	13	25	25	45.4	13	31	31	61.6	13	<2	1
14	15	15	25.2	14	19	19	32.3	14	63	63	83.8	14	57	57	89.8	14	<2	1
15	21	21	36.3	15	23	23	41.4	15	58	58	76.7	15	12	12	22.2	15	<2	1
16	8	8	12.1	16	50	50	73.7	16	26	26	50.5	16	23	23	50.5	16	<2	1
17	18	18	32.3	17	45	45	70.7	17	28	28	52.5	17	36	36	69.6	17	<2	1
18	65	65	86.8	18	20	20	34.3	18	66	66	85.8	18	64	64	91.9	18	<2	1
19	14	14	23.2	19	29	29	53.5	19	53	53	73.7	19	16	16	33.3	19	<2	1
20	28	28	48.4	20	85	85	86.8	20	37	37	58.5	20	10	10	20.2	20	<2	1
21	64	64	85.8	21	12	12	18.1	21	26	26	50.5	21	30	30	57.5	21	<2	1
22	34	34	57.5	22	29	29	53.5	22	23	23	42.4	22	22	22	48.4	22	<2	1
23	6	6	9	23	38	38	62.6	23	31	31	53.5	23	46	46	79.7	23	<2	1
24	4	4	6	24	20	20	34.3	24	17	17	31.3	24	48	48	82.8	24	<2	1
25	46	46	70.7	25	46	46	72.7	25	10	10	22.2	25	35	35	67.6	25	<2	1
26	40	40	62.6	26	7	7	14.1	26	9	9	19.1	26	21	21	47.4	26	<2	1
27	50	50	74.7	27	33	33	61.6	27	4	4	12.1	27	12	12	22.2	27	<2	1
28	54	54	78.7	28	52	52	76.7	28	80	80	95.9	28	14	14	26.2	28	<2	1
29	6	6	9	29	61	61	78.7	29	38	38	59.5	29	16	16	33.3	29	<2	1
30	130	130	98.9	30	40	40	63.6	30	25	25	45.4	30	68	68	93.9	30	<2	1
31	19	19	35.3	31	19	19	32.3	31	66	66	85.8	31	54	54	87.8	31	<2	1
32	32	32	56.5	32	42	42	69.6	32	4	4	12.1	32	47	47	80.8	32	<2	1
33	10	10	16.1	33	14	14	23.2	33	7	7	14.1	33	32	32	63.6	33	<2	1
34	24	24	39.3	34	76	76	83.8	34	25	25	45.4	34	51	51	85.8	34	<2	1
35	47	47	73.7	35	12	12	18.1	35	14	14	26.2	35	10	10	20.2	35	<2	1
36	60	60	83.8	36	27	27	48.4	36	12	12	23.2	36	4	4	13.1	36	<2	1
37	15	15	25.2	37	146	146	98.9	37	19	19	33.3	37	32	32	63.6	37	<2	1
38	15	15	25.2	38	25	25	43.4	38	15	15	28.2	38	16	16	33.3	38	<2	1
39	10	10	16.1	39	112	112	96.9	39	9	9	19.1	39	90	90	98.9	39	41	41
40	18	18	32.3	40	92	92	90.9	40	61	61	82.8	40	19	19	42.4	40	17	17
41	8	8	12.1	41	150	150	100	41	90	90	100	41	14	14	26.2	41	30	30
42	4	4	6	42	100	100	93.9	42	58	58	76.7	42	20	20	44.4	42	42	42
43	24	24	39.3	43	45	45	70.7	43	21	21	36.3	43	23	23	50.5	43	45	45
44	40	40	62.6	44	40	40	63.6	44	22	22	39.3	44	36	36	69.6	44	26	26
45	26	26	45.4	45	65	65	80.8	45	23	23	42.4	45	27	27	52.5	45	12	12
46	29	29	49.4	46	50	50	73.7	46	20	20	34.3	46	78	78	96.9	46	27	27
47	21	21	36.3	47	80	80	84.8	47	65	65	84.8	47	22	22	48.4	47	65	65
48	24	24	39.3	48	22	22	39.3	48	20	20	34.3	48	9	9	17.1	48	17	17
49	30	30	53.5	49	28	28	51.5	49	54	54	74.7	49	33	33	66.6	49	24	24
50	38	38	60.6	50	12	12	18.1	50	35	35	56.5	50	7	7	14.1	50	18	18
51	14	14	23.2	51	26	26	47.4	51	15	15	28.2	51	12	12	22.2	51	30	30
52	46	46	70.7	52	50	50	73.7	52	25	25	45.4	52	15	15	29.2	52	42	42
53	11	11	18.1	53	98	98	92.9	53	45	45	63.6	53	78	78	96.9	53	56	56
54	100	100	92.9	54	22	22	39.3	54	14	14	26.2	54	14	14	26.2	54	38	38
55	38	38	60.6	55	10	10	15.1	55	52	52	71.7	55	36	36	69.6	55	30	30
56	30	30	53.5	56	23	23	41.4	56	68	68	89.8	56	30	30	57.5	56	44	44
57	120	120	96.9	57	110	110	94.9	57	8	8	16.1	57	19	19	42.4	57	25	25
58	100	100	92.9	58	32	32	58.5	58	25	25	45.4	58	60	60	90.9	58	60	60
59	130	130	98.9	59	12	12	18.1	59	85	85	98.9	59	72	72	94.9	59	34	34
60	15	15	25.2	60	27	27	48.4	60	13	13	24.2	60	9	9	17.1	60	22	22
61	42	42	65.6	61	63	63	79.7	61	56	56	75.7	61	16	16	33.3	61	23	23
62	55	55	79.7	62	15	15	25.2	62	49	49	67.6	62	67	67	92.9	62	30	30
63	29	29	49.4	63	15	15	25.2	63	80	80	95.9	63	12	12	22.2	63	71	71
64	51	51	75.7	64	40	40	63.6	64	23	23	42.4	64	8	8	15.1	64	55	55
65	55	55	79.7	65	85	85	86.8	65	9	9	19.1	65	38	38	73.7	65	19	19
66	12	12	21.2	66	85	85	86.8	66	78	78	93.9	66	20	20	44.4	66	44	44
67	15	15	25.2	67	145	145	97.9	67	50	50	69.6	67	8	8	15.1	67	11	11
68	57	57	81.8	68	55	55	77.7	68	13	13	24.2	68	9	9	17.1	68	50	50
69	65	65	86.8	69	40	40	63.6	69	7	7	14.1	69	27	27	52.5	69	35	35
70	85	85	91.9	70	25	25	43.4	70	70	70	90.9	70	15	15	29.2	70	60	60
71	25	25	43.4	71	14	14	23.2	71	31	31	53.5	71	47	47	80.8	71	20	20
72	51	51	75.7	72	110	110	94.9	72	50	50	69.6	72	56	56	88.8	72	19	19
73	120	120	96.9	73	32	32	58.5	73	18	18	32.3	73	35	35	67.6	73	43	43
74	45	45	68.6	74	10	10	15.1	74	60	60	80.8	74	37	37	72.7	74	7	7
75	26	26	45.4	75	28	28	51.5	75	40	40	60.6	75	29	29	55.5	75	8	8
76	30	30	53.5	76	30	30	57.5	76	8	8	16.1	76	17	17	38.3	76	15	15
77	13	13	22.2	77	70	70	82.8	77	40	40	60.6	77	50	50	84.8	77	150	150
78	40	40	62.6	78	29	29	53.5	78	35	35	56.5	78	38	38	73.7	78	34	34
79	22	22	38.3	79	40	40	63.6	79	48	48	64.6	79	72	72	94.9	79	9	9
80	45	45	68.6	80	15	15	25.2	80	44	44	62.6	80	32	32	63.6	80	46	46
81	60	60	83.8	81	6	6	13.1	81	71	71	91.9	81	<2	1	0	81	<2	1
82	29	29	49.4	82	41	41	68.6	82	49	49	67.6	82	20	20	44.4	82	20	20
83	11	11	18.1	83	82	82	85.8	83	21	21	36.3	83	40	40	75.7	83	40	40
84	35	35	58.5	84	32	32	58.5	84	22	22	39.3	84	31	31	61.6	84	31	31
85	46	46	70.7	85	65	65	80.8	85	66	66	85.8	85	17	17	38.3	85	17	17
86	75	75	90.9	86	15	15	25.2	86	22	22	39.3	86	16	16	33.3	86	16	16
87	65	65	86.8	87	10	10	15.1	87	21	21	36.3	87	15	15	29.2	87	15	15
88	53	53	77.7	88	16	16	31.3	88	52	52	71.7	88	18	18	40.4	88	18	18
89	24	24	39.3	89	15	15	25.2	89	48	48	64.6	89	15	15	29.2	89	15	15
90	100	100	92.9	90	15	15	25.2	90	48	48	64.6	90	40	40	75.7	90	40	40
91	66	66	89.8	91	12	12	18.1	91	58	58	76.7	91	160	160	100	91	160	160
92	44	44	67.6	92	27	27	48.4	92	8	8	16.1	92	29	29	55.5	92	29	29
93	42	42	65.6	93	20	20	34.3	93	66	66	85.8	93	52	52	86.8	93	52	52
94	110	110	95.9	94	21	21	38.3	94	60	60	80.8	94	30	30	57.5	94	30	30
95	26	26	45.4	95	94	94	91.9	95	81	81	97.9	95	42	42	78.7	95	42	42
96	6	6	9	96	85	85	86.8	96	77	77	92.9	96	40	40	75.7	96	40	40
97	11	11	18.1	97	25	25	43.4	97	78	78	93.9	97	30	30	57.5	97	30	30
98	59	59	82.8	98	25	25	43.4	98	16	16	30.3	98	27	27	52.5	98	27	27
99	16	16	30.3	99	4	4	11.1	99	32	32	55.5	99	48	48	82.8	99	48	48
100	5	5	8	100	5	5	12.1	100	58	58	76.7	100	18	18	40.4	100	18	18

30	10	15	70	-5.5	33	17	13	67	-5.5	31	12	16	69	-5.5	30	12	21	70	-5.5	29	18
20	15	10	80	-6.0	16	7	17	84	-6.0	19	8	12	81	-6.0	18	11	12	82	-6.0	11	5
5	4	15	95	-6.5	9	6	7	91	-6.5	11	10	8	89	-6.5	7	4	11	93	-6.5	6	4
1	1	4	99	-7.0	3	2	6	97	-7.0	1	0	10	99	-7.0	3	2	4	97	-7.0	2	1
0	0	1	100	-7.5	1	1	2	99	-7.5	1	1	0	99	-7.5	1	1	2	99	-7.5	1	1
0	0	0	100	-8.0	0	0	1	100	-8.0	0	0	1	100	-8.0	0	0	1	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**

				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
12	18	-2.5	-3.0	7	16	18	-3.0	-3.5	8	15	22	-3.0	-3.5	8	#N/A	#N/A	#N/A	#N/A	#N/A	15	17	-
20	29	-3.5	-4.0	14	18	27	-3.5	-4.0	15	22	31	-3.5	-4.0	13	22	28	-3.5	-4.0	13	20	32	-
37	55	-4.5	-5.0	29	39	54	-4.5	-5.0	29	38	53	-4.5	-5.0	30	49	70	-5.0	-5.5	33	46	59	-
70	80	-5.5	-6.0	54	67	84	-5.5	-6.0	53	69	81	-5.5	-6.0	54	70	82	-5.5	-6.0	52	71	89	-
80	95	-6.0	-6.5	70	84	91	-6.0	-6.5	64	81	89	-6.0	-6.5	73	82	93	-6.0	-6.5	68	71	89	-
80	95	-6.0	-6.5	80	84	91	-6.0	-6.5	86	89	99	-6.5	-7.5	96	82	93	-6.0	-6.5	82	89	94	-

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	<2	1	0	9	<2	1	0	9	50	50	72.7	9	<2	1	0	9	<2
10	74	74	84.8	10	18	18	29.2	10	30	30	45.4	10	<2	1	0	10	<2
11	40	40	62.6	11	4	4	10.1	11	35	35	54.5	11	<2	1	0	11	<2
12	46	46	70.7	12	5	5	11.1	12	23	23	38.3	12	<2	1	0	12	<2
13	70	70	81.8	13	120	120	96.9	13	24	24	39.3	13	<2	1	0	13	11
14	90	90	93.9	14	24	24	39.3	14	39	39	61.6	14	<2	1	0	14	5
15	115	115	95.9	15	61	61	80.8	15	29	29	42.4	15	<2	1	0	15	18
16	15	15	26.2	16	8	8	15.1	16	16	16	30.3	16	<2	1	0	16	16
17	55	55	77.7	17	24	24	39.3	17	45	45	66.6	17	<2	1	0	17	56
18	70	70	81.8	18	89	89	89.8	18	14	14	24.2	18	<2	1	0	18	13
19	45	45	68.6	19	32	32	51.5	19	72	72	82.8	19	<2	1	0	19	4
20	23	23	37.3	20	45	45	65.6	20	100	100	92.9	20	92	92	93.9	20	47
21	12	12	20.2	21	19	19	30.3	21	10	10	16.1	21	35	35	50.5	21	27
22	50	50	72.7	22	167	167	98.9	22	36	36	60.6	22	40	40	57.5	22	32
23	50	50	72.7	23	30	30	50.5	23	55	55	77.7	23	61	61	78.7	23	18
24	38	38	59.5	24	89	89	89.8	24	48	48	70.7	24	79	79	87.8	24	47
25	3	3	9	25	91	91	91.9	25	54	54	76.7	25	101	101	95.9	25	113
26	8	8	17.1	26	44	44	64.6	26	10	10	16.1	26	50	50	73.7	26	12
27	41	41	64.6	27	133	133	97.9	27	80	80	85.8	27	155	155	97.9	27	128
28	52	52	75.7	28	48	48	68.6	28	79	79	84.8	28	62	62	81.8	28	11
29	38	38	59.5	29	7	7	13.1	29	120	120	98.9	29	79	79	87.8	29	48
30	7	7	13.1	30	42	42	61.6	30	75	75	83.8	30	21	21	31.3	30	46
31	49	49	71.7	31	83	83	88.8	31	15	15	26.2	31	185	185	100	31	34
32	120	120	97.9	32	62	62	83.8	32	50	50	72.7	32	66	66	83.8	32	91
33	60	60	79.7	33	185	185	100	33	55	55	77.7	33	49	49	72.7	33	21
34	125	125	98.9	34	53	53	71.7	34	85	85	87.8	34	21	21	31.3	34	210
35	27	27	43.4	35	61	61	80.8	35	20	20	33.3	35	22	22	36.3	35	72
36	19	19	31.3	36	26	26	42.4	36	80	80	85.8	36	40	40	57.5	36	51
37	148	148	100	37	58	58	75.7	37	30	30	45.4	37	60	60	77.7	37	45
38	43	43	65.6	38	41	41	60.6	38	110	110	97.9	38	22	22	36.3	38	36
39	13	13	22.2	39	49	49	69.6	39	50	50	72.7	39	17	17	28.2	39	19
40	4	4	10.1	40	108	108	94.9	40	20	20	33.3	40	75	75	86.8	40	19
41	9	9	18.1	41	72	72	85.8	41	19	19	31.3	41	51	51	74.7	41	16
42	7	7	13.1	42	9	9	16.1	42	32	32	52.5	42	11	11	21.2	42	51
43	12	12	20.2	43	33	33	54.5	43	35	35	54.5	43	10	10	20.2	43	21
44	7	7	13.1	44	21	21	36.3	44	11	11	20.2	44	85	85	89.8	44	45
45	25	25	38.3	45	42	42	61.6	45	24	24	39.3	45	34	34	49.4	45	73
46	55	55	77.7	46	26	26	42.4	46	30	30	45.4	46	90	90	91.9	46	30
47	29	29	47.4	47	99	99	93.9	47	26	26	41.4	47	13	13	22.2	47	12
48	5	5	11.1	48	26	26	42.4	48	9	9	15.1	48	29	29	43.4	48	30
49	32	32	53.5	49	45	45	65.6	49	6	6	12.1	49	36	36	53.5	49	29
50	53	53	76.7	50	17	17	27.2	50	15	15	26.2	50	110	110	96.9	50	14
51	32	32	53.5	51	40	40	58.5	51	5	5	10.1	51	35	35	50.5	51	21
52	74	74	84.8	52	5	5	11.1	52	12	12	22.2	52	90	90	91.9	52	61
53	73	73	83.8	53	55	55	73.7	53	7	7	13.1	53	15	15	25.2	53	17
54	6	6	12.1	54	20	20	32.3	54	4	4	8	54	21	21	31.3	54	21
55	65	65	80.8	55	38	38	57.5	55	34	34	53.5	55	32	32	47.4	55	59
56	20	20	32.3	56	56	56	74.7	56	15	15	26.2	56	40	40	57.5	56	46
57	29	29	47.4	57	26	26	42.4	57	15	15	26.2	57	23	23	39.3	57	49
58	16	16	28.2	58	46	46	67.6	58	105	105	96.9	58	36	36	53.5	58	25
59	10	10	19.1	59	14	14	19.1	59	45	45	66.6	59	43	43	65.6	59	83
60	15	15	26.2	60	27	27	47.4	60	35	35	54.5	60	19	19	29.2	60	14
61	26	26	41.4	61	3	3	9	61	10	10	16.1	61	13	13	22.2	61	25
62	22	22	35.3	62	35	35	56.5	62	12	12	22.2	62	162	162	98.9	62	7
63	14	14	25.2	63	32	32	51.5	63	5	5	10.1	63	41	41	63.6	63	42
64	43	43	65.6	64	26	26	42.4	64	42	42	65.6	64	25	25	40.4	64	56
65	81	81	89.8	65	51	51	70.7	65	35	35	54.5	65	55	55	76.7	65	17
66	83	83	90.9	66	21	21	36.3	66	19	19	31.3	66	36	36	53.5	66	52
67	27	27	43.4	67	74	74	87.8	67	29	29	42.4	67	14	14	24.2	67	26
68	30	30	50.5	68	59	59	78.7	68	102	102	95.9	68	44	44	67.6	68	7
69	90	90	93.9	69	14	14	19.1	69	40	40	62.6	69	44	44	67.6	69	20
70	7	7	13.1	70	9	9	16.1	70	30	30	45.4	70	29	29	43.4	70	40
71	25	25	38.3	71	16	16	22.2	71	51	51	75.7	71	9	9	19.1	71	15
72	88	88	92.9	72	16	16	22.2	72	194	194	100	72	40	40	57.5	72	5
73	30	30	50.5	73	67	67	84.8	73	62	62	80.8	73	61	61	78.7	73	54
74	86	86	91.9	74	61	61	80.8	74	41	41	64.6	74	94	94	94.9	74	42
75	34	34	55.5	75	24	24	39.3	75	92	92	89.8	75	69	69	85.8	75	101
76	25	25	38.3	76	16	16	22.2	76	22	22	37.3	76	31	31	46.4	76	13
77	30	30	50.5	77	15	15	21.2	77	30	30	45.4	77	22	22	36.3	77	178
78	21	21	34.3	78	42	42	61.6	78	11	11	20.2	78	85	85	89.8	78	32
79	39	39	61.6	79	32	32	51.5	79	4	4	8	79	61	61	78.7	79	26
80	37	37	57.5	80	73	73	86.8	80	20	20	33.3	80	25	25	40.4	80	18
81	35	35	56.5	81	54	54	72.7	81	14	14	24.2	81	66	66	83.8	81	81
82	26	26	41.4	82	20	20	32.3	82	94	94	90.9	82	40	40	57.5	82	21
83	13	13	22.2	83	16	16	22.2	83	45	45	66.6	83	21	21	31.3	83	35
84	45	45	68.6	84	20	20	32.3	84	29	29	42.4	84	20	20	30.3	84	49
85	20	20	32.3	85	19	19	30.3	85	65	65	81.8	85	45	45	69.6	85	42
86	40	40	62.6	86	27	27	47.4	86	49	49	71.7	86	27	27	42.4	86	58
87	13	13	22.2	87	28	28	49.4	87	95	95	91.9	87	29	29	43.4	87	45
88	37	37	57.5	88	16	16	22.2	88	100	100	92.9	88	42	42	64.6	88	33
89	18	18	29.2	89	13	13	18.1	89	30	30	45.4	89	32	32	47.4	89	32
90	29	29	47.4	90	22	22	38.3	90	35	35	54.5	90	16	16	27.2	90	10
91	22	22	35.3	91	58	58	75.7	91	40	40	62.6	91	65	65	82.8	91	31
92	27	27	43.4	92	34	34	55.5	92	90	90	88.8	92	15	15	25.2	92	12
93	80	80	88.8	93	60	60	79.7	93	20	20	33.3	93	36	36	53.5	93	15
94	44	44	67.6	94	7	7	13.1	94	101	101	94.9	94	21	21	31.3	94	55
95	27	27	43.4	95	17	17	27.2	95	7	7	13.1	95	51	51	74.7	95	87
96	50	50	72.7	96	95	95	92.9	96	35	35	54.5	96	43	43	65.6	96	20
97	115	115	95.9	97	40	40	58.5	97	61	61	79.7	97	46	46	70.7	97	12
98	79	79	87.8	98	20	20	32.3	98	46	46	69.6	98	40	40	57.5	98	64
99	78	78	86.8	99	58	58	75.7	99	10	10	16.1	99	35	35	50.5	99	41
100	18	18	29.2	100	112	112	95.9	100	31	31	51.5	100	46	46	70.7	100	29

38	16	20	62	-5.5	36	14	16	64	-5.5	33	19	14	67	-5.5	32	17	16	68	-5.5	26	12
22	16	16	78	-6.0	22	20	14	78	-6.0	14	10	19	86	-6.0	15	10	17	85	-6.0	14	11
6	2	16	94	-6.5	2	2	20	98	-6.5	4	3	10	96	-6.5	5	3	10	95	-6.5	3	1
4	4	2	96	-7.0	0	0	2	100	-7.0	1	1	3	99	-7.0	2	1	3	98	-7.0	2	1
0	0	4	100	-7.5	0	0	0	100	-7.5	0	0	1	100	-7.5	1	1	1	99	-7.5	1	1
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	1	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
15	18	-3.0	-3.5	9	12	17	-3.0	-3.5	11	16	18	-3.0	-3.5	8	#N/A	#N/A	#N/A	#N/A	#N/A	15	19
22	31	-4.0	-4.5	18	23	29	-4.0	-4.5	18	23	37	-4.0	-4.5	17	25	33	-3.0	-3.5	8	23	31
42	62	-5.0	-5.5	37	48	64	-5.0	-5.5	33	37	53	-4.5	-5.0	30	39	52	-4.5	-5.0	30	44	57
62	78	-5.5	-6.0	60	64	78	-5.5	-6.0	59	67	86	-5.5	-6.0	52	68	85	-5.5	-6.0	52	74	86
78	94	-6.0	-6.5	73	78	98	-6.0	-6.5	71	67	86	-5.5	-6.0	62	68	85	-5.5	-6.0	63	74	86
78	94	-6.0	-6.5	83	78	98	-6.0	-6.5	79	86	96	-6.0	-6.5	73	85	95	-6.0	-6.5	76	86	97

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	1	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	1	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	1	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	1	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	1	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	1	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	1	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	1	8	<2	1	0	8	<2	1	0	8	<2
9	<2	1	0	9	<2	20	26.2	9	<2	1	0	9	<2	1	0	9	<2
10	<2	1	0	10	20	50	64.6	10	<2	1	0	10	<2	1	0	10	<2
11	9	9	15.1	11	50	19	24.2	11	<2	1	0	11	<2	1	0	11	<2
12	4	4	10.1	12	19	30	43.4	12	<2	1	0	12	<2	1	0	12	<2
13	31	31	39.3	13	30	24	29.2	13	51	51	72.7	13	<2	1	0	13	<2
14	25	25	32.3	14	24	43	59.5	14	30	30	47.4	14	<2	1	0	14	<2
15	74	74	85.8	15	43	39	52.5	15	10	10	16.1	15	<2	1	0	15	<2
16	13	13	18.1	16	39	30	43.4	16	15	15	21.2	16	<2	1	0	16	32
17	76	76	86.8	17	30	56	71.7	17	37	37	56.5	17	<2	1	0	17	63
18	18	18	23.2	18	56	25	31.3	18	100	100	97.9	18	<2	1	0	18	20
19	57	57	69.6	19	25	4	9	19	25	25	39.3	19	<2	1	0	19	38
20	43	43	57.5	20	4	25	31.3	20	55	55	77.7	20	<2	1	0	20	32
21	52	52	66.6	21	25	22	28.2	21	97	97	96.9	21	<2	1	0	21	17
22	27	27	34.3	22	22	25	31.3	22	8	8	13.1	22	<2	1	0	22	6
23	20	20	26.2	23	25	10	13.1	23	20	20	29.2	23	33	33	52.5	23	71
24	18	18	23.2	24	10	6	11.1	24	61	61	84.8	24	30	30	48.4	24	47
25	28	28	36.3	25	6	34	48.4	25	18	18	27.2	25	14	14	33.3	25	17
26	70	70	82.8	26	34	68	81.8	26	68	68	88.8	26	23	23	39.3	26	9
27	70	70	82.8	27	68	11	14.1	27	44	44	63.6	27	28	28	45.4	27	14
28	40	40	50.5	28	11	35	49.4	28	76	76	91.9	28	25	25	44.4	28	17
29	37	37	48.4	29	35	11	14.1	29	24	24	37.3	29	71	71	88.8	29	12
30	17	17	22.2	30	11	65	78.7	30	8	8	13.1	30	68	68	86.8	30	19
31	48	48	63.6	31	65	29	41.4	31	52	52	73.7	31	44	44	67.6	31	41
32	35	35	45.4	32	29	16	20.2	32	54	54	76.7	32	28	28	45.4	32	29
33	29	29	38.3	33	16	19	24.2	33	44	44	63.6	33	36	36	57.5	33	10
34	25	25	32.3	34	19	25	31.3	34	47	47	69.6	34	11	11	27.2	34	26
35	47	47	62.6	35	25	26	38.3	35	140	140	100	35	24	24	42.4	35	72
36	15	15	20.2	36	26	44	60.6	36	78	78	95.9	36	76	76	91.9	36	19
37	24	24	31.3	37	44	18	23.2	37	32	32	49.4	37	22	22	38.3	37	8
38	69	69	81.8	38	18	51	68.6	38	47	47	69.6	38	51	51	73.7	38	21
39	34	34	44.4	39	51	42	57.5	39	16	16	22.2	39	61	61	82.8	39	6
40	8	8	14.1	40	42	28	40.4	40	32	32	49.4	40	35	35	54.5	40	27
41	100	100	94.9	41	28	25	31.3	41	40	40	57.5	41	11	11	27.2	41	47
42	33	33	42.4	42	25	74	89.8	42	77	77	93.9	42	46	46	68.6	42	11
43	40	40	50.5	43	74	9	12.1	43	68	68	88.8	43	35	35	54.5	43	27
44	60	60	74.7	44	9	73	86.8	44	47	47	69.6	44	20	20	35.3	44	43
45	21	21	30.3	45	73	29	41.4	45	12	12	18.1	45	41	41	63.6	45	24
46	4	4	10.1	46	29	30	43.4	46	57	57	79.7	46	65	65	85.8	46	48
47	27	27	34.3	47	30	66	80.8	47	3	3	12.1	47	39	39	60.6	47	6
48	130	130	96.9	48	66	73	86.8	48	58	58	81.8	48	39	39	60.6	48	19
49	36	36	47.4	49	73	65	78.7	49	25	25	39.3	49	74	74	89.8	49	12
50	170	170	100	50	65	24	29.2	50	11	11	17.1	50	11	11	27.2	50	37
51	140	140	97.9	51	24	50	64.6	51	67	67	86.8	51	54	54	74.7	51	39
52	43	43	57.5	52	50	70	83.8	52	18	18	27.2	52	69	69	87.8	52	44
53	20	20	26.2	53	70	80	91.9	53	27	27	45.4	53	83	83	93.9	53	77
54	88	88	89.8	54	80	63	76.7	54	32	32	49.4	54	50	50	72.7	54	11
55	65	65	78.7	55	63	14	17.1	55	57	57	79.7	55	46	46	68.6	55	25
56	40	40	50.5	56	14	71	85.8	56	62	62	85.8	56	92	92	95.9	56	115
57	32	32	40.4	57	71	45	61.6	57	36	36	55.5	57	46	46	68.6	57	72
58	80	80	87.8	58	45	16	20.2	58	21	21	32.3	58	24	24	42.4	58	48
59	62	62	77.7	59	16	90	96.9	59	76	76	91.9	59	55	55	76.7	59	23
60	65	65	78.7	60	90	45	61.6	60	34	34	53.5	60	34	34	53.5	60	44
61	33	33	42.4	61	45	25	31.3	61	27	27	45.4	61	205	205	100	61	45
62	32	32	40.4	62	25	26	38.3	62	8	8	13.1	62	59	59	79.7	62	17
63	68	68	80.8	63	26	15	18.1	63	26	26	44.4	63	150	150	98.9	63	74
64	42	42	56.5	64	15	56	71.7	64	46	46	67.6	64	100	100	96.9	64	36
65	9	9	15.1	65	56	30	43.4	65	24	24	37.3	65	120	120	97.9	65	22
66	60	60	74.7	66	30	63	76.7	66	25	25	39.3	66	85	85	94.9	66	15
67	160	160	98.9	67	63	41	55.5	67	17	17	23.2	67	20	20	35.3	67	40
68	88	88	89.8	68	41	80	91.9	68	71	71	90.9	68	76	76	91.9	68	41
69	58	58	71.7	69	80	50	64.6	69	77	77	93.9	69	62	62	83.8	69	12
70	58	58	71.7	70	50	50	64.6	70	67	67	86.8	70	29	29	47.4	70	32
71	38	38	49.4	71	50	61	75.7	71	55	55	77.7	71	20	20	35.3	71	77
72	45	45	60.6	72	61	90	96.9	72	41	41	61.6	72	30	30	48.4	72	20
73	40	40	50.5	73	90	69	82.8	73	17	17	23.2	73	35	35	54.5	73	74
74	90	90	91.9	74	69	80	91.9	74	35	35	54.5	74	42	42	66.6	74	66
75	45	45	60.6	75	80	82	95.9	75	60	60	82.8	75	59	59	79.7	75	33
76	50	50	64.6	76	82	45	61.6	76	40	40	57.5	76	19	19	34.3	76	29
77	71	71	84.8	77	45	60	73.7	77	120	120	98.9	77	40	40	62.6	77	76
78	56	56	68.6	78	60	53	69.6	78	46	46	67.6	78	23	23	39.3	78	27
79	58	58	71.7	79	53	75	90.9	79	45	45	65.6	79	11	11	27.2	79	61
80	80	80	87.8	80	75	40	53.5	80	52	52	73.7	80	41	41	63.6	80	70
81	20	20	26.2	81	40	42	57.5	81	32	32	49.4	81	23	23	39.3	81	57
82	40	40	50.5	82	42	110	100	82	40	40	57.5	82	54	54	74.7	82	14
83	90	90	91.9	83	110	100	98.9	83	52	52	73.7	83	10	10	25.2	83	54
84	90	90	91.9	84	100	73	86.8	84	60	60	82.8	84	8	8	24.2	84	12
85	20	20	26.2	85	73	80	91.9	85	30	30	47.4	85	30	30	48.4	85	150
86	35	35	45.4	86	80	40	53.5	86	21	21	32.3	86	63	63	84.8	86	63
87	115	115	95.9	87	40	31	47.4	87	17	17	23.2	87	4	4	22.2	87	73
88	15	15	20.2	88	31	41	55.5	88	40	40	57.5	88	47	47	71.7	88	53
89	50	50	64.6	89	41	70	83.8	89	25	25	39.3	89	75	75	90.9	89	190
90	53	53	67.6	90	70	16	20.2	90	14	14	20.2	90	36	36	57.5	90	42
91	44	44	59.5	91	16	38	51.5	91	20	20	29.2	91	11	11	27.2	91	22
92	40	40	50.5	92	38	35	49.4	92	43	43	62.6	92	41	41	63.6	92	18
93	57	57	69.6	93	35	11	14.1	93	25	25	39.3	93	56	56	78.7	93	40
94	60	60	74.7	94	11	25	31.3	94	22	22	35.3	94	10	10	25.2	94	15
95	5	5	12.1	95	25	60	73.7	95	12	12	18.1	95	5	5	23.2	95	52
96	28	28	36.3	96	60	4	9	96	45	45	65.6	96	37	37	59.5	96	59
97	10	10	17.1	97	4	20	26.2	97	20	20	29.2	97	11	11	27.2	97	43
98	5	5	12.1	98	20	15	18.1	98	17	17	23.2	98	55	55	76.7	98	23
99	19	19	25.2	99	15	54	70.7	99	22	22	35.3	99	60	60	81.8	99	41
100	13	13	18.1	100	54	0	0	100	21	21	32.3	100	32	32	51.5	100	40

41	17	12	59	-5.5	38	18	17	62	-5.5	48	23	14	52	-5.5	41	12	13	59	-5.5	29	12
24	15	17	76	-6.0	20	11	18	80	-6.0	25	16	23	75	-6.0	29	16	12	71	-6.0	17	13
9	5	15	91	-6.5	9	8	11	91	-6.5	9	6	16	91	-6.5	13	9	16	87	-6.5	4	1
4	4	5	96	-7.0	1	1	8	99	-7.0	3	3	6	97	-7.0	4	4	9	96	-7.0	3	2
0	0	4	100	-7.5	0	0	1	100	-7.5	0	0	3	100	-7.5	0	0	4	100	-7.5	1	1
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
12	17	-3.5	-4.0	15	14	17	-3.0	-3.5	10	16	24	-4.0	-4.5	16	11	19	-2.5	-3.0	7	16	17
17	26	-4.0	-4.5	22	21	34	-4.0	-4.5	18	24	38	-4.5	-5.0	23	23	27	-3.5	-4.0	13	23	30
47	59	-5.0	-5.5	35	45	62	-5.0	-5.5	35	38	52	-5.0	-5.5	43	46	59	-5.0	-5.5	36	38	54
59	76	-5.5	-6.0	63	62	80	-5.5	-6.0	58	75	91	-6.0	-6.5	64	71	87	-6.0	-6.5	70	71	83
76	91	-6.0	-6.5	77	80	91	-6.0	-6.5	72	75	91	-6.0	-6.5	78	71	87	-6.0	-6.5	84	83	96
76	91	-6.0	-6.5	88	80	91	-6.0	-6.5	87	75	91	-6.0	-6.5	88	87	96	-6.5	-7.0	101	83	96

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	10	10	8	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	69	69	79.7	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	25	25	29.2	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	170	170	100	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	25	25	29.2	7	<2	1	0	7	52	52	61.6	7	<2	1	0	7	<2
8	17	17	17.1	8	<2	1	0	8	25	25	26.2	8	<2	1	0	8	<2
9	10	10	8	9	82	82	86.8	9	22	22	20.2	9	<2	1	0	9	<2
10	100	100	93.9	10	71	71	80.8	10	70	70	75.7	10	<2	1	0	10	<2
11	130	130	96.9	11	20	20	27.2	11	60	60	69.6	11	60	60	70.7	11	<2
12	14	14	13.1	12	29	29	39.3	12	75	75	82.8	12	36	36	48.4	12	<2
13	28	28	34.3	13	34	34	45.4	13	17	17	16.1	13	8	8	16.1	13	<2
14	57	57	69.6	14	42	42	55.5	14	45	45	49.4	14	8	8	16.1	14	<2
15	16	16	16.1	15	60	60	77.7	15	31	31	35.3	15	161	161	100	15	27
16	53	53	67.6	16	3	3	8	16	72	72	80.8	16	93	93	87.8	16	3
17	32	32	44.4	17	49	49	64.6	17	25	25	26.2	17	44	44	58.5	17	3
18	60	60	72.7	18	10	10	14.1	18	17	17	16.1	18	6	6	11.1	18	72
19	60	60	72.7	19	50	50	65.6	19	52	52	61.6	19	12	12	23.2	19	24
20	30	30	39.3	20	18	18	23.2	20	10	10	7	20	27	27	37.3	20	61
21	58	58	71.7	21	11	11	16.1	21	26	26	30.3	21	98	98	92.9	21	84
22	35	35	48.4	22	43	43	58.5	22	11	11	10.1	22	9	9	19.1	22	80
23	45	45	58.5	23	39	39	50.5	23	43	43	47.4	23	95	95	89.8	23	12
24	20	20	22.2	24	18	18	23.2	24	35	35	38.3	24	46	46	59.5	24	40
25	5	5	4	25	24	24	35.3	25	71	71	78.7	25	113	113	94.9	25	21
26	3	3	2	26	59	59	76.7	26	53	53	64.6	26	78	78	81.8	26	62
27	4	4	3	27	22	22	31.3	27	36	36	40.4	27	10	10	21.2	27	66
28	49	49	63.6	28	42	42	55.5	28	25	25	26.2	28	76	76	80.8	28	17
29	9	9	6	29	16	16	20.2	29	36	36	40.4	29	67	67	71.7	29	30
30	29	29	36.3	30	39	39	50.5	30	45	45	49.4	30	6	6	11.1	30	40
31	30	30	39.3	31	74	74	84.8	31	64	64	73.7	31	7	7	13.1	31	22
32	48	48	61.6	32	18	18	23.2	32	18	18	18.1	32	46	46	59.5	32	22
33	68	68	76.7	33	125	125	97.9	33	28	28	33.3	33	20	20	30.3	33	40
34	10	10	8	34	94	94	92.9	34	36	36	40.4	34	24	24	32.3	34	138
35	98	98	91.9	35	36	36	48.4	35	11	11	10.1	35	30	30	44.4	35	70
36	140	140	97.9	36	97	97	93.9	36	63	63	72.7	36	70	70	73.7	36	57
37	24	24	27.2	37	34	34	45.4	37	50	50	55.5	37	15	15	25.2	37	41
38	12	12	12.1	38	58	58	75.7	38	52	52	61.6	38	17	17	27.2	38	26
39	24	24	27.2	39	21	21	30.3	39	54	54	65.6	39	82	82	83.8	39	13
40	68	68	76.7	40	26	26	36.3	40	37	37	44.4	40	67	67	71.7	40	84
41	50	50	64.6	41	93	93	91.9	41	64	64	73.7	41	43	43	57.5	41	10
42	21	21	24.2	42	47	47	62.6	42	110	110	93.9	42	70	70	73.7	42	81
43	40	40	52.5	43	128	128	98.9	43	5	5	6	43	25	25	33.3	43	36
44	165	165	98.9	44	52	52	68.6	44	40	40	45.4	44	3	3	10.1	44	16
45	32	32	44.4	45	39	39	50.5	45	77	77	84.8	45	28	28	40.4	45	62
46	70	70	81.8	46	64	64	79.7	46	32	32	36.3	46	35	35	46.4	46	35
47	30	30	39.3	47	110	110	95.9	47	30	30	34.3	47	56	56	68.6	47	51
48	47	47	59.5	48	73	73	83.8	48	56	56	68.6	48	30	30	44.4	48	10
49	31	31	42.4	49	40	40	53.5	49	15	15	14.1	49	25	25	33.3	49	13
50	100	100	93.9	50	12	12	17.1	50	85	85	89.8	50	54	54	67.6	50	25
51	14	14	13.1	51	97	97	93.9	51	85	85	89.8	51	160	160	98.9	51	12
52	23	23	26.2	52	53	53	70.7	52	36	36	40.4	52	39	39	50.5	52	12
53	20	20	22.2	53	10	10	14.1	53	50	50	55.5	53	74	74	78.7	53	31
54	47	47	59.5	54	13	13	19.1	54	110	110	93.9	54	123	123	95.9	54	66
55	11	11	11.1	55	32	32	41.4	55	54	54	65.6	55	50	50	64.6	55	30
56	31	31	42.4	56	5	5	10.1	56	46	46	52.5	56	155	155	97.9	56	81
57	68	68	76.7	57	51	51	67.6	57	145	145	98.9	57	41	41	52.5	57	152
58	60	60	72.7	58	85	85	87.8	58	84	84	87.8	58	26	26	36.3	58	115
59	39	39	51.5	59	28	28	38.3	59	12	12	12.1	59	35	35	46.4	59	41
60	26	26	32.3	60	36	36	48.4	60	35	35	38.3	60	85	85	84.8	60	41
61	40	40	52.5	61	43	43	58.5	61	16	16	15.1	61	27	27	37.3	61	33
62	35	35	48.4	62	30	30	40.4	62	70	70	75.7	62	78	78	81.8	62	22
63	110	110	95.9	63	53	53	70.7	63	77	77	84.8	63	19	19	29.2	63	36
64	18	18	18.1	64	130	130	100	64	73	73	81.8	64	25	25	33.3	64	31
65	80	80	86.8	65	17	17	21.2	65	46	46	52.5	65	53	53	66.6	65	72
66	29	29	36.3	66	71	71	80.8	66	140	140	97.9	66	70	70	73.7	66	182
67	44	44	56.5	67	45	45	61.6	67	100	100	91.9	67	42	42	54.5	67	25
68	14	14	13.1	68	85	85	87.8	68	80	80	86.8	68	18	18	28.2	68	53
69	56	56	68.6	69	72	72	82.8	69	75	75	82.8	69	41	41	52.5	69	63
70	98	98	91.9	70	60	60	77.7	70	55	55	67.6	70	100	100	93.9	70	34
71	69	69	79.7	71	19	19	26.2	71	46	46	52.5	71	13	13	24.2	71	37
72	9	9	6	72	8	8	12.1	72	23	23	24.2	72	8	8	16.1	72	38
73	50	50	64.6	73	22	22	31.3	73	120	120	96.9	73	70	70	73.7	73	69
74	43	43	55.5	74	50	50	65.6	74	10	10	7	74	135	135	96.9	74	9
75	78	78	83.8	75	85	85	87.8	75	20	20	19.1	75	59	59	69.6	75	55
76	29	29	36.3	76	55	55	73.7	76	61	61	70.7	76	42	42	54.5	76	61
77	48	48	61.6	77	12	12	17.1	77	27	27	31.3	77	9	9	19.1	77	42
78	79	79	85.8	78	54	54	72.7	78	22	22	20.2	78	72	72	77.7	78	10
79	27	27	33.3	79	23	23	34.3	79	51	51	60.6	79	95	95	89.8	79	31
80	19	19	20.2	80	22	22	31.3	80	22	22	20.2	80	93	93	87.8	80	30
81	19	19	20.2	81	81	81	85.8	81	44	44	48.4	81	36	36	48.4	81	45
82	44	44	56.5	82	7	7	11.1	82	40	40	45.4	82	47	47	62.6	82	73
83	75	75	82.8	83	52	52	68.6	83	170	170	100	83	27	27	37.3	83	55
84	52	52	66.6	84	42	42	55.5	84	70	70	75.7	84	28	28	40.4	84	34
85	90	90	89.8	85	34	34	45.4	85	50	50	55.5	85	75	75	79.7	85	16
86	78	78	83.8	86	27	27	37.3	86	45	45	49.4	86	50	50	64.6	86	8
87	32	32	44.4	87	56	56	74.7	87	32	32	36.3	87	16	16	26.2	87	23
88	82	82	87.8	88	8	8	12.1	88	22	22	20.2	88	89	89	86.8	88	9
89	40	40	52.5	89	20	20	27.2	89	14	14	13.1	89	95	95	89.8	89	25
90	28	28	34.3	90	47	47	62.6	90	25	25	26.2	90	48	48	63.6	90	59
91	57	57	69.6	91	32	32	41.4	91	10	10	7	91	22	22	31.3	91	46
92	18	18	18.1	92	85	85	87.8	92	62	62	71.7	92	39	39	50.5	92	19
93	60	60	72.7	93	20	20	27.2	93	110	110	93.9	93	88	88	85.8	93	30
94	90	90	89.8	94	116	116	96.9	94	50	50	55.5	94	29	29	42.4	94	41
95	33	33	47.4	95	44	44	60.6	95	50	50	55.5	95	29	29	42.4	95	26
96	6	6	5	96	40	40	53.5	96	105	105	92.9	96	7	7	13.1	96	19
97	22	22	25.2	97	32	32	41.4	97	84	84	87.8	97	11	11	22.2	97	87
98	35	35	48.4	98	17	17	21.2	98	23	23	24.2	98	42	42	54.5	98	10
99	25	25	29.2	99	32	32	41.4	99	27	27	31.3	99	46	46	59.5	99	27
100	84	84	88.8	100	4	4	9	100	71	71	78.7	100	7	7	13.1	100	17

29	15	18	71	-5.5	48	32	12	52	-5.5	37	18	19	63	-5.5	30	11	9	70	-5.5	27	13
14	9	15	86	-6.0	16	13	32	84	-6.0	19	17	18	81	-6.0	19	17	11	81	-6.0	14	10
5	4	9	95	-6.5	3	3	13	97	-6.5	2	2	17	98	-6.5	2	2	17	98	-6.5	4	4
1	1	4	99	-7.0	0	0	3	100	-7.0	0	0	2	100	-7.0	0	0	2	100	-7.0	0	0
0	0	1	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	0	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
10	17	-2.5	-3.0	8	14	19	-3.0	-3.5	9	12	19	-3.5	-4.0	14	14	27	-3.5	-4.0	12	16	19
22	29	-3.5	-4.0	13	19	26	-3.5	-4.0	15	19	29	-4.0	-4.5	20	14	27	-3.5	-4.0	15	24	30
37	53	-4.5	-5.0	30	40	52	-5.0	-5.5	43	44	63	-5.0	-5.5	36	45	61	-4.5	-5.0	25	45	57
71	86	-5.5	-6.0	49	52	84	-5.5	-6.0	58	63	81	-5.5	-6.0	57	70	81	-5.5	-6.0	53	73	86
71	86	-5.5	-6.0	61	84	97	-6.0	-6.5	64	81	98	-6.0	-6.5	68	81	98	-6.0	-6.5	68	73	86
86	95	-6.0	-6.5	74	84	97	-6.0	-6.5	75	81	98	-6.0	-6.5	77	81	98	-6.0	-6.5	77	86	96

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	10	10	18.1
10	8	8	13.1
11	13	13	23.2
12	37	37	59.5
13	72	72	89.8
14	24	24	38.3
15	45	45	68.6
16	84	84	94.9
17	53	53	76.7
18	55	55	80.8
19	80	80	92.9
20	30	30	48.4
21	55	55	80.8
22	100	100	95.9
23	64	64	85.8
24	54	54	79.7
25	74	74	90.9
26	105	105	96.9
27	44	44	66.6
28	45	45	68.6
29	50	50	73.7
30	20	20	32.3
31	79	79	91.9
32	33	33	53.5
33	4	4	8
34	16	16	26.2
35	71	71	88.8
36	7	7	12.1
37	68	68	87.8
38	22	22	36.3
39	44	44	66.6
40	5	5	9
41	42	42	65.6
42	6	6	10.1
43	8	8	13.1
44	25	25	40.4
45	16	16	26.2
46	8	8	13.1
47	110	110	97.9
48	9	9	17.1
49	37	37	59.5
50	18	18	29.2
51	53	53	76.7
52	62	62	84.8
53	120	120	98.9
54	130	130	100
55	82	82	93.9
56	53	53	76.7
57	15	15	25.2
58	30	30	48.4
59	40	40	63.6
60	33	33	53.5
61	32	32	52.5
62	26	26	42.4
63	26	26	42.4
64	29	29	47.4
65	20	20	32.3
66	28	28	44.4
67	50	50	73.7
68	30	30	48.4
69	6	6	10.1
70	39	39	62.6
71	45	45	68.6
72	16	16	26.2
73	18	18	29.2
74	20	20	32.3
75	28	28	44.4
76	10	10	18.1
77	65	65	86.8
78	18	18	29.2
79	48	48	71.7
80	35	35	57.5
81	60	60	82.8
82	24	24	38.3
83	48	48	71.7
84	25	25	40.4
85	40	40	63.6
86	50	50	73.7
87	35	35	57.5
88	14	14	24.2
89	28	28	44.4
90	30	30	48.4
91	8	8	13.1
92	37	37	59.5
93	11	11	20.2
94	12	12	22.2
95	60	60	82.8
96	23	23	37.3
97	11	11	20.2
98	20	20	32.3
99	33	33	53.5
100	34	34	56.5

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	3	3	8
10	50	50	58.5
11	38	38	45.4
12	65	65	84.8
13	65	65	84.8
14	30	30	36.3
15	22	22	28.2
16	35	35	42.4
17	25	25	32.3
18	16	16	24.2
19	63	63	82.8
20	15	15	22.2
21	46	46	52.5
22	51	51	62.6
23	10	10	16.1
24	60	60	79.7
25	34	34	40.4
26	8	8	12.1
27	55	55	73.7
28	52	52	68.6
29	56	56	76.7
30	65	65	84.8
31	10	10	16.1
32	47	47	54.5
33	52	52	68.6
34	52	52	68.6
35	80	80	91.9
36	11	11	18.1
37	49	49	57.5
38	7	7	11.1
39	59	59	78.7
40	51	51	62.6
41	23	23	30.3
42	43	43	50.5
43	65	65	84.8
44	46	46	52.5
45	90	90	96.9
46	35	35	42.4
47	34	34	40.4
48	39	39	47.4
49	55	55	73.7
50	19	19	27.2
51	16	16	24.2
52	57	57	77.7
53	13	13	20.2
54	51	51	62.6
55	63	63	82.8
56	37	37	44.4
57	15	15	22.2
58	38	38	45.4
59	50	50	58.5
60	53	53	72.7
61	9	9	14.1
62	70	70	89.8
63	30	30	36.3
64	40	40	48.4
65	8	8	12.1
66	31	31	38.3
67	23	23	30.3
68	120	120	100
69	3	3	8
70	25	25	32.3
71	12	12	19.1
72	25	25	32.3
73	27	27	35.3
74	100	100	98.9
75	50	50	58.5
76	71	71	90.9
77	55	55	73.7
78	40	40	48.4
79	69	69	88.8
80	81	81	93.9
81	51	51	62.6
82	52	52	68.6
83	13	13	20.2
84	93	93	97.9
85	50	50	58.5
86	31	31	38.3
87	86	86	95.9
88	51	51	62.6
89	80	80	91.9
90	45	45	51.5
91	51	51	62.6
92	5	5	10.1
93	9	9	14.1
94	47	47	54.5
95	48	48	56.5
96	81	81	93.9
97	60	60	79.7
98	18	18	26.2
99	22	22	28.2
100	60	60	79.7

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	43	43	56.5
7	55	55	72.7
8	16	16	18.1
9	25	25	33.3
10	55	55	72.7
11	69	69	81.8
12	46	46	63.6
13	37	37	49.4
14	60	60	76.7
15	18	18	19.1
16	30	30	37.3
17	70	70	83.8
18	20	20	20.2
19	30	30	37.3
20	20	20	20.2
21	30	30	37.3
22	45	45	60.6
23	43	43	56.5
24	70	70	83.8
25	15	15	14.1
26	22	22	27.2
27	71	71	88.8
28	64	64	79.7
29	5	5	6
30	11	11	10.1
31	31	31	41.4
32	85	85	93.9
33	15	15	14.1
34	76	76	91.9
35	34	34	44.4
36	9	9	8
37	24	24	29.2
38	26	26	36.3
39	89	89	96.9
40	64	64	79.7
41	11	11	10.1
42	70	70	83.8
43	41	41	51.5
44	62	62	78.7
45	35	35	45.4
46	31	31	41.4
47	43	43	56.5
48	25	25	33.3
49	21	21	23.2
50	54	54	70.7
51	56	56	74.7
52	85	85	93.9
53	71	71	88.8
54	51	51	68.6
55	52	52	69.6
56	61	61	77.7
57	95	95	98.9
58	54	54	70.7
59	15	15	14.1
60	35	35	45.4
61	22	22	27.2
62	70	70	83.8
63	45	45	60.6
64	41	41	51.5
65	20	20	20.2
66	13	13	12.1
67	15	15	14.1
68	50	50	65.6
69	24	24	29.2
70	21	21	23.2
71	25	25	33.3
72	13	13	12.1
73	7	7	7
74	41	41	51.5
75	30	30	37.3
76	21	21	23.2
77	24	24	29.2
78	50	50	65.6
79	35	35	45.4
80	40	40	50.5
81	43	43	56.5
82	87	87	95.9
83	90	90	97.9
84	75	75	90.9
85	48	48	64.6
86	50	50	65.6
87	35	35	45.4
88	95	95	98.9
89	80	80	92.9
90	3	3	5
91	41	41	51.5
92	58	58	75.7
93	45	45	60.6
94	9	9	8
95	69	69	81.8
96	21	21	23.2
97	24	24	29.2
98	31	31	41.4
99	70	70	83.8
100	41	41	51.5

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	72	72	87.8
8	19	19	34.3
9	32	32	57.5
10	7	7	7
11	17	17	27.2
12	18	18	30.3
13	57	57	73.7
14	59	59	77.7
15	17	17	27.2
16	9	9	10.1
17	13	13	14.1
18	38	38	64.6
19	16	16	23.2
20	5	5	6
21	18	18	30.3
22	17	17	27.2
23	19	19	34.3
24	14	14	16.1
25	72	72	87.8
26	16	16	23.2
27	45	45	69.6
28	24	24	46.4
29	19	19	34.3
30	85	85	96.9
31	22	22	43.4
32	18	18	30.3
33	78	78	93.9
34	60	60	78.7
35	42	42	67.6
36	21	21	41.4
37	8	8	8
38	20	20	38.3
39	58	58	75.7
40	18	18	30.3
41	94	94	100
42	24	24	46.4
43	78	78	93.9
44	15	15	21.2
45	41	41	66.6
46	9	9	10.1
47	25	25	50.5
48	13	13	14.1
49	47	47	70.7
50	90	90	97.9
51	76	76	92.9
52	64	64	80.8
53	26	26	52.5
54	52	52	71.7
55	35	35	61.6
56	27	27	54.5
57	42	42	67.6
58	68	68	84.8
59	24	24	46.4
60	20	20	38.3
61	22	22	43.4
62	24	24	46.4
63	14	14	16.1
64	35	35	61.6
65	58	58	75.7
66	14	14	16.1
67	16	16	23.2
68	40	40	65.6
69	14	14	16.1
70	15	15	21.2
71	32	32	57.5
72	14	14	16.1
73	53	53	72.7
74	26	26	52.5
75	57	57	73.7
76	92	92	98.9
77	71	71	86.8
78	66	66	83.8
79	73	73	89.8
80	11	11	13.1
81	83	83	95.9
82	21	21	41.4
83	73	73	89.8
84	70	70	85.8
85	25	25	50.5
86	36	36	63.6
87	20	20	38.3
88	32	32	57.5
89	29	29	55.5
90	65	65	81.8
91	23	23	45.4
92	10	10	12.1
93	32	32	57.5
94	16	16	23.2
95	8	8	8
96	19	19	34.3
97	63	63	79.7
98	74	74	91.9
99	31	31	56.5
100	65	65	81.8

count	size (mm)
1	<2
2	<2
3	<2
4	<2
5	<2
6	<2
7	<2
8	<2
9	<2
10	<2
11	<2
12	<2
13	<2
14	<2
15	<2
16	76
17	51
18	44
19	33
20	59
21	62
22	115
23	60
24	36
25	75
26	55
27	20
28	64
29	55
30	27
31	17
32	20
33	100
34	43
35	15
36	11
37	41
38	61
39	71
40	85
41	39
42	38
43	19
44	10
45	60
46	55
47	20
48	85
49	36
50	109
51	10
52	71
53	72
54	41
55	22
56	17
57	20
58	21
59	9
60	23
61	49
62	24
63	56
64	40
65	17
66	39
67	40
68	31
69	41
70	61
71	16
72	26
73	23
74	22
75	35
76	6
77	7
78	5
79	27
80	13
81	22
82	28
83	74
84	20
85	15
86	38
87	21
88	78
89	26
90	31
91	16
92	8
93	16
94	72
95	32
96	24
97	96
98	39
99	17
100	10

33	17	17	67	-5.5	28	13	22	72	-5.5	39	17	20	61	-5.5	41	22	15	59	-5.5	31	8
16	11	17	84	-6.0	15	12	13	85	-6.0	22	15	17	78	-6.0	19	9	22	81	-6.0	23	16
5	5	11	95	-6.5	3	3	12	97	-6.5	7	6	15	93	-6.5	10	9	9	90	-6.5	7	5
0	0	5	100	-7.0	0	0	3	100	-7.0	1	1	6	99	-7.0	1	1	9	99	-7.0	2	2
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	1	100	-7.5	0	0	1	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
11	18	-1.0	-2.0	3	9	18	-3.0	-3.5	10	11	20	-3.5	-4.0	14	15	23	-3.0	-3.5	8	#N/A	#N/A
25	31	-3.5	-4.0	11	24	35	-4.0	-4.5	17	20	28	-4.0	-4.5	20	23	28	-3.5	-4.0	13	25	32
50	67	-5.0	-5.5	32	50	72	-5.0	-5.5	32	41	61	-5.0	-5.5	37	44	59	-5.0	-5.5	37	40	53
67	84	-5.5	-6.0	53	72	85	-5.5	-6.0	49	61	78	-5.5	-6.0	60	59	81	-5.5	-6.0	58	69	77
84	95	-6.0	-6.5	64	72	85	-5.5	-6.0	62	78	93	-6.0	-6.5	73	81	90	-6.0	-6.5	72	77	93
84	95	-6.0	-6.5	77	85	97	-6.0	-6.5	74	78	93	-6.0	-6.5	84	90	99	-6.5	-7.0	90	77	93

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	18	18	22.2	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	112	112	97.9	7	<2	1	0	7	<2
8	<2	1	0	8	43	43	67.6	8	13	13	11.1	8	<2	1	0	8	<2
9	<2	1	0	9	44	44	70.7	9	60	60	73.7	9	<2	1	0	9	<2
10	<2	1	0	10	44	44	70.7	10	34	34	41.4	10	<2	1	0	10	<2
11	<2	1	0	11	29	29	41.4	11	60	60	73.7	11	<2	1	0	11	<2
12	50	50	70.7	12	6	6	7	12	11	11	10.1	12	<2	1	0	12	<2
13	8	8	19.1	13	12	12	18.1	13	29	29	33.3	13	<2	1	0	13	<2
14	50	50	70.7	14	28	28	38.3	14	34	34	41.4	14	6	6	13.1	14	<2
15	30	30	46.4	15	47	47	74.7	15	35	35	43.4	15	84	84	87.8	15	<2
16	50	50	70.7	16	31	31	46.4	16	100	100	96.9	16	26	26	37.3	16	<2
17	52	52	76.7	17	21	21	31.3	17	41	41	55.5	17	22	22	33.3	17	<2
18	74	74	88.8	18	65	65	85.8	18	80	80	89.8	18	34	34	44.4	18	<2
19	74	74	88.8	19	38	38	60.6	19	69	69	81.8	19	14	14	24.2	19	41
20	41	41	61.6	20	8	8	8	20	77	77	87.8	20	32	32	41.4	20	35
21	50	50	70.7	21	72	72	87.8	21	27	27	31.3	21	9	9	15.1	21	50
22	35	35	51.5	22	81	81	93.9	22	30	30	34.3	22	118	118	96.9	22	80
23	100	100	96.9	23	53	53	79.7	23	112	112	97.9	23	23	23	35.3	23	42
24	74	74	88.8	24	43	43	67.6	24	15	15	14.1	24	64	64	79.7	24	83
25	13	13	25.2	25	20	20	29.2	25	36	36	48.4	25	65	65	81.8	25	32
26	29	29	44.4	26	14	14	20.2	26	8	8	6	26	145	145	100	26	66
27	70	70	84.8	27	85	85	96.9	27	28	28	32.3	27	22	22	33.3	27	15
28	59	59	80.8	28	76	76	89.8	28	3	3	5	28	55	55	71.7	28	11
29	23	23	39.3	29	60	60	82.8	29	51	51	67.6	29	8	8	14.1	29	67
30	30	30	46.4	30	79	79	90.9	30	97	97	95.9	30	73	73	84.8	30	45
31	85	85	94.9	31	98	98	97.9	31	31	31	39.3	31	64	64	79.7	31	18
32	46	46	67.6	32	21	21	31.3	32	16	16	17.1	32	125	125	98.9	32	80
33	62	62	81.8	33	10	10	10.1	33	94	94	93.9	33	104	104	93.9	33	15
34	70	70	84.8	34	49	49	75.7	34	20	20	24.2	34	63	63	78.7	34	20
35	18	18	31.3	35	29	29	41.4	35	16	16	17.1	35	120	120	97.9	35	16
36	38	38	57.5	36	10	10	10.1	36	9	9	7	36	110	110	95.9	36	26
37	75	75	91.9	37	42	42	64.6	37	35	35	43.4	37	54	54	70.7	37	14
38	24	24	40.4	38	21	21	31.3	38	47	47	62.6	38	38	38	51.5	38	109
39	4	4	14.1	39	11	11	13.1	39	67	67	80.8	39	16	16	25.2	39	41
40	28	28	43.4	40	20	20	29.2	40	30	30	34.3	40	9	9	15.1	40	91
41	14	14	26.2	41	34	34	52.5	41	80	80	89.8	41	53	53	68.6	41	19
42	4	4	14.1	42	38	38	60.6	42	62	62	76.7	42	75	75	85.8	42	33
43	22	22	37.3	43	11	11	13.1	43	35	35	43.4	43	47	47	61.6	43	39
44	14	14	26.2	44	66	66	86.8	44	70	70	82.8	44	50	50	63.6	44	10
45	63	63	83.8	45	82	82	95.9	45	16	16	17.1	45	9	9	15.1	45	24
46	104	104	97.9	46	28	28	38.3	46	52	52	69.6	46	34	34	44.4	46	73
47	35	35	51.5	47	23	23	35.3	47	13	13	11.1	47	16	16	25.2	47	24
48	10	10	22.2	48	34	34	52.5	48	40	40	51.5	48	27	27	38.3	48	21
49	16	16	29.2	49	98	98	97.9	49	60	60	73.7	49	31	31	40.4	49	21
50	4	4	14.1	50	46	46	72.7	50	76	76	86.8	50	11	11	18.1	50	7
51	4	4	14.1	51	31	31	46.4	51	25	25	28.2	51	35	35	47.4	51	45
52	41	41	61.6	52	35	35	55.5	52	77	77	87.8	52	50	50	63.6	52	52
53	35	35	51.5	53	80	80	91.9	53	135	135	100	53	100	100	91.9	53	5
54	14	14	26.2	54	42	42	64.6	54	30	30	34.3	54	43	43	56.5	54	7
55	43	43	64.6	55	58	58	81.8	55	94	94	93.9	55	34	34	44.4	55	86
56	26	26	41.4	56	73	73	88.8	56	54	54	70.7	56	20	20	31.3	56	51
57	34	34	50.5	57	23	23	35.3	57	32	32	40.4	57	50	50	63.6	57	25
58	3	3	11.1	58	33	33	50.5	58	10	10	9	58	38	38	51.5	58	86
59	29	29	44.4	59	19	19	26.2	59	42	42	57.5	59	16	16	25.2	59	16
60	35	35	51.5	60	51	51	76.7	60	44	44	59.5	60	30	30	39.3	60	11
61	48	48	68.6	61	33	33	50.5	61	25	25	28.2	61	65	65	81.8	61	36
62	26	26	41.4	62	35	35	55.5	62	17	17	20.2	62	39	39	53.5	62	130
63	70	70	84.8	63	56	56	80.8	63	64	64	77.7	63	12	12	23.2	63	42
64	120	120	100	64	11	11	13.1	64	19	19	23.2	64	40	40	54.5	64	141
65	19	19	33.3	65	35	35	55.5	65	50	50	63.6	65	43	43	56.5	65	43
66	22	22	37.3	66	10	10	10.1	66	25	25	28.2	66	35	35	47.4	66	29
67	38	38	57.5	67	36	36	58.5	67	30	30	34.3	67	11	11	18.1	67	19
68	35	35	51.5	68	19	19	26.2	68	22	22	27.2	68	11	11	18.1	68	30
69	80	80	92.9	69	39	39	62.6	69	81	81	91.9	69	41	41	55.5	69	15
70	37	37	56.5	70	28	28	38.3	70	42	42	57.5	70	18	18	29.2	70	100
71	8	8	19.1	71	9	9	9	71	46	46	61.6	71	11	11	18.1	71	32
72	91	91	95.9	72	17	17	24.2	72	65	65	78.7	72	95	95	90.9	72	22
73	50	50	70.7	73	29	29	41.4	73	41	41	55.5	73	20	20	31.3	73	73
74	48	48	68.6	74	15	15	22.2	74	54	54	70.7	74	80	80	86.8	74	31
75	55	55	78.7	75	29	29	41.4	75	30	30	34.3	75	56	56	74.7	75	23
76	45	45	65.6	76	42	42	64.6	76	17	17	20.2	76	72	72	83.8	76	120
77	5	5	18.1	77	25	25	37.3	77	40	40	51.5	77	32	32	41.4	77	51
78	18	18	31.3	78	100	100	100	78	74	74	84.8	78	52	52	67.6	78	61
79	115	115	98.9	79	62	62	84.8	79	40	40	51.5	79	60	60	77.7	79	79
80	10	10	22.2	80	17	17	24.2	80	85	85	92.9	80	105	105	94.9	80	36
81	10	10	22.2	81	11	11	13.1	81	75	75	85.8	81	25	25	36.3	81	29
82	71	71	87.8	82	16	16	23.2	82	50	50	63.6	82	32	32	41.4	82	20
83	30	30	46.4	83	51	51	76.7	83	65	65	78.7	83	44	44	58.5	83	55
84	45	45	65.6	84	11	11	13.1	84	35	35	43.4	84	36	36	49.4	84	65
85	39	39	59.5	85	19	19	26.2	85	35	35	43.4	85	103	103	92.9	85	11
86	19	19	33.3	86	81	81	93.9	86	50	50	63.6	86	53	53	68.6	86	36
87	3	3	11.1	87	32	32	49.4	87	15	15	14.1	87	56	56	74.7	87	23
88	55	55	78.7	88	22	22	34.3	88	36	36	48.4	88	46	46	59.5	88	32
89	16	16	29.2	89	34	34	52.5	89	45	45	60.6	89	49	49	62.6	89	90
90	80	80	92.9	90	31	31	46.4	90	40	40	51.5	90	56	56	74.7	90	80
91	53	53	77.7	91	43	43	67.6	91	51	51	67.6	91	19	19	30.3	91	71
92	62	62	81.8	92	51	51	76.7	92	55	55	72.7	92	55	55	71.7	92	75
93	40	40	60.6	93	36	36	58.5	93	20	20	24.2	93	17	17	28.2	93	60
94	30	30	46.4	94	46	46	72.7	94	70	70	82.8	94	50	50	63.6	94	36
95	20	20	35.3	95	30	30	45.4	95	14	14	13.1	95	11	11	18.1	95	40
96	3	3	11.1	96	60	60	82.8	96	15	15	14.1	96	55	55	71.7	96	96
97	9	9	21.2	97	40	40	63.6	97	21	21	26.2	97	85	85	88.8	97	40
98	41	41	61.6	98	80	80	91.9	98	9	9	7	98	46	46	59.5	98	16
99	20	20	35.3	99	13	13	19.1	99	50	50	63.6	99	89	89	89.8	99	70
100	50	50	70.7	100	14	14	20.2	100	39	39	50.5	100	37	37	50.5	100	63

26	18	12	74	-5.5	45	28	17	55	-5.5	42	30	19	58	-5.5	38	26	15	62	-5.5	47	30
8	6	18	92	-6.0	17	16	28	83	-6.0	12	9	30	88	-6.0	12	9	26	88	-6.0	17	11
2	2	6	98	-6.5	1	1	16	99	-6.5	3	2	9	97	-6.5	3	2	9	97	-6.5	6	5
0	0	2	100	-7.0	0	0	1	100	-7.0	1	1	2	99	-7.0	1	1	2	99	-7.0	1	0
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	1	100	-7.5	0	0	1	100	-7.5	1	1
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
14	18	-3.0	-3.5	10	7	17	-3.5	-4.0	15	11	21	-4.0	-4.5	19	14	17	-2.5	-3.0	7	14	17
18	26	-3.5	-4.0	15	17	26	-4.0	-4.5	22	21	39	-4.5	-5.0	24	22	33	-4.0	-4.5	18	17	29
37	62	-4.5	-5.0	27	38	55	-5.0	-5.5	41	39	58	-5.0	-5.5	39	47	62	-5.0	-5.5	34	41	53
74	92	-5.5	-6.0	46	55	83	-5.5	-6.0	58	58	88	-5.5	-6.0	55	62	88	-5.5	-6.0	54	53	83
74	92	-5.5	-6.0	55	83	99	-6.0	-6.5	65	58	88	-5.5	-6.0	61	62	88	-5.5	-6.0	61	83	94
74	92	-5.5	-6.0	62	83	99	-6.0	-6.5	74	88	97	-6.0	-6.5	69	88	97	-6.0	-6.5	69	83	94

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	25	25	28.2	1	<2	1	0	1	<2	1	0	1	<2
2	25	25	43.4	2	20	20	21.2	2	<2	1	0	2	<2	1	0	2	<2
3	23	23	37.3	3	63	63	82.8	3	25	25	22.2	3	<2	1	0	3	<2
4	18	18	26.2	4	56	56	73.7	4	24	24	21.2	4	<2	1	0	4	<2
5	31	31	57.5	5	41	41	51.5	5	13	13	4	5	<2	1	0	5	<2
6	44	44	70.7	6	60	60	76.7	6	9	9	2	6	<2	1	0	6	<2
7	10	10	17.1	7	45	45	53.5	7	33	33	39.3	7	<2	1	0	7	<2
8	98	98	98.9	8	40	40	49.4	8	11	11	3	8	<2	1	0	8	<2
9	30	30	54.5	9	37	37	46.4	9	20	20	16.1	9	<2	1	0	9	<2
10	37	37	66.6	10	75	75	89.8	10	41	41	51.5	10	<2	1	0	10	<2
11	29	29	51.5	11	70	70	84.8	11	19	19	13.1	11	<2	1	0	11	78
12	110	110	100	12	15	15	14.1	12	60	60	78.7	12	49	49	66.6	12	30
13	45	45	72.7	13	80	80	92.9	13	30	30	32.3	13	55	55	76.7	13	65
14	18	18	26.2	14	12	12	7	14	69	69	88.8	14	50	50	69.6	14	58
15	25	25	43.4	15	36	36	43.4	15	29	29	28.2	15	16	16	21.2	15	50
16	45	45	72.7	16	50	50	62.6	16	64	64	84.8	16	96	96	97.9	16	55
17	22	22	33.3	17	13	13	10.1	17	30	30	32.3	17	32	32	45.4	17	60
18	32	32	58.5	18	35	35	40.4	18	55	55	71.7	18	56	56	77.7	18	98
19	32	32	58.5	19	60	60	76.7	19	20	20	16.1	19	41	41	57.5	19	75
20	46	46	74.7	20	52	52	66.6	20	25	25	22.2	20	59	59	80.8	20	89
21	23	23	37.3	21	20	20	21.2	21	16	16	8	21	56	56	77.7	21	31
22	12	12	18.1	22	56	56	73.7	22	87	87	95.9	22	72	72	92.9	22	33
23	22	22	33.3	23	87	87	96.9	23	48	48	60.6	23	21	21	29.2	23	49
24	15	15	24.2	24	78	78	91.9	24	61	61	80.8	24	53	53	73.7	24	16
25	3	3	1	25	62	62	81.8	25	41	41	51.5	25	47	47	63.6	25	46
26	80	80	96.9	26	37	37	46.4	26	59	59	77.7	26	23	23	33.3	26	61
27	51	51	81.8	27	47	47	57.5	27	69	69	88.8	27	33	33	47.4	27	47
28	47	47	75.7	28	55	55	70.7	28	90	90	96.9	28	21	21	29.2	28	54
29	32	32	58.5	29	28	28	33.3	29	39	39	44.4	29	70	70	90.9	29	57
30	3	3	1	30	38	38	48.4	30	55	55	71.7	30	35	35	50.5	30	35
31	81	81	97.9	31	70	70	84.8	31	16	16	8	31	19	19	24.2	31	98
32	23	23	37.3	32	61	61	80.8	32	40	40	47.4	32	73	73	94.9	32	86
33	28	28	48.4	33	36	36	43.4	33	29	29	28.2	33	34	34	49.4	33	47
34	47	47	75.7	34	13	13	10.1	34	31	31	34.3	34	80	80	96.9	34	53
35	13	13	19.1	35	30	30	34.3	35	50	50	61.6	35	48	48	65.6	35	27
36	52	52	82.8	36	23	23	26.2	36	81	81	94.9	36	60	60	83.8	36	22
37	28	28	48.4	37	42	42	52.5	37	52	52	66.6	37	54	54	75.7	37	17
38	18	18	26.2	38	30	30	34.3	38	16	16	8	38	41	41	57.5	38	193
39	63	63	91.9	39	17	17	17.1	39	51	51	63.6	39	6	6	14.1	39	5
40	52	52	82.8	40	47	47	57.5	40	64	64	84.8	40	49	49	66.6	40	22
41	56	56	88.8	41	36	36	43.4	41	58	58	76.7	41	25	25	35.3	41	45
42	19	19	30.3	42	46	46	55.5	42	19	19	13.1	42	51	51	70.7	42	25
43	14	14	21.2	43	26	26	29.2	43	55	55	71.7	43	22	22	32.3	43	22
44	53	53	84.8	44	18	18	20.2	44	40	40	47.4	44	35	35	50.5	44	19
45	5	5	6	45	31	31	37.3	45	44	44	56.5	45	44	44	59.5	45	66
46	22	22	33.3	46	12	12	7	46	32	32	38.3	46	72	72	92.9	46	46
47	34	34	62.6	47	53	53	67.6	47	61	61	80.8	47	46	46	62.6	47	64
48	28	28	48.4	48	10	10	4	48	39	39	44.4	48	4	4	12.1	48	61
49	60	60	90.9	49	20	20	21.2	49	28	28	26.2	49	101	101	98.9	49	50
50	50	50	77.7	50	70	70	84.8	50	52	52	66.6	50	47	47	63.6	50	74
51	8	8	10.1	51	50	50	62.6	51	46	46	58.5	51	27	27	40.4	51	34
52	32	32	58.5	52	46	46	55.5	52	50	50	61.6	52	28	28	42.4	52	20
53	8	8	10.1	53	49	49	61.6	53	15	15	5	53	49	49	66.6	53	16
54	19	19	30.3	54	75	75	89.8	54	15	15	5	54	59	59	80.8	54	29
55	75	75	94.9	55	15	15	14.1	55	28	28	26.2	55	67	67	88.8	55	53
56	23	23	37.3	56	40	40	49.4	56	19	19	13.1	56	63	63	86.8	56	19
57	8	8	10.1	57	72	72	88.8	57	22	22	19.1	57	26	26	39.3	57	55
58	50	50	77.7	58	35	35	40.4	58	40	40	47.4	58	130	130	100	58	29
59	23	23	37.3	59	34	34	39.3	59	60	60	78.7	59	39	39	55.5	59	46
60	14	14	21.2	60	6	6	2	60	51	51	63.6	60	18	18	23.2	60	51
61	75	75	94.9	61	33	33	38.3	61	70	70	90.9	61	33	33	47.4	61	44
62	39	39	68.6	62	56	56	73.7	62	17	17	11.1	62	62	62	85.8	62	5
63	29	29	51.5	63	88	88	97.9	63	25	25	22.2	63	59	59	80.8	63	22
64	37	37	66.6	64	65	65	83.8	64	54	54	69.6	64	40	40	56.5	64	54
65	34	34	62.6	65	60	60	76.7	65	72	72	91.9	65	35	35	50.5	65	20
66	6	6	8	66	13	13	10.1	66	29	29	28.2	66	21	21	29.2	66	63
67	5	5	6	67	12	12	7	67	31	31	34.3	67	24	24	34.3	67	52
68	9	9	14.1	68	10	10	4	68	15	15	5	68	53	53	73.7	68	31
69	50	50	77.7	69	55	55	70.7	69	46	46	58.5	69	35	35	50.5	69	110
70	3	3	1	70	90	90	98.9	70	31	31	34.3	70	25	25	35.3	70	62
71	26	26	46.4	71	70	70	84.8	71	43	43	53.5	71	52	52	72.7	71	45
72	9	9	14.1	72	50	50	62.6	72	74	74	92.9	72	35	35	50.5	72	61
73	21	21	32.3	73	10	10	4	73	77	77	93.9	73	68	68	89.8	73	51
74	14	14	21.2	74	80	80	92.9	74	34	34	40.4	74	19	19	24.2	74	36
75	66	66	92.9	75	17	17	17.1	75	61	61	80.8	75	15	15	20.2	75	24
76	6	6	8	76	35	35	40.4	76	64	64	84.8	76	30	30	44.4	76	65
77	40	40	69.6	77	9	9	3	77	51	51	63.6	77	27	27	40.4	77	50
78	30	30	54.5	78	26	26	29.2	78	39	39	44.4	78	29	29	43.4	78	26
79	74	74	93.9	79	80	80	92.9	79	34	34	40.4	79	76	76	95.9	79	96
80	34	34	62.6	80	54	54	68.6	80	54	54	69.6	80	63	63	86.8	80	44
81	30	30	54.5	81	3	3	1	81	53	53	68.6	81	44	44	59.5	81	21
82	27	27	47.4	82	47	47	57.5	82	61	61	80.8	82	20	20	27.2	82	34
83	13	13	19.1	83	20	20	21.2	83	35	35	42.4	83	9	9	17.1	83	21
84	25	25	43.4	84	16	16	16.1	84	95	95	97.9	84	25	25	35.3	84	45
85	50	50	77.7	85	26	26	29.2	85	145	145	100	85	7	7	16.1	85	91
86	58	58	89.8	86	20	20	21.2	86	18	18	12.1	86	25	25	35.3	86	70
87	3	3	1	87	55	55	70.7	87	22	22	19.1	87	44	44	59.5	87	44
88	3	3	1	88	30	30	34.3	88	55	55	71.7	88	5	5	13.1	88	86
89	9	9	14.1	89	17	17	17.1	89	64	64	84.8	89	20	20	27.2	89	31
90	44	44	70.7	90	13	13	10.1	90	44	44	56.5	90	51	51	70.7	90	32
91	24	24	42.4	91	23	23	26.2	91	56	56	75.7	91	60	60	83.8	91	63
92	29	29	51.5	92	47	47	57.5	92	31	31	34.3	92	6	6	14.1	92	43
93	18	18	26.2	93	26	26	29.2	93	43	43	53.5	93	58	58	79.7	93	22
94	55	55	85.8	94	60	60	76.7	94	102	102	98.9	94	32	32	45.4	94	51
95	22	22	33.3	95	50	50	62.6	95	43	43	53.5	95	70	70	90.9	95	62
96	36	36	65.6	96	54	54	68.6	96	35	35	42.4	96	17	17	22.2	96	82
97	55	55	85.8	97	95	95	100	97	29	29	28.2	97	19	19	24.2	97	15
98	15	15	24.2	98	45	45	53.5	98	20	20	16.1	98	3	3	11.1	98	11
99	8	8	10.1	99	84	84	95.9	99	25	25	22.2	99	12	12	19.1	99	10
100	55	55	85.8	100	<2	1	0	100	40	40	47.4	100	9	9	17.1	100	23

48	22	10	52	-5.5	39	19	16	61	-5.5	39	18	8	61	-5.5	30	18	17	70	-5.5	34	14	9
26	18	22	74	-6.0	20	13	19	80	-6.0	21	14	18	79	-6.0	12	8	18	88	-6.0	20	16	14
8	4	18	92	-6.5	7	7	13	93	-6.5	7	6	14	93	-6.5	4	3	8	96	-6.5	4	3	16
4	4	4	96	-7.0	0	0	7	100	-7.0	1	1	6	99	-7.0	1	1	3	99	-7.0	1	1	3
0	0	4	100	-7.5	0	0	0	100	-7.5	0	0	1	100	-7.5	0	0	1	100	-7.5	0	0	1
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
25	33	-3.5	-4.0	11	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
42	52	-5.0	-5.5	42	45	61	-5.0	-5.5	36	46	53	-4.5	-5.0	28	47	53	-4.5	-5.0	27	50	57	-4.5
74	92	-6.0	-6.5	65	61	80	-5.5	-6.0	58	61	79	-5.5	-6.0	59	70	88	-5.5	-6.0	50	66	80	-5.5
74	92	-6.0	-6.5	77	80	93	-6.0	-6.5	71	79	93	-6.0	-6.5	72	70	88	-5.5	-6.0	59	80	96	-6.0
74	92	-6.0	-6.5	87	80	93	-6.0	-6.5	83	79	93	-6.0	-6.5	84	88	96	-6.0	-6.5	70	80	96	-6.0

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm replace "<2" wit 1
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1
9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1
10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1
11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2	1
12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2	1
13	<2	1	0	13	<2	1	0	13	<2	1	0	13	<2	1	0	13	<2	1
14	<2	1	0	14	<2	1	0	14	<2	1	0	14	<2	1	0	14	<2	1
15	<2	1	0	15	<2	1	0	15	<2	1	0	15	<2	1	0	15	<2	1
16	<2	1	0	16	<2	1	0	16	<2	1	0	16	<2	1	0	16	<2	1
17	<2	1	0	17	<2	1	0	17	<2	1	0	17	<2	1	0	17	<2	1
18	<2	1	0	18	<2	1	0	18	<2	1	0	18	<2	1	0	18	<2	1
19	<2	1	0	19	<2	1	0	19	<2	1	0	19	<2	1	0	19	<2	1
20	<2	1	0	20	<2	1	0	20	<2	1	0	20	<2	1	0	20	<2	1
21	<2	1	0	21	<2	1	0	21	<2	1	0	21	<2	1	0	21	<2	1
22	<2	1	0	22	<2	1	0	22	<2	1	0	22	<2	1	0	22	<2	1
23	50	50	55.5	23	<2	1	0	23	<2	1	0	23	<2	1	0	23	<2	1
24	100	100	92.9	24	<2	1	0	24	<2	1	0	24	<2	1	0	24	<2	1
25	16	16	31.3	25	<2	1	0	25	<2	1	0	25	<2	1	0	25	<2	1
26	47	47	52.5	26	<2	1	0	26	<2	1	0	26	<2	1	0	26	<2	1
27	14	14	26.2	27	<2	1	0	27	<2	1	0	27	<2	1	0	27	<2	1
28	55	55	61.6	28	115	115	98.9	28	<2	1	0	28	<2	1	0	28	<2	1
29	90	90	88.8	29	15	15	31.3	29	<2	1	0	29	<2	1	0	29	<2	1
30	135	135	97.9	30	43	43	55.5	30	<2	1	0	30	<2	1	0	30	<2	1
31	125	125	95.9	31	34	34	46.4	31	<2	1	0	31	<2	1	0	31	<2	1
32	88	88	87.8	32	17	17	32.3	32	<2	1	0	32	<2	1	0	32	<2	1
33	170	170	98.9	33	22	22	38.3	33	<2	1	0	33	<2	1	0	33	<2	1
34	33	33	42.4	34	14	14	30.3	34	<2	1	0	34	<2	1	0	34	<2	1
35	28	28	40.4	35	21	21	35.3	35	<2	1	0	35	<2	1	0	35	<2	1
36	180	180	100	36	34	34	46.4	36	70	70	86.8	36	115	115	97.9	36	<2	1
37	65	65	74.7	37	21	21	35.3	37	64	64	77.7	37	55	55	77.7	37	<2	1
38	51	51	56.5	38	33	33	45.4	38	75	75	88.8	38	34	34	55.5	38	<2	1
39	47	47	52.5	39	44	44	57.5	39	67	67	83.8	39	33	33	53.5	39	<2	1
40	17	17	33.3	40	31	31	43.4	40	64	64	77.7	40	29	29	49.4	40	<2	1
41	56	56	62.6	41	44	44	57.5	41	115	115	97.9	41	49	49	74.7	41	<2	1
42	9	9	24.2	42	78	78	89.8	42	75	75	88.8	42	34	34	55.5	42	<2	1
43	17	17	33.3	43	61	61	77.7	43	33	33	53.5	43	33	33	53.5	43	<2	1
44	22	22	36.3	44	78	78	89.8	44	51	51	68.6	44	39	39	60.6	44	<2	1
45	90	90	88.8	45	21	21	35.3	45	13	13	41.4	45	41	41	64.6	45	<2	1
46	33	33	42.4	46	25	25	39.3	46	6	6	36.3	46	130	130	100	46	99	99
47	61	61	69.6	47	19	19	34.3	47	118	118	98.9	47	8	8	41.4	47	23	23
48	74	74	83.8	48	76	76	88.8	48	96	96	94.9	48	<2	1	0	48	24	24
49	36	36	47.4	49	42	42	54.5	49	130	130	100	49	<2	1	0	49	25	25
50	64	64	71.7	50	53	53	69.6	50	101	101	96.9	50	<2	1	0	50	97	97
51	79	79	85.8	51	54	54	70.7	51	32	32	50.5	51	<2	1	0	51	88	88
52	34	34	44.4	52	98	98	96.9	52	46	46	61.6	52	<2	1	0	52	54	54
53	22	22	36.3	53	47	47	63.6	53	93	93	93.9	53	64	64	85.8	53	72	72
54	110	110	94.9	54	43	43	55.5	54	80	80	90.9	54	34	34	55.5	54	60	60
55	36	36	47.4	55	67	67	84.8	55	68	68	84.8	55	47	47	71.7	55	61	61
56	22	22	36.3	56	47	47	63.6	56	11	11	40.4	56	62	62	83.8	56	44	44
57	67	67	77.7	57	48	48	65.6	57	72	72	87.8	57	67	67	90.9	57	40	40
58	60	60	66.6	58	55	55	71.7	58	48	48	63.6	58	48	48	72.7	58	68	68
59	65	65	74.7	59	63	63	79.7	59	56	56	73.7	59	63	63	84.8	59	58	58
60	63	63	70.7	60	65	65	80.8	60	37	37	58.5	60	77	77	93.9	60	63	63
61	58	58	63.6	61	92	92	93.9	61	23	23	46.4	61	61	61	81.8	61	57	57
62	67	67	77.7	62	44	44	57.5	62	33	33	53.5	62	24	24	47.4	62	83	83
63	70	70	79.7	63	68	68	86.8	63	100	100	95.9	63	38	38	59.5	63	55	55
64	54	54	60.6	64	35	35	49.4	64	60	60	75.7	64	64	64	85.8	64	80	80
65	28	28	40.4	65	65	65	80.8	65	50	50	66.6	65	85	85	94.9	65	42	42
66	90	90	88.8	66	55	55	71.7	66	66	66	81.8	66	95	95	96.9	66	66	66
67	53	53	58.5	67	36	36	50.5	67	4	4	35.3	67	90	90	95.9	67	71	71
68	80	80	86.8	68	61	61	77.7	68	36	36	57.5	68	76	76	92.9	68	81	81
69	14	14	26.2	69	55	55	71.7	69	56	56	73.7	69	29	29	49.4	69	44	44
70	70	70	79.7	70	39	39	51.5	70	18	18	44.4	70	57	57	79.7	70	36	36
71	35	35	46.4	71	113	113	97.9	71	80	80	90.9	71	45	45	68.6	71	68	68
72	37	37	49.4	72	31	31	43.4	72	32	32	50.5	72	46	46	70.7	72	49	49
73	58	58	63.6	73	8	8	28.2	73	37	37	58.5	73	64	64	85.8	73	26	26
74	40	40	50.5	74	80	80	91.9	74	34	34	55.5	74	58	58	80.8	74	8	8
75	130	130	96.9	75	10	10	29.2	75	6	6	36.3	75	24	24	47.4	75	68	68
76	59	59	65.6	76	95	95	94.9	76	34	34	55.5	76	13	13	43.4	76	93	93
77	48	48	54.5	77	34	34	46.4	77	53	53	70.7	77	21	21	45.4	77	44	44
78	60	60	66.6	78	60	60	76.7	78	48	48	63.6	78	40	40	61.6	78	55	55
79	70	70	79.7	79	67	67	84.8	79	65	65	79.7	79	45	45	68.6	79	88	88
80	16	16	31.3	80	50	50	67.6	80	16	16	42.4	80	15	15	44.4	80	60	60
81	51	51	56.5	81	75	75	87.8	81	52	52	69.6	81	66	66	88.8	81	46	46
82	24	24	39.3	82	57	57	74.7	82	22	22	45.4	82	40	40	61.6	82	30	30
83	15	15	28.2	83	84	84	92.9	83	16	16	42.4	83	32	32	52.5	83	47	47
84	42	42	51.5	84	46	46	61.6	84	55	55	72.7	84	66	66	88.8	84	22	22
85	100	100	92.9	85	40	40	52.5	85	10	10	39.3	85	42	42	65.6	85	16	16
86	90	90	88.8	86	120	120	100	86	63	63	76.7	86	55	55	77.7	86	79	79
87	65	65	74.7	87	41	41	53.5	87	26	26	49.4	87	52	52	75.7	87	7	7
88	34	34	44.4	88	18	18	33.3	88	6	6	36.3	88	61	61	81.8	88	69	69
89	53	53	58.5	89	25	25	39.3	89	23	23	46.4	89	37	37	58.5	89	81	81
90	64	64	71.7	90	3	3	27.2	90	86	86	92.9	90	120	120	98.9	90	135	135
91	73	73	82.8	91	65	65	80.8	91	69	69	85.8	91	42	42	65.6	91	37	37
92	75	75	84.8	92	50	50	67.6	92	23	23	46.4	92	9	9	42.4	92	26	26
93	12	12	25.2	93	46	46	61.6	93	65	65	79.7	93	29	29	49.4	93	27	27
94	21	21	35.3	94	45	45	60.6	94	39	39	60.6	94	7	7	40.4	94	38	38
95	60	60	66.6	95	97	97	95.9	95	48	48	63.6	95	74	74	91.9	95	73	73
96	15	15	28.2	96	49	49	66.6	96	46	46	61.6	96	48	48	72.7	96	18	18
97	4	4	22.2	97	30	30	42.4	97	50	50	66.6	97	44	44	67.6	97	46	46
98	15	15	28.2	98	59	59	75.7	98	54	54	71.7	98	40	40	61.6	98	40	40
99	6	6	23.2	99	65	65	80.8	99	32	32	50.5	99	22	22	46.4	99	72	72
100	64	64	71.7	100	28	28	41.4	100	66	66	81.8	100	54	54	76.7	100	63	63

29	17	16	71	-5.5	32	14	10	68	-5.5	41	18	14	59	-5.5	32	18	14	68	-5.5	26	18
12	8	17	88	-6.0	18	15	14	82	-6.0	23	17	18	77	-6.0	14	11	18	86	-6.0	8	7
4	3	8	96	-6.5	3	1	15	97	-6.5	6	4	17	94	-6.5	3	2	11	97	-6.5	1	1
1	1	3	99	-7.0	2	2	1	98	-7.0	2	2	4	98	-7.0	1	1	2	99	-7.0	0	0
0	0	1	100	-7.5	0	0	2	100	-7.5	0	0	2	100	-7.5	0	0	1	100	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**

				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
14	23	-3.0	-3.5	9	16	18	-1.0	-2.0	2	14	22	-3.5	-4.0	12	16	17	-2.5	-3.0	6	15	17
23	36	-3.5	-4.0	12	23	30	-3.5	-4.0	12	22	35	-4.0	-4.5	17	21	28	-3.5	-4.0	14	25	35
45	55	-4.5	-5.0	27	37	58	-4.5	-5.0	28	45	59	-5.0	-5.5	36	39	54	-4.5	-5.0	29	48	59
71	88	-5.5	-6.0	49	68	82	-5.5	-6.0	54	59	77	-5.5	-6.0	62	68	86	-5.5	-6.0	52	74	92
71	88	-5.5	-6.0	59	82	97	-6.0	-6.5	67	77	94	-6.0	-6.5	74	68	86	-5.5	-6.0	62	74	92
88	96	-6.0	-6.5	70	82	97	-6.0	-6.5	77	77	94	-6.0	-6.5	83	86	97	-6.0	-6.5	72	74	92

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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	10	10	18.1	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	47	47	71.7	6	<2	1	0	6	55	55	64.6	6	<2	1	0	6	<2
7	37	37	62.6	7	<2	1	0	7	79	79	84.8	7	<2	1	0	7	<2
8	35	35	59.5	8	<2	1	0	8	68	68	79.7	8	<2	1	0	8	<2
9	16	16	34.3	9	<2	1	0	9	108	108	95.9	9	<2	1	0	9	<2
10	11	11	20.2	10	<2	1	0	10	79	79	84.8	10	<2	1	0	10	<2
11	6	6	11.1	11	<2	1	0	11	117	117	96.9	11	<2	1	0	11	<2
12	32	32	53.5	12	<2	1	0	12	14	14	17.1	12	<2	1	0	12	<2
13	60	60	83.8	13	<2	1	0	13	51	51	62.6	13	<2	1	0	13	<2
14	50	50	78.7	14	<2	1	0	14	34	34	45.4	14	<2	1	0	14	<2
15	39	39	65.6	15	<2	1	0	15	44	44	53.5	15	<2	1	0	15	<2
16	9	9	14.1	16	<2	1	0	16	74	74	81.8	16	<2	1	0	16	82
17	5	5	9	17	85	85	94.9	17	60	60	69.6	17	30	30	45.4	17	65
18	14	14	26.2	18	90	90	96.9	18	64	64	74.7	18	38	38	64.6	18	59
19	62	62	85.8	19	76	76	88.8	19	78	78	83.8	19	63	63	83.8	19	33
20	20	20	39.3	20	87	87	95.9	20	65	65	77.7	20	90	90	96.9	20	75
21	10	10	18.1	21	5	5	18.1	21	85	85	92.9	21	81	81	94.9	21	32
22	14	14	26.2	22	140	140	98.9	22	139	139	98.9	22	30	30	45.4	22	35
23	15	15	30.3	23	17	17	30.3	23	66	66	78.7	23	52	52	76.7	23	38
24	50	50	78.7	24	23	23	37.3	24	79	79	84.8	24	15	15	23.2	24	8
25	108	108	98.9	25	30	30	53.5	25	21	21	29.2	25	59	59	82.8	25	20
26	11	11	20.2	26	24	24	40.4	26	44	44	53.5	26	21	21	33.3	26	47
27	72	72	92.9	27	15	15	28.2	27	44	44	53.5	27	55	55	79.7	27	34
28	3	3	4	28	55	55	76.7	28	30	30	42.4	28	19	19	29.2	28	16
29	20	20	39.3	29	23	23	37.3	29	10	10	8	29	72	72	87.8	29	66
30	15	15	30.3	30	47	47	69.6	30	13	13	16.1	30	15	15	23.2	30	20
31	9	9	14.1	31	25	25	42.4	31	10	10	8	31	66	66	86.8	31	22
32	22	22	43.4	32	27	27	48.4	32	25	25	36.3	32	26	26	41.4	32	65
33	39	39	65.6	33	40	40	63.6	33	21	21	29.2	33	140	140	100	33	51
34	28	28	49.4	34	46	46	68.6	34	6	6	5	34	16	16	25.2	34	14
35	15	15	30.3	35	55	55	76.7	35	82	82	91.9	35	40	40	66.6	35	68
36	13	13	23.2	36	5	5	18.1	36	10	10	8	36	64	64	84.8	36	30
37	26	26	46.4	37	47	47	69.6	37	9	9	7	37	76	76	90.9	37	71
38	37	37	62.6	38	32	32	57.5	38	37	37	48.4	38	31	31	49.4	38	27
39	34	34	57.5	39	12	12	23.2	39	20	20	26.2	39	33	33	54.5	39	5
40	22	22	43.4	40	30	30	53.5	40	18	18	23.2	40	56	56	80.8	40	51
41	33	33	55.5	41	56	56	78.7	41	70	70	80.8	41	50	50	70.7	41	14
42	62	62	85.8	42	27	27	48.4	42	61	61	72.7	42	22	22	36.3	42	11
43	32	32	53.5	43	20	20	33.3	43	25	25	36.3	43	20	20	32.3	43	52
44	7	7	12.1	44	36	36	60.6	44	75	75	82.8	44	36	36	59.5	44	31
45	5	5	9	45	5	5	18.1	45	64	64	74.7	45	36	36	59.5	45	32
46	51	51	81.8	46	75	75	87.8	46	19	19	24.2	46	50	50	70.7	46	44
47	14	14	26.2	47	35	35	58.5	47	11	11	13.1	47	49	49	69.6	47	14
48	36	36	60.6	48	71	71	84.8	48	22	22	34.3	48	48	48	68.6	48	29
49	13	13	23.2	49	12	12	23.2	49	55	55	64.6	49	78	78	92.9	49	18
50	26	26	46.4	50	25	25	42.4	50	46	46	59.5	50	52	52	76.7	50	54
51	9	9	14.1	51	83	83	93.9	51	21	21	29.2	51	119	119	98.9	51	93
52	40	40	67.6	52	40	40	63.6	52	10	10	8	52	26	26	41.4	52	38
53	97	97	96.9	53	5	5	18.1	53	55	55	64.6	53	16	16	25.2	53	10
54	47	47	71.7	54	19	19	32.3	54	12	12	14.1	54	31	31	49.4	54	31
55	67	67	90.9	55	61	61	80.8	55	15	15	18.1	55	21	21	33.3	55	22
56	44	44	70.7	56	18	18	31.3	56	162	162	100	56	30	30	45.4	56	28
57	37	37	62.6	57	30	30	53.5	57	40	40	51.5	57	37	37	62.6	57	44
58	34	34	57.5	58	4	4	16.1	58	79	79	84.8	58	35	35	58.5	58	58
59	64	64	87.8	59	73	73	85.8	59	80	80	88.8	59	45	45	67.6	59	14
60	40	40	67.6	60	73	73	85.8	60	60	60	69.6	60	34	34	56.5	60	60
61	47	47	71.7	61	27	27	48.4	61	15	15	18.1	61	91	91	97.9	61	16
62	49	49	77.7	62	12	12	23.2	62	44	44	53.5	62	31	31	49.4	62	42
63	29	29	50.5	63	49	49	73.7	63	80	80	88.8	63	33	33	54.5	63	21
64	36	36	60.6	64	20	20	33.3	64	28	28	40.4	64	64	64	84.8	64	40
65	57	57	82.8	65	140	140	98.9	65	30	30	42.4	65	22	22	36.3	65	55
66	20	20	39.3	66	14	14	27.2	66	15	15	18.1	66	21	21	33.3	66	42
67	69	69	91.9	67	28	28	51.5	67	37	37	48.4	67	30	30	45.4	67	22
68	4	4	6	68	82	82	92.9	68	32	32	44.4	68	31	31	49.4	68	46
69	15	15	30.3	69	25	25	42.4	69	45	45	57.5	69	50	50	70.7	69	52
70	48	48	75.7	70	20	20	33.3	70	23	23	35.3	70	29	29	44.4	70	58
71	31	31	52.5	71	12	12	23.2	71	125	125	97.9	71	34	34	56.5	71	30
72	105	105	97.9	72	49	49	73.7	72	19	19	24.2	72	24	24	39.3	72	59
73	4	4	6	73	48	48	71.7	73	45	45	57.5	73	10	10	18.1	73	61
74	9	9	14.1	74	26	26	46.4	74	25	25	36.3	74	39	39	65.6	74	7
75	66	66	89.8	75	77	77	89.8	75	50	50	60.6	75	8	8	16.1	75	21
76	48	48	75.7	76	80	80	90.9	76	15	15	18.1	76	36	36	59.5	76	12
77	77	77	95.9	77	81	81	91.9	77	50	50	60.6	77	87	87	95.9	77	27
78	43	43	69.6	78	4	4	16.1	78	17	17	22.2	78	76	76	90.9	78	25
79	19	19	38.3	79	70	70	83.8	79	55	55	64.6	79	11	11	20.2	79	5
80	30	30	51.5	80	24	24	40.4	80	10	10	8	80	32	32	53.5	80	21
81	140	140	100	81	60	60	79.7	81	39	39	50.5	81	51	51	74.7	81	58
82	76	76	94.9	82	7	7	22.2	82	21	21	29.2	82	26	26	41.4	82	16
83	18	18	36.3	83	45	45	67.6	83	29	29	41.4	83	73	73	89.8	83	52
84	18	18	36.3	84	36	36	60.6	84	90	90	93.9	84	72	72	87.8	84	42
85	47	47	71.7	85	40	40	63.6	85	62	62	73.7	85	17	17	28.2	85	34
86	20	20	39.3	86	51	51	75.7	86	25	25	36.3	86	24	24	39.3	86	14
87	14	14	26.2	87	35	35	58.5	87	59	59	68.6	87	22	22	36.3	87	4
88	3	3	4	88	26	26	46.4	88	60	60	69.6	88	37	37	62.6	88	14
89	16	16	34.3	89	25	25	42.4	89	95	95	94.9	89	19	19	29.2	89	22
90	11	11	20.2	90	20	20	33.3	90	51	51	62.6	90	19	19	29.2	90	4
91	4	4	6	91	48	48	71.7	91	21	21	29.2	91	14	14	21.2	91	6
92	13	13	23.2	92	61	61	80.8	92	20	20	26.2	92	16	16	25.2	92	7
93	24	24	45.4	93	91	91	97.9	93	64	64	74.7	93	79	79	93.9	93	20
94	50	50	78.7	94	39	39	62.6	94	34	34	45.4	94	14	14	21.2	94	38
95	7	7	12.1	95	65	65	82.8	95	41	41	52.5	95	50	50	70.7	95	40
96	61	61	84.8	96	30	30	53.5	96	6	6	5	96	51	51	74.7	96	49
97	65	65	88.8	97	23	23	37.3	97	20	20	26.2	97	9	9	17.1	97	44
98	33	33	55.5	98	15	15	28.2	98	12	12	14.1	98	10	10	18.1	98	20
99	72	72	92.9	99	40	40	63.6	99	36	36	47.4	99	53	53	78.7	99	22
100	26	26	46.4	100	28	28	51.5	100	80	80	88.8	100	58	58	81.8	100	47

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24	17	15	76	-6.0	8	7	18	92	-6.0	18	14	14	82	-6.0	13	8	15	87	-6.0	13	9
7	7	17	93	-6.5	1	1	7	99	-6.5	4	3	14	96	-6.5	5	2	8	95	-6.5	4	3
0	0	7	100	-7.0	0	0	1	100	-7.0	1	1	3	99	-7.0	3	2	2	97	-7.0	1	1
0	0	0	100	-7.5	0	0	0	100	-7.5	0	0	1	100	-7.5	1	0	2	99	-7.5	0	0
0	0	0	100	-8.0	0	0	0	100	-8.0	0	0	0	100	-8.0	1	0	0	99	-8.0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	1	1	0	99	-8.5	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			1	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
16	17	-3.0	-3.5	8	14	21	-3.0	-3.5	9	12	20	-3.0	-3.5	10	16	19	-2.5	-3.0	6	#N/A	#N/A
23	33	-4.0	-4.5	17	21	30	-3.5	-4.0	13	20	29	-3.5	-4.0	14	25	34	-3.5	-4.0	11	19	29
43	61	-5.0	-5.5	37	39	56	-4.5	-5.0	28	39	52	-4.5	-5.0	30	47	57	-4.5	-5.0	25	37	51
61	76	-5.5	-6.0	63	74	92	-5.5	-6.0	46	68	82	-5.5	-6.0	54	72	87	-5.5	-6.0	48	67	87
76	93	-6.0	-6.5	75	74	92	-5.5	-6.0	55	82	96	-6.0	-6.5	67	72	87	-5.5	-6.0	60	67	87
76	93	-6.0	-6.5	85	74	92	-5.5	-6.0	62	82	96	-6.0	-6.5	78	87	95	-6.0	-6.5	73	87	96

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	110	110	98.9	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	24	24	41.4	8	<2	1	0	8	<2
9	<2	1	0	9	<2	1	0	9	25	25	43.4	9	<2	1	0	9	<2
10	95	95	94.9	10	7	7	10.1	10	107	107	97.9	10	<2	1	0	10	<2
11	21	21	29.2	11	45	45	73.7	11	54	54	75.7	11	<2	1	0	11	<2
12	25	25	34.3	12	11	11	16.1	12	47	47	71.7	12	<2	1	0	12	<2
13	45	45	57.5	13	16	16	28.2	13	67	67	83.8	13	<2	1	0	13	<2
14	51	51	66.6	14	32	32	52.5	14	70	70	88.8	14	<2	1	0	14	<2
15	6	6	12.1	15	66	66	92.9	15	52	52	73.7	15	78	78	92.9	15	<2
16	3	3	9	16	28	28	48.4	16	67	67	83.8	16	14	14	30.3	16	<2
17	51	51	66.6	17	40	40	64.6	17	47	47	71.7	17	34	34	59.5	17	<2
18	64	64	74.7	18	5	5	9	18	46	46	68.6	18	11	11	24.2	18	<2
19	15	15	19.1	19	11	11	16.1	19	66	66	82.8	19	37	37	62.6	19	67
20	88	88	90.9	20	68	68	94.9	20	85	85	95.9	20	10	10	21.2	20	67
21	70	70	79.7	21	32	32	52.5	21	101	101	96.9	21	42	42	67.6	21	55
22	62	62	73.7	22	11	11	16.1	22	67	67	83.8	22	68	68	87.8	22	48
23	13	13	18.1	23	16	16	28.2	23	23	23	39.3	23	12	12	25.2	23	62
24	31	31	41.4	24	43	43	70.7	24	41	41	64.6	24	18	18	36.3	24	61
25	22	22	32.3	25	52	52	78.7	25	39	39	59.5	25	29	29	51.5	25	32
26	44	44	55.5	26	13	13	22.2	26	27	27	44.4	26	46	46	72.7	26	71
27	90	90	91.9	27	36	36	58.5	27	17	17	29.2	27	38	38	64.6	27	18
28	7	7	14.1	28	37	37	59.5	28	58	58	77.7	28	135	135	97.9	28	48
29	45	45	57.5	29	19	19	31.3	29	19	19	33.3	29	145	145	98.9	29	38
30	50	50	63.6	30	58	58	89.8	30	11	11	17.1	30	45	45	70.7	30	96
31	73	73	83.8	31	9	9	14.1	31	13	13	22.2	31	53	53	77.7	31	46
32	27	27	39.3	32	24	24	39.3	32	10	10	14.1	32	47	47	73.7	32	130
33	43	43	54.5	33	11	11	16.1	33	15	15	26.2	33	7	7	16.1	33	21
34	30	30	40.4	34	60	60	90.9	34	33	33	52.5	34	116	116	96.9	34	56
35	68	68	78.7	35	25	25	40.4	35	13	13	22.2	35	28	28	50.5	35	14
36	94	94	93.9	36	55	55	83.8	36	7	7	10.1	36	115	115	95.9	36	50
37	95	95	94.9	37	21	21	33.3	37	15	15	26.2	37	62	62	84.8	37	70
38	42	42	53.5	38	55	55	83.8	38	31	31	50.5	38	20	20	41.4	38	63
39	40	40	45.4	39	40	40	64.6	39	20	20	34.3	39	19	19	39.3	39	13
40	21	21	29.2	40	44	44	72.7	40	9	9	12.1	40	22	22	45.4	40	36
41	60	60	70.7	41	21	21	33.3	41	78	78	92.9	41	39	39	66.6	41	52
42	50	50	63.6	42	32	32	52.5	42	4	4	6	42	17	17	34.3	42	66
43	101	101	98.9	43	97	97	100	43	40	40	63.6	43	9	9	19.1	43	97
44	15	15	19.1	44	32	32	52.5	44	34	34	55.5	44	7	7	16.1	44	34
45	72	72	81.8	45	31	31	51.5	45	4	4	6	45	16	16	33.3	45	44
46	85	85	88.8	46	71	71	95.9	46	72	72	91.9	46	13	13	27.2	46	12
47	80	80	85.8	47	42	42	69.6	47	23	23	39.3	47	15	15	31.3	47	21
48	40	40	45.4	48	55	55	83.8	48	28	28	47.4	48	20	20	41.4	48	16
49	26	26	38.3	49	14	14	24.2	49	27	27	44.4	49	43	43	68.6	49	30
50	31	31	41.4	50	25	25	40.4	50	46	46	68.6	50	10	10	21.2	50	77
51	25	25	34.3	51	67	67	93.9	51	69	69	87.8	51	21	21	43.4	51	29
52	40	40	45.4	52	12	12	21.2	52	33	33	52.5	52	29	29	51.5	52	17
53	21	21	29.2	53	27	27	44.4	53	29	29	49.4	53	18	18	36.3	53	27
54	71	71	80.8	54	7	7	10.1	54	18	18	31.3	54	38	38	64.6	54	37
55	12	12	17.1	55	17	17	30.3	55	22	22	37.3	55	15	15	31.3	55	18
56	20	20	27.2	56	40	40	64.6	56	8	8	11.1	56	13	13	27.2	56	54
57	40	40	45.4	57	75	75	97.9	57	70	70	88.8	57	17	17	34.3	57	44
58	81	81	87.8	58	60	60	90.9	58	55	55	76.7	58	34	34	59.5	58	45
59	74	74	84.8	59	49	49	76.7	59	39	39	59.5	59	47	47	73.7	59	20
60	90	90	91.9	60	30	30	50.5	60	10	10	14.1	60	33	33	57.5	60	39
61	46	46	61.6	61	21	21	33.3	61	4	4	6	61	13	13	27.2	61	39
62	57	57	69.6	62	48	48	75.7	62	80	80	93.9	62	33	33	57.5	62	51
63	60	60	70.7	63	56	56	87.8	63	18	18	31.3	63	32	32	55.5	63	31
64	44	44	55.5	64	26	26	43.4	64	34	34	55.5	64	68	68	87.8	64	30
65	39	39	44.4	65	53	53	80.8	65	52	52	73.7	65	23	23	47.4	65	13
66	17	17	23.2	66	14	14	24.2	66	11	11	17.1	66	59	59	81.8	66	54
67	6	6	12.1	67	9	9	14.1	67	17	17	29.2	67	18	18	36.3	67	74
68	7	7	14.1	68	47	47	74.7	68	11	11	17.1	68	49	49	76.7	68	27
69	5	5	10.1	69	19	19	31.3	69	58	58	77.7	69	34	34	59.5	69	23
70	17	17	23.2	70	11	11	16.1	70	12	12	20.2	70	23	23	47.4	70	99
71	50	50	63.6	71	21	21	33.3	71	15	15	26.2	71	37	37	62.6	71	48
72	80	80	85.8	72	34	34	56.5	72	13	13	22.2	72	78	78	92.9	72	42
73	5	5	10.1	73	15	15	26.2	73	27	27	44.4	73	56	56	79.7	73	43
74	40	40	45.4	74	49	49	76.7	74	28	28	47.4	74	9	9	19.1	74	48
75	66	66	77.7	75	57	57	88.8	75	10	10	14.1	75	72	72	90.9	75	16
76	61	61	72.7	76	40	40	64.6	76	42	42	67.6	76	64	64	86.8	76	4
77	45	45	57.5	77	13	13	22.2	77	14	14	25.2	77	22	22	45.4	77	40
78	24	24	33.3	78	7	7	10.1	78	58	58	77.7	78	60	60	82.8	78	13
79	25	25	34.3	79	55	55	83.8	79	68	68	86.8	79	45	45	70.7	79	19
80	15	15	19.1	80	27	27	44.4	80	62	62	81.8	80	19	19	39.3	80	32
81	46	46	61.6	81	80	80	98.9	81	21	21	35.3	81	58	58	80.8	81	54
82	40	40	45.4	82	52	52	78.7	82	71	71	90.9	82	21	21	43.4	82	41
83	15	15	19.1	83	37	37	59.5	83	37	37	58.5	83	48	48	75.7	83	52
84	10	10	16.1	84	22	22	38.3	84	41	41	64.6	84	63	63	85.8	84	20
85	119	119	100	85	27	27	44.4	85	39	39	59.5	85	71	71	89.8	85	44
86	95	95	94.9	86	34	34	56.5	86	33	33	52.5	86	26	26	49.4	86	48
87	65	65	76.7	87	27	27	44.4	87	46	46	68.6	87	10	10	21.2	87	63
88	18	18	25.2	88	37	37	59.5	88	22	22	37.3	88	5	5	14.1	88	30
89	100	100	97.9	89	53	53	80.8	89	41	41	64.6	89	60	60	82.8	89	32
90	72	72	81.8	90	54	54	82.8	90	31	31	50.5	90	75	75	91.9	90	24
91	35	35	43.4	91	38	38	63.6	91	60	60	80.8	91	29	29	51.5	91	33
92	20	20	27.2	92	43	43	70.7	92	24	24	41.4	92	55	55	78.7	92	65
93	40	40	45.4	93	37	37	59.5	93	21	21	35.3	93	83	83	94.9	93	30
94	40	40	45.4	94	8	8	13.1	94	39	39	59.5	94	5	5	14.1	94	13
95	45	45	57.5	95	71	71	95.9	95	160	160	100	95	422	422	100	95	12
96	25	25	34.3	96	25	25	40.4	96	9	9	12.1	96	31	31	54.5	96	24
97	52	52	68.6	97	28	28	48.4	97	6	6	9	97	8	8	18.1	97	16
98	19	19	26.2	98	40	40	64.6	98	12	12	20.2	98	12	12	25.2	98	37
99	85	85	88.8	99	21	21	33.3	99	36	36	57.5	99	44	44	69.6	99	59
100	64	64	74.7	100	15	15	26.2	100	80	80	93.9	100	32	32	55.5	100	78

.0	42	28	16	58	-7.0	34	23	12	66	-7.0	33	14	10	67	-7.0
.5	14	8	28	86	-7.5	11	10	23	89	-7.5	19	11	14	81	-7.5
.0	6	5	8	94	-8.0	1	1	10	99	-8.0	8	3	11	92	-8.0
.5	1	1	5	99	-8.5	0	0	1	100	-8.5	5	5	3	95	-8.5
.0			1	100	-9.0			0	100	-9.0			5	100	-9.0
		100					**100**					**100**			
					Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**
	16	19	-3.5	-4.0	11	16	22	-4.0	-4.5	16	16	19	-3.5	-4.0	11
	24	31	-5.0	-5.5	34	22	31	-4.5	-5.0	25	25	29	-4.5	-5.0	23
	42	58	-6.5	-7.0	107	42	54	-6.0	-6.5	80	44	57	-6.0	-6.5	75
	58	86	-7.0	-7.5	157	66	89	-7.0	-7.5	146	67	81	-7.0	-7.5	156
	58	86	-7.0	-7.5	176	66	89	-7.0	-7.5	167	81	92	-7.5	-8.0	198
	86	94	-7.5	-8.0	215	89	99	-7.5	-8.0	186	81	92	-7.5	-8.0	240

paste group of
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count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Perce Rank
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5	
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9	
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16	
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16	
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18	
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20	
7	<2	1	0	20	5	7	140	140	71.7	20	5	7	<2	1	0	20	
8	<2	1	0	20	5	8	32	32	28.2	20	5	8	<2	1	0	20	
9	<2	1	0	21	8	9	42	42	33.3	21	8	9	<2	1	0	21	
10	15	15	16.1	22	9	10	65	65	42.4	22	9	10	<2	1	0	22	
11	48	48	32.3	23	10.1	11	115	115	60.6	23	10.1	11	50	50	37.3	23	
12	91	91	42.4	23	10.1	12	115	115	60.6	23	10.1	12	15	15	17.1	23	
13	140	140	63.6	24	12.1	13	17	17	16.1	24	12.1	13	98	98	57.5	24	
14	65	65	35.3	25	13.1	14	112	112	59.5	25	13.1	14	120	120	63.6	25	
15	15	15	16.1	27	14.1	15	60	60	41.4	27	14.1	15	15	15	17.1	27	
16	69	69	36.3	27	14.1	16	65	65	42.4	27	14.1	16	70	70	45.4	27	
17	40	40	28.2	29	16.1	17	160	160	81.8	29	16.1	17	220	220	85.8	29	
18	180	180	83.8	30	17.1	18	165	165	83.8	30	17.1	18	46	46	34.3	30	
19	30	30	22.2	31	18.1	19	190	190	89.8	31	18.1	19	42	42	32.3	31	
20	265	265	94.9	31	18.1	20	140	140	71.7	31	18.1	20	115	115	62.6	31	
21	36	36	25.2	31	18.1	21	8	8	8	31	18.1	21	200	200	82.8	31	
22	125	125	56.5	32	21.2	22	138	138	70.7	32	21.2	22	45	45	33.3	32	
23	20	20	20.2	33	22.2	23	175	175	86.8	33	22.2	23	65	65	44.4	33	
24	87	87	41.4	34	23.2	24	156	156	79.7	34	23.2	24	40	40	30.3	34	
25	95	95	43.4	34	23.2	25	4	4	6	34	23.2	25	90	90	53.5	34	
26	155	155	72.7	34	23.2	26	35	35	31.3	34	23.2	26	110	110	61.6	34	
27	210	210	88.8	35	26.2	27	180	180	87.8	35	26.2	27	830	830	100	35	
28	195	195	86.8	40	27.2	28	210	210	92.9	40	27.2	28	155	155	76.7	40	
29	4	4	13.1	40	27.2	29	130	130	66.6	40	27.2	29	70	70	45.4	40	
30	30	30	22.2	40	27.2	30	55	55	40.4	40	27.2	30	90	90	53.5	40	
31	150	150	71.7	42	30.3	31	50	50	37.3	42	30.3	31	230	230	89.8	42	
32	300	300	96.9	42	30.3	32	125	125	65.6	42	30.3	32	105	105	60.6	42	
33	159	159	77.7	44	32.3	33	31	31	25.2	44	32.3	33	205	205	84.8	44	
34	100	100	45.4	44	32.3	34	158	158	80.8	44	32.3	34	310	310	94.9	44	
35	170	170	80.8	46	34.3	35	8	8	8	46	34.3	35	20	20	20.2	46	
36	120	120	54.5	48	35.3	36	16	16	14.1	48	35.3	36	160	160	77.7	48	
37	100	100	45.4	49	36.3	37	49	49	36.3	49	36.3	37	10	10	13.1	49	
38	135	135	60.6	50	37.3	38	105	105	55.5	50	37.3	38	150	150	75.7	50	
39	205	205	87.8	54	38.3	39	121	121	64.6	54	38.3	39	133	133	70.7	54	
40	145	145	67.6	54	38.3	40	230	230	96.9	54	38.3	40	8	8	12.1	54	
41	37	37	27.2	55	40.4	41	38	38	32.3	55	40.4	41	20	20	20.2	55	
42	18	18	19.1	55	40.4	42	30	30	24.2	55	40.4	42	12	12	16.1	55	
43	115	115	52.5	55	40.4	43	146	146	76.7	55	40.4	43	225	225	88.8	55	
44	35	35	24.2	55	40.4	44	155	155	78.7	55	40.4	44	130	130	67.6	55	
45	3	3	9	61	44.4	45	200	200	91.9	61	44.4	45	5	5	10.1	61	
46	155	155	72.7	62	45.4	46	26	26	23.2	62	45.4	46	49	49	36.3	62	
47	140	140	63.6	62	45.4	47	170	170	85.8	62	45.4	47	160	160	77.7	62	
48	104	104	47.4	62	45.4	48	32	32	28.2	62	45.4	48	70	70	45.4	62	
49	157	157	76.7	64	48.4	49	120	120	62.6	64	48.4	49	490	490	98.9	64	
50	45	45	30.3	67	49.4	50	97	97	54.5	67	49.4	50	90	90	53.5	67	
51	220	220	90.9	67	49.4	51	42	42	33.3	67	49.4	51	145	145	74.7	67	
52	80	80	40.4	70	51.5	52	48	48	35.3	70	51.5	52	277	277	93.9	70	
53	140	140	63.6	72	52.5	53	120	120	62.6	72	52.5	53	28	28	27.2	72	
54	350	350	98.9	74	53.5	54	76	76	46.4	74	53.5	54	20	20	20.2	74	
55	110	110	48.4	75	54.5	55	140	140	71.7	75	54.5	55	71	71	49.4	75	
56	180	180	83.8	75	54.5	56	135	135	67.6	75	54.5	56	140	140	71.7	75	
57	110	110	48.4	76	56.5	57	150	150	77.7	76	56.5	57	61	61	42.4	76	
58	135	135	60.6	78	57.5	58	87	87	52.5	78	57.5	58	120	120	63.6	78	
59	15	15	16.1	80	58.5	59	80	80	47.4	80	58.5	59	55	55	38.3	80	
60	300	300	96.9	82	59.5	60	180	180	87.8	82	59.5	60	126	126	66.6	82	
61	145	145	67.6	83	60.6	61	135	135	67.6	83	60.6	61	460	460	96.9	83	
62	180	180	83.8	84	61.6	62	15	15	12.1	84	61.6	62	31	31	28.2	84	
63	36	36	25.2	85	62.6	63	244	244	98.9	85	62.6	63	220	220	85.8	85	
64	215	215	89.8	86	63.6	64	110	110	57.5	86	63.6	64	19	19	19.1	86	
65	42	42	29.2	88	64.6	65	50	50	37.3	88	64.6	65	56	56	39.3	88	
66	9	9	15.1	88	64.6	66	24	24	22.2	88	64.6	66	200	200	82.8	88	
67	116	116	53.5	89	66.6	67	145	145	75.7	89	66.6	67	130	130	67.6	89	
68	840	840	100	90	67.6	68	85	85	51.5	90	67.6	68	35	35	29.2	90	
69	25	25	21.2	90	67.6	69	235	235	97.9	90	67.6	69	275	275	92.9	90	
70	130	130	58.5	90	67.6	70	90	90	53.5	90	67.6	70	90	90	53.5	90	
71	50	50	33.3	90	67.6	71	360	360	100	90	67.6	71	255	255	91.9	90	
72	250	250	93.9	92	71.7	72	80	80	47.4	92	71.7	72	120	120	63.6	92	
73	78	78	39.3	93	72.7	73	19	19	18.1	93	72.7	73	130	130	67.6	93	
74	75	75	38.3	93	72.7	74	137	137	69.6	93	72.7	74	250	250	90.9	93	
75	270	270	95.9	95	74.7	75	16	16	14.1	95	74.7	75	168	168	79.7	95	
76	53	53	34.3	99	75.7	76	110	110	57.5	99	75.7	76	177	177	80.8	99	
77	137	137	62.6	100	76.7	77	31	31	25.2	100	76.7	77	25	25	25.2	100	
78	140	140	63.6	100	76.7	78	13	13	10.1	100	76.7	78	70	70	45.4	100	
79	3	3	9	105	78.7	79	31	31	25.2	105	78.7	79	5	5	10.1	105	
80	165	165	79.7	107	79.7	80	32	32	28.2	107	79.7	80	21	21	23.2	107	
81	160	160	78.7	107	79.7	81	215	215	94.9	107	79.7	81	190	190	81.8	107	
82	95	95	43.4	109	81.8	82	17	17	16.1	109	81.8	82	390	390	95.9	109	
83	155	155	72.7	110	82.8	83	75	75	45.4	110	82.8	83	470	470	97.9	110	
84	3	3	9	115	83.8	84	65	65	42.4	115	83.8	84	140	140	71.7	115	
85	155	155	72.7	116	84.8	85	105	105	55.5	116	84.8	85	56	56	39.3	116	

-3.5	83	0	0	17	-3.5	86	2	1	14	-3.5	83	3	0	17	-3.5
-4.0	83	3	0	17	-4.0	84	2	2	16	-4.0	80	0	3	20	-4.0
-4.5	80	5	3	20	-4.5	82	1	2	18	-4.5	80	4	0	20	-4.5
-5.0	75	2	5	25	-5.0	81	8	1	19	-5.0	76	5	4	24	-5.0
-5.5	73	6	2	27	-5.5	73	5	8	27	-5.5	71	5	5	29	-5.5
-6.0	67	19	6	33	-6.0	68	21	5	32	-6.0	66	13	5	34	-6.0
-6.5	48	15	19	52	-6.5	47	12	21	53	-6.5	53	18	13	47	-6.5
-7.0	33	18	15	67	-7.0	35	21	12	65	-7.0	35	12	18	65	-7.0
-7.5	15	11	18	85	-7.5	14	9	21	86	-7.5	23	13	12	77	-7.5
-8.0	4	3	11	96	-8.0	5	3	9	95	-8.0	10	8	13	90	-8.0
-8.5	1	1	3	99	-8.5	2	2	3	98	-8.5	2	2	8	98	-8.5
-9.0			1	100	-9.0			2	100	-9.0			2	100	-9.0
		100					**100**					**100**			
s					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**
	15	17	-2.5	-4.0	10	16	18	-4.0	-4.5	16	#N/A	#N/A	#N/A	#N/A	#N/A
	25	27	-5.0	-5.5	32	19	27	-5.0	-5.5	41	24	29	-5.0	-5.5	34
	33	52	-6.0	-6.5	87	32	53	-6.0	-6.5	86	47	65	-6.5	-7.0	95
	67	85	-7.0	-7.5	149	65	86	-7.0	-7.5	151	65	77	-7.0	-7.5	170
	67	85	-7.0	-7.5	177	65	86	-7.0	-7.5	174	77	90	-7.5	-8.0	218
	85	96	-7.5	-8.0	211	86	95	-7.5	-8.0	211	90	98	-8.0	-8.5	256

paste group of 6
ew location to

umns A and B

cle sizes in green
at row 30.
or particles
2 mm, they are
1's in the next
fferent "less than"
sed, some things
e changed.
e more than 100
need to fill down
to the right of the
lumn to match.
e fewer than 100,
clear all contents
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rmulas, unless you
an 311 particles.

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Perc Rank
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5	
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9	
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16	
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16	
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18	
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20	
7	<2	1	0	20	5	7	<2	1	0	20	5	7	<2	1	0	20	
8	<2	1	0	20	5	8	<2	1	0	20	5	8	<2	1	0	20	
9	<2	1	0	21	8	9	<2	1	0	21	8	9	<2	1	0	21	
10	<2	1	0	22	9	10	<2	1	0	22	9	10	<2	1	0	22	
11	<2	1	0	23	10.1	11	<2	1	0	23	10.1	11	<2	1	0	23	
12	<2	1	0	23	10.1	12	<2	1	0	23	10.1	12	<2	1	0	23	
13	<2	1	0	24	12.1	13	130	130	65.6	24	12.1	13	<2	1	0	24	
14	<2	1	0	25	13.1	14	85	85	42.4	25	13.1	14	<2	1	0	25	
15	90	90	49.4	27	14.1	15	90	90	48.4	27	14.1	15	<2	1	0	27	
16	240	240	92.9	27	14.1	16	220	220	91.9	27	14.1	16	<2	1	0	27	
17	175	175	81.8	29	16.1	17	135	135	68.6	29	16.1	17	<2	1	0	29	
18	175	175	81.8	30	17.1	18	120	120	61.6	30	17.1	18	110	110	56.5	30	
19	110	110	59.5	31	18.1	19	150	150	74.7	31	18.1	19	110	110	56.5	31	
20	80	80	42.4	31	18.1	20	130	130	65.6	31	18.1	20	150	150	67.6	31	
21	120	120	63.6	31	18.1	21	205	205	87.8	31	18.1	21	265	265	90.9	31	
22	60	60	31.3	32	21.2	22	160	160	81.8	32	21.2	22	80	80	43.4	32	
23	115	115	61.6	33	22.2	23	135	135	68.6	33	22.2	23	85	85	46.4	33	
24	70	70	35.3	34	23.2	24	160	160	81.8	34	23.2	24	15	15	18.1	34	
25	180	180	83.8	34	23.2	25	51	51	29.2	34	23.2	25	250	250	87.8	34	
26	105	105	57.5	34	23.2	26	40	40	22.2	34	23.2	26	175	175	74.7	34	
27	90	90	49.4	35	26.2	27	140	140	70.7	35	26.2	27	172	172	73.7	35	
28	70	70	35.3	40	27.2	28	35	35	20.2	40	27.2	28	115	115	62.6	40	
29	130	130	68.6	40	27.2	29	75	75	35.3	40	27.2	29	105	105	55.5	40	
30	260	260	96.9	40	27.2	30	155	155	78.7	40	27.2	30	79	79	42.4	40	
31	79	79	41.4	42	30.3	31	250	250	94.9	42	30.3	31	181	181	77.7	42	
32	100	100	55.5	42	30.3	32	120	120	61.6	42	30.3	32	150	150	67.6	42	
33	3	3	14.1	44	32.3	33	45	45	25.2	44	32.3	33	99	99	54.5	44	
34	132	132	70.7	44	32.3	34	145	145	71.7	44	32.3	34	110	110	56.5	44	
35	80	80	42.4	46	34.3	35	76	76	37.3	46	34.3	35	31	31	23.2	46	
36	130	130	68.6	48	35.3	36	60	60	31.3	48	35.3	36	73	73	41.4	48	
37	81	81	45.4	49	36.3	37	21	21	17.1	49	36.3	37	98	98	52.5	49	
38	74	74	39.3	50	37.3	38	85	85	42.4	50	37.3	38	72	72	40.4	50	
39	48	48	27.2	54	38.3	39	34	34	19.1	54	38.3	39	66	66	36.3	54	
40	270	270	97.9	54	38.3	40	100	100	55.5	54	38.3	40	330	330	96.9	54	
41	148	148	74.7	55	40.4	41	310	310	97.9	55	40.4	41	230	230	86.8	55	
42	92	92	52.5	55	40.4	42	150	150	74.7	55	40.4	42	405	405	98.9	55	
43	68	68	33.3	55	40.4	43	56	56	30.3	55	40.4	43	330	330	96.9	55	
44	145	145	71.7	55	40.4	44	30	30	18.1	55	40.4	44	64	64	33.3	55	
45	8	8	15.1	61	44.4	45	105	105	57.5	61	44.4	45	120	120	63.6	61	
46	72	72	37.3	62	45.4	46	95	95	54.5	62	45.4	46	70	70	38.3	62	
47	124	124	65.6	62	45.4	47	78	78	38.3	62	45.4	47	49	49	29.2	62	
48	59	59	30.3	62	45.4	48	10	10	13.1	62	45.4	48	55	55	30.3	62	
49	192	192	87.8	64	48.4	49	120	120	61.6	64	48.4	49	15	15	18.1	64	
50	29	29	23.2	67	49.4	50	94	94	53.5	67	49.4	50	26	26	21.2	67	
51	270	270	97.9	67	49.4	51	85	85	42.4	67	49.4	51	290	290	93.9	67	
52	191	191	86.8	70	51.5	52	220	220	91.9	70	51.5	52	65	65	34.3	70	
53	129	129	67.6	72	52.5	53	80	80	40.4	72	52.5	53	311	311	95.9	72	
54	45	45	26.2	74	53.5	54	150	150	74.7	74	53.5	54	80	80	43.4	74	
55	32	32	24.2	75	54.5	55	145	145	71.7	75	54.5	55	160	160	70.7	75	
56	68	68	33.3	75	54.5	56	112	112	58.5	75	54.5	56	111	111	60.6	75	
57	57	57	29.2	76	56.5	57	90	90	48.4	76	56.5	57	210	210	82.8	76	
58	230	230	91.9	78	57.5	58	100	100	55.5	78	57.5	58	130	130	65.6	78	
59	98	98	53.5	80	58.5	59	205	205	87.8	80	58.5	59	180	180	75.7	80	
60	125	125	66.6	82	59.5	60	180	180	84.8	82	59.5	60	180	180	75.7	82	
61	150	150	75.7	83	60.6	61	118	118	59.5	83	60.6	61	95	95	49.4	83	
62	145	145	71.7	84	61.6	62	70	70	33.3	84	61.6	62	160	160	70.7	84	
63	200	200	88.8	85	62.6	63	68	68	32.3	85	62.6	63	310	310	94.9	85	
64	115	115	61.6	86	63.6	64	50	50	28.2	86	63.6	64	270	270	91.9	86	
65	90	90	49.4	88	64.6	65	5	5	12.1	88	64.6	65	110	110	56.5	88	
66	110	110	59.5	88	64.6	66	190	190	86.8	88	64.6	66	140	140	66.6	88	
67	145	145	71.7	89	66.6	67	46	46	27.2	89	66.6	67	120	120	63.6	89	
68	8	8	15.1	90	67.6	68	550	550	100	90	67.6	68	27	27	22.2	90	
69	20	20	19.1	90	67.6	69	90	90	48.4	90	67.6	69	35	35	24.2	90	
70	215	215	90.9	90	67.6	70	180	180	84.8	90	67.6	70	205	205	81.8	90	
71	64	64	32.3	90	67.6	71	78	78	38.3	90	67.6	71	65	65	34.3	90	
72	165	165	79.7	92	71.7	72	155	155	78.7	92	71.7	72	42	42	26.2	92	
73	180	180	83.8	93	72.7	73	120	120	61.6	93	72.7	73	220	220	84.8	93	
74	87	87	48.4	93	72.7	74	205	205	87.8	93	72.7	74	25	25	20.2	93	
75	250	250	94.9	95	74.7	75	35	35	20.2	95	74.7	75	68	68	37.3	95	
76	250	250	94.9	99	75.7	76	85	85	42.4	99	75.7	76	95	95	49.4	99	
77	160	160	77.7	100	76.7	77	90	90	48.4	100	76.7	77	210	210	82.8	100	
78	80	80	42.4	100	76.7	78	85	85	42.4	100	76.7	78	111	111	60.6	100	
79	155	155	76.7	105	78.7	79	160	160	81.8	105	78.7	79	60	60	31.3	105	

-3.5	76	2	1	24	-3.5	69	1	1	31	-3.5	69	3	1	31	-3.5
-4.0	74	5	2	26	-4.0	68	0	1	32	-4.0	66	1	3	34	-4.0
-4.5	69	4	5	31	-4.5	68	5	0	32	-4.5	65	7	1	35	-4.5
-5.0	65	4	4	35	-5.0	63	5	5	37	-5.0	58	6	7	42	-5.0
-5.5	61	2	4	39	-5.5	58	8	5	42	-5.5	52	4	6	48	-5.5
-6.0	59	14	2	41	-6.0	50	12	8	50	-6.0	48	13	4	52	-6.0
-6.5	45	13	14	55	-6.5	38	6	12	62	-6.5	35	3	13	65	-6.5
-7.0	32	16	13	68	-7.0	32	18	6	68	-7.0	32	15	3	68	-7.0
-7.5	16	10	16	84	-7.5	14	10	18	86	-7.5	17	11	15	83	-7.5
-8.0	6	6	10	94	-8.0	4	3	10	96	-8.0	6	4	11	94	-8.0
-8.5	0	0	6	100	-8.5	1	1	3	99	-8.5	2	2	4	98	-8.5
-9.0			0	100	-9.0			1	100	-9.0			2	100	-9.0
		100					**100**					**100**			
s					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**
	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	24	26	-3.5	-4.0	13	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	41	55	-6.0	-6.5	80	50	62	-6.0	-6.5	64	48	52	-5.5	-6.0	54
	68	84	-7.0	-7.5	149	68	86	-7.0	-7.5	146	68	83	-7.0	-7.5	150
	84	94	-7.5	-8.0	180	68	86	-7.0	-7.5	173	83	94	-7.5	-8.0	186
	84	94	-7.5	-8.0	222	86	96	-7.5	-8.0	207	83	94	-7.5	-8.0	225

paste group of 6
ew location to

umns A and B

cle sizes in green
at row 30.
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clear all contents
low the last
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rmulas, unless you
an 311 particles.

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Perc Rank
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5	
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9	
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16	
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16	
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18	
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20	
7	<2	1	0	20	5	7	<2	1	0	20	5	7	<2	1	0	20	
8	<2	1	0	20	5	8	<2	1	0	20	5	8	<2	1	0	20	
9	<2	1	0	21	8	9	<2	1	0	21	8	9	<2	1	0	21	
10	<2	1	0	22	9	10	<2	1	0	22	9	10	<2	1	0	22	
11	<2	1	0	23	10.1	11	<2	1	0	23	10.1	11	<2	1	0	23	
12	<2	1	0	23	10.1	12	<2	1	0	23	10.1	12	<2	1	0	23	
13	<2	1	0	24	12.1	13	<2	1	0	24	12.1	13	<2	1	0	24	
14	<2	1	0	25	13.1	14	<2	1	0	25	13.1	14	<2	1	0	25	
15	<2	1	0	27	14.1	15	<2	1	0	27	14.1	15	<2	1	0	27	
16	<2	1	0	27	14.1	16	<2	1	0	27	14.1	16	<2	1	0	27	
17	<2	1	0	29	16.1	17	<2	1	0	29	16.1	17	<2	1	0	29	
18	<2	1	0	30	17.1	18	<2	1	0	30	17.1	18	<2	1	0	30	
19	<2	1	0	31	18.1	19	<2	1	0	31	18.1	19	<2	1	0	31	
20	<2	1	0	31	18.1	20	<2	1	0	31	18.1	20	<2	1	0	31	
21	130	130	68.6	31	18.1	21	<2	1	0	31	18.1	21	<2	1	0	31	
22	18	18	28.2	32	21.2	22	<2	1	0	32	21.2	22	<2	1	0	32	
23	16	16	25.2	33	22.2	23	<2	1	0	33	22.2	23	<2	1	0	33	
24	180	180	81.8	34	23.2	24	<2	1	0	34	23.2	24	<2	1	0	34	
25	130	130	68.6	34	23.2	25	<2	1	0	34	23.2	25	<2	1	0	34	
26	200	200	87.8	34	23.2	26	<2	1	0	34	23.2	26	<2	1	0	34	
27	97	97	56.5	35	26.2	27	42	42	40.4	35	26.2	27	<2	1	0	35	
28	33	33	35.3	40	27.2	28	74	74	53.5	40	27.2	28	<2	1	0	40	
29	205	205	88.8	40	27.2	29	143	143	73.7	40	27.2	29	<2	1	0	40	
30	73	73	42.4	40	27.2	30	130	130	68.6	40	27.2	30	<2	1	0	40	
31	210	210	89.8	42	30.3	31	87	87	60.6	42	30.3	31	75	75	54.5	42	
32	199	199	86.8	42	30.3	32	95	95	62.6	42	30.3	32	75	75	54.5	42	
33	150	150	73.7	44	32.3	33	180	180	84.8	44	32.3	33	40	40	43.4	44	
34	22	22	30.3	44	32.3	34	137	137	72.7	44	32.3	34	85	85	59.5	44	
35	300	300	95.9	46	34.3	35	8	8	29.2	46	34.3	35	30	30	38.3	46	
36	137	137	70.7	48	35.3	36	490	490	100	48	35.3	36	61	61	50.5	48	
37	55	55	39.3	49	36.3	37	49	49	44.4	49	36.3	37	87	87	61.6	49	
38	156	156	79.7	50	37.3	38	70	70	52.5	50	37.3	38	268	268	94.9	50	
39	113	113	62.6	54	38.3	39	10	10	30.3	54	38.3	39	89	89	62.6	54	
40	150	150	73.7	54	38.3	40	160	160	78.7	54	38.3	40	55	55	49.4	54	
41	24	24	31.3	55	40.4	41	65	65	50.5	55	40.4	41	85	85	59.5	55	
42	40	40	37.3	55	40.4	42	175	175	82.8	55	40.4	42	80	80	57.5	55	
43	187	187	84.8	55	40.4	43	24	24	33.3	55	40.4	43	465	465	98.9	55	
44	80	80	49.4	55	40.4	44	210	210	90.9	55	40.4	44	190	190	84.8	55	
45	84	84	52.5	61	44.4	45	6	6	27.2	61	44.4	45	360	360	97.9	61	
46	89	89	54.5	62	45.4	46	205	205	88.8	62	45.4	46	36	36	42.4	62	
47	98	98	57.5	62	45.4	47	135	135	71.7	62	45.4	47	20	20	34.3	62	
48	100	100	58.5	62	45.4	48	240	240	94.9	62	45.4	48	210	210	88.8	62	
49	29	29	33.3	64	48.4	49	67	67	51.5	64	48.4	49	175	175	80.8	64	
50	350	350	100	67	49.4	50	185	185	86.8	67	49.4	50	280	280	95.9	67	
51	79	79	47.4	67	49.4	51	155	155	76.7	67	49.4	51	150	150	72.7	67	
52	83	83	51.5	70	51.5	52	7	7	28.2	70	51.5	52	120	120	67.6	70	
53	5	5	22.2	72	52.5	53	50	50	45.4	72	52.5	53	181	181	83.8	72	
54	105	105	59.5	74	53.5	54	78	78	54.5	74	53.5	54	150	150	72.7	74	
55	220	220	91.9	75	54.5	55	31	31	36.3	75	54.5	55	63	63	51.5	75	
56	75	75	44.4	75	54.5	56	85	85	59.5	75	54.5	56	161	161	77.7	75	
57	74	74	43.4	76	56.5	57	210	210	90.9	76	56.5	57	90	90	63.6	76	
58	17	17	26.2	78	57.5	58	165	165	79.7	78	57.5	58	130	130	68.6	78	
59	17	17	26.2	80	58.5	59	57	57	47.4	80	58.5	59	165	165	78.7	80	
60	280	280	94.9	82	59.5	60	240	240	94.9	82	59.5	60	95	95	65.6	82	
61	95	95	55.5	83	60.6	61	115	115	66.6	83	60.6	61	15	15	32.3	83	
62	3	3	20.2	84	61.6	62	35	35	38.3	84	61.6	62	235	235	93.9	84	
63	79	79	47.4	85	62.6	63	215	215	92.9	85	62.6	63	43	43	46.4	85	
64	75	75	44.4	86	63.6	64	61	61	49.4	86	63.6	64	155	155	74.7	86	
65	145	145	72.7	88	64.6	65	55	55	46.4	88	64.6	65	210	210	88.8	88	
66	187	187	84.8	88	64.6	66	177	177	83.8	88	64.6	66	30	30	38.3	88	
67	152	152	78.7	89	66.6	67	36	36	39.3	89	66.6	67	175	175	80.8	89	
68	215	215	90.9	90	67.6	68	205	205	88.8	90	67.6	68	40	40	43.4	90	
69	110	110	60.6	90	67.6	69	150	150	74.7	90	67.6	69	44	44	47.4	90	
70	160	160	80.8	90	67.6	70	305	305	97.9	90	67.6	70	25	25	35.3	90	
71	110	110	60.6	90	67.6	71	170	170	80.8	90	67.6	71	40	40	43.4	90	
72	3	3	20.2	92	71.7	72	185	185	86.8	92	71.7	72	233	233	92.9	92	
73	60	60	40.4	93	72.7	73	120	120	67.6	93	72.7	73	10	10	30.3	93	
74	117	117	64.6	93	72.7	74	132	132	70.7	93	72.7	74	210	210	88.8	93	
75	125	125	67.6	95	74.7	75	150	150	74.7	95	74.7	75	311	311	96.9	95	
76	320	320	98.9	99	75.7	76	25	25	34.3	99	75.7	76	50	50	48.4	99	
77	120	120	65.6	100	76.7	77	270	270	96.9	100	76.7	77	100	100	66.6	100	
78	38	38	36.3	100	76.7	78	80	80	56.5	100	76.7	78	31	31	41.4	100	
79	43	43	38.3	105	78.7	79	45	45	41.4	105	78.7	79	75	75	54.5	105	

-3.5	84	2	0	16	-3.5	79	1	3	21	-3.5	75	1	0	25	-3.5
-4.0	82	3	2	18	-4.0	78	5	1	22	-4.0	74	4	1	26	-4.0
-4.5	79	4	3	21	-4.5	73	6	5	27	-4.5	70	3	4	30	-4.5
-5.0	75	5	4	25	-5.0	67	8	6	33	-5.0	67	1	3	33	-5.0
-5.5	70	12	5	30	-5.5	59	7	8	41	-5.5	66	6	1	34	-5.5
-6.0	58	8	12	42	-6.0	52	15	7	48	-6.0	60	16	6	40	-6.0
-6.5	50	15	8	50	-6.5	37	16	15	63	-6.5	44	23	16	56	-6.5
-7.0	35	20	15	65	-7.0	21	14	16	79	-7.0	21	17	23	79	-7.0
-7.5	15	14	20	85	-7.5	7	6	14	93	-7.5	4	4	17	96	-7.5
-8.0	1	1	14	99	-8.0	1	1	6	99	-8.0	0	0	4	100	-8.0
-8.5	0	0	1	100	-8.5	0	0	1	100	-8.5	0	0	0	100	-8.5
-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0
		100					**100**					**100**			
s					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**
	16	18	-3.5	-4.0	11	16	18	-2.0	-3.0	4	#N/A	#N/A	#N/A	#N/A	#N/A
	25	30	-5.0	-5.5	32	22	27	-4.0	-4.5	20	25	26	-3.5	-4.0	11
	50	65	-6.5	-7.0	90	48	63	-6.0	-6.5	67	40	56	-6.0	-6.5	79
	65	85	-7.0	-7.5	152	63	79	-6.5	-7.0	117	56	79	-6.5	-7.0	120
	65	85	-7.0	-7.5	177	79	93	-7.0	-7.5	145	79	96	-7.0	-7.5	142
	85	99	-7.5	-8.0	204	79	93	-7.0	-7.5	167	79	96	-7.0	-7.5	160

paste group of 6
ew location to

umns A and B

cle sizes in green
at row 30.
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2 mm, they are
n 1's in the next
fferent "less than"
sed, some things
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e more than 100
u need to fill down
to the right of the
lumn to match.
e fewer than 100,
clear all contents
low the last
e.
es are needed to
rmulas, unless you
an 311 particles.

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Perce Rank
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5	
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9	
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16	
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16	
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18	
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20	
7	<2	1	0	20	5	7	<2	1	0	20	5	7	<2	1	0	20	
8	<2	1	0	20	5	8	<2	1	0	20	5	8	<2	1	0	20	
9	<2	1	0	21	8	9	<2	1	0	21	8	9	<2	1	0	21	
10	<2	1	0	22	9	10	<2	1	0	22	9	10	<2	1	0	22	
11	<2	1	0	23	10.1	11	<2	1	0	23	10.1	11	<2	1	0	23	
12	<2	1	0	23	10.1	12	<2	1	0	23	10.1	12	<2	1	0	23	
13	<2	1	0	24	12.1	13	<2	1	0	24	12.1	13	<2	1	0	24	
14	<2	1	0	25	13.1	14	<2	1	0	25	13.1	14	<2	1	0	25	
15	64	64	40.4	27	14.1	15	<2	1	0	27	14.1	15	<2	1	0	27	
16	150	150	70.7	27	14.1	16	28	28	31.3	27	14.1	16	<2	1	0	27	
17	140	140	67.6	29	16.1	17	5	5	16.1	29	16.1	17	<2	1	0	29	
18	90	90	49.4	30	17.1	18	80	80	54.5	30	17.1	18	<2	1	0	30	
19	33	33	25.2	31	18.1	19	80	80	54.5	31	18.1	19	<2	1	0	31	
20	195	195	89.8	31	18.1	20	80	80	54.5	31	18.1	20	<2	1	0	31	
21	165	165	80.8	31	18.1	21	4	4	15.1	31	18.1	21	<2	1	0	31	
22	22	22	20.2	32	21.2	22	10	10	18.1	32	21.2	22	<2	1	0	32	
23	98	98	52.5	33	22.2	23	64	64	47.4	33	22.2	23	60	60	38.3	33	
24	270	270	100	34	23.2	24	76	76	52.5	34	23.2	24	45	45	33.3	34	
25	125	125	61.6	34	23.2	25	50	50	41.4	34	23.2	25	152	152	89.8	34	
26	28	28	23.2	34	23.2	26	195	195	95.9	34	23.2	26	84	84	49.4	34	
27	58	58	37.3	35	26.2	27	43	43	39.3	35	26.2	27	64	64	39.3	35	
28	81	81	46.4	40	27.2	28	35	35	35.3	40	27.2	28	15	15	25.2	40	
29	48	48	33.3	40	27.2	29	19	19	25.2	40	27.2	29	135	135	83.8	40	
30	31	31	24.2	40	27.2	30	119	119	75.7	40	27.2	30	17	17	26.2	40	
31	200	200	91.9	42	30.3	31	115	115	71.7	42	30.3	31	165	165	93.9	42	
32	42	42	28.2	42	30.3	32	175	175	91.9	42	30.3	32	99	99	60.6	42	
33	150	150	70.7	44	32.3	33	125	125	78.7	44	32.3	33	29	29	32.3	44	
34	95	95	50.5	44	32.3	34	180	180	92.9	44	32.3	34	93	93	58.5	44	
35	46	46	30.3	46	34.3	35	65	65	48.4	46	34.3	35	139	139	85.8	46	
36	50	50	34.3	48	35.3	36	130	130	79.7	48	35.3	36	57	57	37.3	48	
37	185	185	85.8	49	36.3	37	75	75	50.5	49	36.3	37	82	82	48.4	49	
38	62	62	38.3	50	37.3	38	23	23	27.2	50	37.3	38	65	65	40.4	50	
39	68	68	42.4	54	38.3	39	104	104	69.6	54	38.3	39	110	110	65.6	54	
40	172	172	81.8	54	38.3	40	155	155	84.8	54	38.3	40	141	141	87.8	54	
41	56	56	36.3	55	40.4	41	58	58	46.4	55	40.4	41	23	23	30.3	55	
42	26	26	22.2	55	40.4	42	140	140	83.8	55	40.4	42	86	86	52.5	55	
43	83	83	48.4	55	40.4	43	75	75	50.5	55	40.4	43	120	120	69.6	55	
44	126	126	63.6	55	40.4	44	40	40	37.3	55	40.4	44	155	155	90.9	55	
45	250	250	97.9	61	44.4	45	42	42	38.3	61	44.4	45	65	65	40.4	61	
46	16	16	17.1	62	45.4	46	220	220	97.9	62	45.4	46	121	121	71.7	62	
47	180	180	82.8	62	45.4	47	27	27	29.2	62	45.4	47	25	25	31.3	62	
48	200	200	91.9	62	45.4	48	90	90	61.6	62	45.4	48	245	245	100	62	
49	180	180	82.8	64	48.4	49	155	155	84.8	64	48.4	49	123	123	75.7	64	
50	97	97	51.5	67	49.4	50	32	32	32.3	67	49.4	50	75	75	44.4	67	
51	25	25	21.2	67	49.4	51	115	115	71.7	67	49.4	51	85	85	50.5	67	
52	180	180	82.8	70	51.5	52	17	17	22.2	70	51.5	52	91	91	56.5	70	
53	18	18	18.1	72	52.5	53	165	165	90.9	72	52.5	53	48	48	34.3	72	
54	150	150	70.7	74	53.5	54	190	190	94.9	74	53.5	54	73	73	43.4	74	
55	121	121	58.5	75	54.5	55	115	115	71.7	75	54.5	55	3	3	22.2	75	
56	120	120	55.5	75	54.5	56	77	77	53.5	75	54.5	56	105	105	62.6	75	
57	195	195	89.8	76	56.5	57	10	10	18.1	76	56.5	57	125	125	76.7	76	
58	46	46	30.3	78	57.5	58	16	16	21.2	78	57.5	58	241	241	98.9	78	
59	47	47	32.3	80	58.5	59	100	100	66.6	80	58.5	59	54	54	35.3	80	
60	160	160	78.7	82	59.5	60	235	235	98.9	82	59.5	60	4	4	23.2	82	
61	220	220	95.9	83	60.6	61	95	95	65.6	83	60.6	61	70	70	42.4	83	
62	120	120	55.5	84	61.6	62	135	135	81.8	84	61.6	62	135	135	83.8	84	
63	185	185	85.8	85	62.6	63	50	50	41.4	85	62.6	63	121	121	71.7	85	
64	122	122	59.5	86	63.6	64	34	34	34.3	86	63.6	64	230	230	96.9	86	
65	126	126	63.6	88	64.6	65	124	124	77.7	88	64.6	65	130	130	79.7	88	
66	150	150	70.7	88	64.6	66	265	265	100	88	64.6	66	161	161	92.9	88	
67	44	44	29.2	89	66.6	67	160	160	86.8	89	66.6	67	75	75	44.4	89	
68	63	63	39.3	90	67.6	68	93	93	64.6	90	67.6	68	89	89	54.5	90	
69	255	255	98.9	90	67.6	69	19	19	25.2	90	67.6	69	127	127	78.7	90	
70	150	150	70.7	90	67.6	70	54	54	44.4	90	67.6	70	155	155	90.9	90	
71	190	190	88.8	90	67.6	71	130	130	79.7	90	67.6	71	140	140	86.8	90	
72	205	205	93.9	92	71.7	72	100	100	66.6	92	71.7	72	87	87	53.5	92	
73	140	140	67.6	93	72.7	73	160	160	86.8	93	72.7	73	180	180	95.9	93	
74	74	74	44.4	93	72.7	74	185	185	93.9	93	72.7	74	240	240	97.9	93	
75	185	185	85.8	95	74.7	75	210	210	96.9	95	74.7	75	94	94	59.5	95	
76	19	19	19.1	99	75.7	76	85	85	59.5	99	75.7	76	55	55	36.3	99	
77	33	33	25.2	100	76.7	77	160	160	86.8	100	76.7	77	90	90	55.5	100	
78	64	64	40.4	100	76.7	78	53	53	43.4	100	76.7	78	22	22	28.2	100	

-3.5	81	4	1	19	-3.5	80	1	1	20	-3.5	84	2	1	16	-3.5
-4.0	77	0	4	23	-4.0	79	2	1	21	-4.0	82	3	2	18	-4.0
-4.5	77	2	0	23	-4.5	77	6	2	23	-4.5	79	3	3	21	-4.5
-5.0	75	4	2	25	-5.0	71	5	6	29	-5.0	76	5	3	24	-5.0
-5.5	71	5	4	29	-5.5	66	6	5	34	-5.5	71	7	5	29	-5.5
-6.0	66	14	5	34	-6.0	60	13	6	40	-6.0	64	13	7	36	-6.0
-6.5	52	16	14	48	-6.5	47	16	13	53	-6.5	51	18	13	49	-6.5
-7.0	36	21	16	64	-7.0	31	22	16	69	-7.0	33	22	18	67	-7.0
-7.5	15	12	21	85	-7.5	9	8	22	91	-7.5	11	9	22	89	-7.5
-8.0	3	3	12	97	-8.0	1	1	8	99	-8.0	2	2	9	98	-8.0
-8.5	0	0	3	100	-8.5	0	0	1	100	-8.5	0	0	2	100	-8.5
-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0
		100					**100**					**100**			
s					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**
	12	17	-1.0	-2.0	3	16	19	-2.5	-3.0	6	16	18	-3.5	-4.0	11
	25	29	-5.0	-5.5	32	23	29	-4.5	-5.0	25	24	29	-5.0	-5.5	34
	48	64	-6.5	-7.0	94	40	53	-6.0	-6.5	83	49	67	-6.5	-7.0	92
	64	85	-7.0	-7.5	153	69	91	-7.0	-7.5	140	67	89	-7.0	-7.5	145
	64	85	-7.0	-7.5	177	69	91	-7.0	-7.5	161	67	89	-7.0	-7.5	167
	85	97	-7.5	-8.0	208	69	91	-7.0	-7.5	177	89	98	-7.5	-8.0	187

paste group of 6
ew location to

umns A and B

cle sizes in green
at row 30.
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2 mm, they are
1's in the next
fferent "less than"
sed, some things
e changed.
e more than 100
need to fill down
to the right of the
lumn to match.
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clear all contents
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es are needed to
rmulas, unless you
an 311 particles.

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Perc Rank
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5	
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9	
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16	
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16	
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18	
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20	
7	<2	1	0	20	5	7	<2	1	0	20	5	7	<2	1	0	20	
8	<2	1	0	20	5	8	<2	1	0	20	5	8	<2	1	0	20	
9	<2	1	0	21	8	9	<2	1	0	21	8	9	<2	1	0	21	
10	<2	1	0	22	9	10	<2	1	0	22	9	10	<2	1	0	22	
11	<2	1	0	23	10.1	11	<2	1	0	23	10.1	11	<2	1	0	23	
12	<2	1	0	23	10.1	12	<2	1	0	23	10.1	12	<2	1	0	23	
13	46	46	29.2	24	12.1	13	130	130	69.6	24	12.1	13	<2	1	0	24	
14	15	15	21.2	25	13.1	14	7	7	16.1	25	13.1	14	110	110	55.5	25	
15	105	105	57.5	27	14.1	15	90	90	51.5	27	14.1	15	123	123	64.6	27	
16	89	89	46.4	27	14.1	16	125	125	68.6	27	14.1	16	45	45	27.2	27	
17	29	29	23.2	29	16.1	17	120	120	62.6	29	16.1	17	75	75	39.3	29	
18	30	30	24.2	30	17.1	18	160	160	82.8	30	17.1	18	180	180	88.8	30	
19	55	55	31.3	31	18.1	19	130	130	69.6	31	18.1	19	95	95	49.4	31	
20	210	210	91.9	31	18.1	20	160	160	82.8	31	18.1	20	18	18	18.1	31	
21	85	85	45.4	31	18.1	21	135	135	75.7	31	18.1	21	225	225	96.9	31	
22	35	35	26.2	32	21.2	22	67	67	40.4	32	21.2	22	138	138	70.7	32	
23	130	130	64.6	33	22.2	23	167	167	86.8	33	22.2	23	50	50	31.3	33	
24	100	100	53.5	34	23.2	24	94	94	53.5	34	23.2	24	18	18	18.1	34	
25	100	100	53.5	34	23.2	25	50	50	34.3	34	23.2	25	260	260	98.9	34	
26	3	3	12.1	34	23.2	26	39	39	31.3	34	23.2	26	120	120	61.6	34	
27	82	82	42.4	35	26.2	27	89	89	50.5	35	26.2	27	45	45	27.2	35	
28	160	160	78.7	40	27.2	28	105	105	57.5	40	27.2	28	61	61	35.3	40	
29	120	120	62.6	40	27.2	29	200	200	93.9	40	27.2	29	28	28	22.2	40	
30	140	140	67.6	40	27.2	30	140	140	76.7	40	27.2	30	150	150	75.7	40	
31	190	190	85.8	42	30.3	31	22	22	22.2	42	30.3	31	110	110	55.5	42	
32	95	95	50.5	42	30.3	32	76	76	43.4	42	30.3	32	5	5	13.1	42	
33	240	240	95.9	44	32.3	33	32	32	27.2	44	32.3	33	60	60	34.3	44	
34	145	145	73.7	44	32.3	34	133	133	74.7	44	32.3	34	125	125	65.6	44	
35	160	160	78.7	46	34.3	35	8	8	17.1	46	34.3	35	145	145	74.7	46	
36	190	190	85.8	48	35.3	36	50	50	34.3	48	35.3	36	80	80	44.4	48	
37	3	3	12.1	49	36.3	37	32	32	27.2	49	36.3	37	166	166	82.8	49	
38	80	80	40.4	50	37.3	38	21	21	21.2	50	37.3	38	43	43	26.2	50	
39	235	235	94.9	54	38.3	39	140	140	76.7	54	38.3	39	95	95	49.4	54	
40	105	105	57.5	54	38.3	40	85	85	46.4	54	38.3	40	48	48	29.2	54	
41	140	140	67.6	55	40.4	41	3	3	12.1	55	40.4	41	170	170	83.8	55	
42	100	100	53.5	55	40.4	42	170	170	87.8	55	40.4	42	48	48	29.2	55	
43	110	110	60.6	55	40.4	43	40	40	32.3	55	40.4	43	185	185	89.8	55	
44	260	260	97.9	55	40.4	44	4	4	14.1	55	40.4	44	160	160	77.7	55	
45	143	143	71.7	61	44.4	45	81	81	45.4	61	44.4	45	170	170	83.8	61	
46	210	210	91.9	62	45.4	46	230	230	98.9	62	45.4	46	77	77	41.4	62	
47	140	140	67.6	62	45.4	47	73	73	42.4	62	45.4	47	140	140	71.7	62	
48	155	155	75.7	62	45.4	48	160	160	82.8	62	45.4	48	160	160	77.7	62	
49	73	73	38.3	64	48.4	49	85	85	46.4	64	48.4	49	66	66	36.3	64	
50	155	155	75.7	67	49.4	50	13	13	20.2	67	49.4	50	120	120	61.6	67	
51	95	95	50.5	67	49.4	51	25	25	25.2	67	49.4	51	140	140	71.7	67	
52	130	130	64.6	70	51.5	52	120	120	62.6	70	51.5	52	160	160	77.7	70	
53	4	4	15.1	72	52.5	53	150	150	80.8	72	52.5	53	88	88	46.4	72	
54	100	100	53.5	74	53.5	54	11	11	19.1	74	53.5	54	110	110	55.5	74	
55	200	200	87.8	75	54.5	55	205	205	95.9	75	54.5	55	90	90	47.4	75	
56	68	68	34.3	75	54.5	56	130	130	69.6	75	54.5	56	112	112	59.5	75	
57	178	178	83.8	76	56.5	57	145	145	78.7	76	56.5	57	111	111	58.5	76	
58	5	5	17.1	78	57.5	58	220	220	97.9	78	57.5	58	8	8	14.1	78	
59	170	170	81.8	80	58.5	59	95	95	54.5	80	58.5	59	85	85	45.4	80	
60	80	80	40.4	82	59.5	60	180	180	90.9	82	59.5	60	125	125	65.6	82	
61	250	250	96.9	83	60.6	61	120	120	62.6	83	60.6	61	9	9	15.1	83	
62	33	33	25.2	84	61.6	62	100	100	56.5	84	61.6	62	211	211	94.9	84	
63	53	53	30.3	85	62.6	63	90	90	51.5	85	62.6	63	220	220	95.9	85	
64	84	84	43.4	86	63.6	64	115	115	61.6	86	63.6	64	161	161	80.8	86	
65	180	180	84.8	88	64.6	65	5	5	15.1	88	64.6	65	90	90	47.4	88	
66	40	40	28.2	88	64.6	66	50	50	34.3	88	64.6	66	130	130	67.6	88	
67	79	79	39.3	89	66.6	67	210	210	96.9	89	66.6	67	73	73	38.3	89	
68	130	130	64.6	90	67.6	68	175	175	88.8	90	67.6	68	98	98	53.5	90	
69	142	142	70.7	90	67.6	69	3	3	12.1	90	67.6	69	190	190	92.9	90	
70	15	15	21.2	90	67.6	70	130	130	69.6	90	67.6	70	133	133	69.6	90	
71	93	93	48.4	90	67.6	71	8	8	17.1	90	67.6	71	240	240	97.9	90	
72	160	160	78.7	92	71.7	72	124	124	67.6	92	71.7	72	96	96	52.5	92	
73	200	200	87.8	93	72.7	73	105	105	57.5	93	72.7	73	200	200	93.9	93	
74	13	13	20.2	93	72.7	74	70	70	41.4	93	72.7	74	171	171	85.8	93	
75	68	68	34.3	95	74.7	75	160	160	82.8	95	74.7	75	153	153	76.7	95	
76	64	64	32.3	99	75.7	76	195	195	92.9	99	75.7	76	33	33	24.2	99	
77	215	215	93.9	100	76.7	77	200	200	93.9	100	76.7	77	55	55	33.3	100	
78	176	176	82.8	100	76.7	78	120	120	62.6	100	76.7	78	173	173	86.8	100	

-3.5	86	2	2	14	-3.5	81	2	2	19	-3.5	88	1	1	12	-3.5
-4.0	84	4	2	16	-4.0	79	0	2	21	-4.0	87	5	1	13	-4.0
-4.5	80	4	4	20	-4.5	79	4	0	21	-4.5	82	3	5	18	-4.5
-5.0	76	6	4	24	-5.0	75	5	4	25	-5.0	79	5	3	21	-5.0
-5.5	70	3	6	30	-5.5	70	5	5	30	-5.5	74	6	5	26	-5.5
-6.0	67	9	3	33	-6.0	65	12	5	35	-6.0	68	13	6	32	-6.0
-6.5	58	16	9	42	-6.5	53	15	12	47	-6.5	55	18	13	45	-6.5
-7.0	42	19	16	58	-7.0	38	20	15	62	-7.0	37	16	18	63	-7.0
-7.5	23	19	19	77	-7.5	18	14	20	82	-7.5	21	18	16	79	-7.5
-8.0	4	4	19	96	-8.0	4	3	14	96	-8.0	3	2	18	97	-8.0
-8.5	0	0	4	100	-8.5	1	1	3	99	-8.5	1	1	2	99	-8.5
-9.0			0	100	-9.0			1	100	-9.0			1	100	-9.0
		100					**100**					**100**			

s					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**
	16	20	-4.0	-4.5	16	13	17	-2.5	-3.0	7	13	18	-4.0	-4.5	20
	24	30	-5.0	-5.5	34	25	30	-5.0	-5.5	32	21	26	-5.0	-5.5	42
	42	58	-6.5	-7.0	107	47	62	-6.5	-7.0	97	45	63	-6.5	-7.0	99
	58	77	-7.0	-7.5	174	62	82	-7.0	-7.5	160	63	79	-7.0	-7.5	165
	77	96	-7.5	-8.0	205	82	96	-7.5	-8.0	189	79	97	-7.5	-8.0	199
	77	96	-7.5	-8.0	229	82	96	-7.5	-8.0	220	79	97	-7.5	-8.0	223

paste group of 6
ew location to

umns A and B

cle sizes in green
at row 30.
or particles
2 mm, they are
1's in the next
fferent "less than"
sed, some things
e changed.
e more than 100
need to fill down
to the right of the
lumn to match.
e fewer than 100,
clear all contents
low the last
e.
es are needed to
rmulas, unless you
an 311 particles.

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	Size (mm) replace "<2" with 1	Perc Rank
1	<2	1	0	5	0	1	<2	1	0	5	0	1	<2	1	0	5	
2	<2	1	0	9	1	2	<2	1	0	9	1	2	<2	1	0	9	
3	<2	1	0	16	2	3	<2	1	0	16	2	3	<2	1	0	16	
4	<2	1	0	16	2	4	<2	1	0	16	2	4	<2	1	0	16	
5	<2	1	0	18	4	5	<2	1	0	18	4	5	<2	1	0	18	
6	<2	1	0	20	5	6	<2	1	0	20	5	6	<2	1	0	20	
7	<2	1	0	20	5	7	<2	1	0	20	5	7	<2	1	0	20	
8	<2	1	0	20	5	8	<2	1	0	20	5	8	<2	1	0	20	
9	160	160	70.7	21	8	9	<2	1	0	21	8	9	<2	1	0	21	
10	195	195	82.8	22	9	10	<2	1	0	22	9	10	245	245	96.9	22	
11	65	65	33.3	23	10.1	11	<2	1	0	23	10.1	11	74	74	38.3	23	
12	10	10	13.1	23	10.1	12	90	90	45.4	23	10.1	12	110	110	49.4	23	
13	72	72	34.3	24	12.1	13	205	205	86.8	24	12.1	13	130	130	63.6	24	
14	240	240	93.9	25	13.1	14	6	6	13.1	25	13.1	14	160	160	72.7	25	
15	52	52	31.3	27	14.1	15	170	170	75.7	27	14.1	15	230	230	90.9	27	
16	145	145	67.6	27	14.1	16	6	6	13.1	27	14.1	16	240	240	95.9	27	
17	105	105	43.4	29	16.1	17	225	225	92.9	29	16.1	17	140	140	66.6	29	
18	125	125	55.5	30	17.1	18	110	110	55.5	30	17.1	18	185	185	80.8	30	
19	80	80	37.3	31	18.1	19	170	170	75.7	31	18.1	19	85	85	42.4	31	
20	193	193	81.8	31	18.1	20	120	120	58.5	31	18.1	20	183	183	79.7	31	
21	125	125	55.5	31	18.1	21	260	260	96.9	31	18.1	21	118	118	55.5	31	
22	120	120	53.5	32	21.2	22	450	450	100	32	21.2	22	188	188	84.8	32	
23	142	142	65.6	33	22.2	23	44	44	28.2	33	22.2	23	280	280	97.9	33	
24	195	195	82.8	34	23.2	24	105	105	52.5	34	23.2	24	180	180	78.7	34	
25	170	170	73.7	34	23.2	25	202	202	85.8	34	23.2	25	185	185	80.8	34	
26	115	115	49.4	34	23.2	26	52	52	30.3	34	23.2	26	400	400	100	34	
27	100	100	42.4	35	26.2	27	122	122	59.5	35	26.2	27	110	110	49.4	35	
28	120	120	53.5	40	27.2	28	54	54	33.3	40	27.2	28	285	285	98.9	40	
29	159	159	69.6	40	27.2	29	135	135	65.6	40	27.2	29	65	65	32.3	40	
30	135	135	62.6	40	27.2	30	65	65	35.3	40	27.2	30	24	24	18.1	40	
31	130	130	59.5	42	30.3	31	156	156	72.7	42	30.3	31	27	27	19.1	42	
32	3	3	8	42	30.3	32	125	125	60.6	42	30.3	32	72	72	36.3	42	
33	14	14	15.1	44	32.3	33	3	3	11.1	44	32.3	33	55	55	28.2	44	
34	45	45	28.2	44	32.3	34	235	235	93.9	44	32.3	34	210	210	86.8	44	
35	84	84	40.4	46	34.3	35	32	32	24.2	46	34.3	35	90	90	44.4	46	
36	23	23	20.2	48	35.3	36	138	138	67.6	48	35.3	36	140	140	66.6	48	
37	198	198	85.8	49	36.3	37	150	150	70.7	49	36.3	37	78	78	41.4	49	
38	210	210	88.8	50	37.3	38	42	42	27.2	50	37.3	38	5	5	9	50	
39	280	280	97.9	54	38.3	39	30	30	23.2	54	38.3	39	50	50	26.2	54	
40	75	75	36.3	54	38.3	40	24	24	21.2	54	38.3	40	190	190	85.8	54	
41	20	20	19.1	55	40.4	41	111	111	56.5	55	40.4	41	135	135	65.6	55	
42	43	43	26.2	55	40.4	42	137	137	66.6	55	40.4	42	37	37	21.2	55	
43	130	130	59.5	55	40.4	43	7	7	16.1	55	40.4	43	160	160	72.7	55	
44	109	109	45.4	55	40.4	44	96	96	49.4	55	40.4	44	158	158	70.7	55	
45	3	3	8	61	44.4	45	40	40	25.2	61	44.4	45	100	100	47.4	61	
46	205	205	87.8	62	45.4	46	12	12	19.1	62	45.4	46	230	230	90.9	62	
47	40	40	24.2	62	45.4	47	27	27	22.2	62	45.4	47	220	220	89.8	62	
48	250	250	94.9	62	45.4	48	15	15	20.2	62	45.4	48	16	16	12.1	62	
49	230	230	92.9	64	48.4	49	180	180	81.8	64	48.4	49	65	65	32.3	64	
50	129	129	58.5	67	49.4	50	82	82	42.4	67	49.4	50	20	20	14.1	67	
51	72	72	34.3	67	49.4	51	45	45	29.2	67	49.4	51	125	125	62.6	67	
52	190	190	78.7	70	51.5	52	200	200	83.8	70	51.5	52	63	63	31.3	70	
53	5	5	10.1	72	52.5	53	175	175	77.7	72	52.5	53	110	110	49.4	72	
54	200	200	86.8	74	53.5	54	83	83	43.4	74	53.5	54	170	170	76.7	74	
55	320	320	100	75	54.5	55	160	160	73.7	75	54.5	55	165	165	74.7	75	
56	115	115	49.4	75	54.5	56	130	130	62.6	75	54.5	56	118	118	55.5	75	
57	117	117	51.5	76	56.5	57	75	75	39.3	76	56.5	57	27	27	19.1	76	
58	183	183	77.7	78	57.5	58	220	220	89.8	78	57.5	58	70	70	35.3	78	
59	5	5	10.1	80	58.5	59	130	130	62.6	80	58.5	59	165	165	74.7	80	
60	195	195	82.8	82	59.5	60	305	305	98.9	82	59.5	60	122	122	59.5	82	
61	190	190	78.7	83	60.6	61	200	200	83.8	83	60.6	61	124	124	61.6	83	
62	255	255	95.9	84	61.6	62	107	107	54.5	84	61.6	62	120	120	57.5	84	
63	170	170	73.7	85	62.6	63	205	205	86.8	85	62.6	63	75	75	39.3	85	
64	130	130	59.5	86	63.6	64	93	93	47.4	86	63.6	64	171	171	77.7	86	
65	175	175	75.7	88	64.6	65	140	140	68.6	88	64.6	65	159	159	71.7	88	
66	113	113	48.4	88	64.6	66	220	220	89.8	88	64.6	66	91	91	45.4	88	
67	127	127	57.5	89	66.6	67	67	67	37.3	89	66.6	67	22	22	16.1	89	
68	190	190	78.7	90	67.6	68	9	9	17.1	90	67.6	68	7	7	10.1	90	
69	163	163	72.7	90	67.6	69	240	240	94.9	90	67.6	69	21	21	15.1	90	
70	144	144	66.6	90	67.6	70	9	9	17.1	90	67.6	70	73	73	37.3	90	
71	260	260	96.9	90	67.6	71	40	40	25.2	90	67.6	71	85	85	42.4	90	
72	160	160	70.7	92	71.7	72	87	87	44.4	92	71.7	72	44	44	23.2	92	
73	140	140	63.6	93	72.7	73	70	70	38.3	93	72.7	73	155	155	68.6	93	
74	110	110	46.4	93	72.7	74	155	155	71.7	93	72.7	74	37	37	21.2	93	
75	85	85	41.4	95	74.7	75	177	177	79.7	95	74.7	75	62	62	30.3	95	
76	48	48	30.3	99	75.7	76	52	52	30.3	99	75.7	76	215	215	88.8	99	
77	150	150	68.6	100	76.7	77	220	220	89.8	100	76.7	77	68	68	34.3	100	
78	210	210	88.8	100	76.7	78	210	210	88.8	100	76.7	78	230	230	90.9	100	

55	5	4	45	-5.0	51	2	4	49	-5.0	47	6	5	53	-5.0	44	2	6	56	-5.0	50	5	4
50	5	5	50	-5.5	49	4	2	51	-5.5	41	4	6	59	-5.5	42	5	2	58	-5.5	45	2	5
45	11	5	55	-6.0	45	8	4	55	-6.0	37	12	4	63	-6.0	37	13	5	63	-6.0	43	10	2
34	16	11	66	-6.5	37	14	8	63	-6.5	25	14	12	75	-6.5	24	21	13	76	-6.5	33	18	10
18	15	16	82	-7.0	23	17	14	77	-7.0	11	10	14	89	-7.0	3	3	21	97	-7.0	15	11	18
3	3	15	97	-7.5	6	6	17	94	-7.5	1	1	10	99	-7.5	0	0	3	100	-7.5	4	4	11
0	0	3	100	-8.0	0	0	6	100	-8.0	0	0	1	100	-8.0	0	0	0	100	-8.0	0	0	4
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	

				Percentile (mm)					Percentile (mm)					Percentile (mm)					Percentile (mm)			
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
50	55	-5.5	-6.0	45	49	51	-5.0	-5.5	38	48	53	-4.5	-5.0	26	50	56	-4.5	-5.0	23	50	55	-5.0
66	82	-6.5	-7.0	110	63	77	-6.5	-7.0	122	75	89	-6.5	-7.0	90	63	76	-6.0	-6.5	88	67	85	-6.5
82	97	-7.0	-7.5	134	77	94	-7.0	-7.5	147	75	89	-6.5	-7.0	113	76	97	-6.5	-7.0	103	67	85	-6.5
82	97	-7.0	-7.5	154	77	94	-7.0	-7.5	166	89	99	-7.0	-7.5	132	76	97	-6.5	-7.0	114	85	96	-7.0

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	12	12	37.3
35	26	26	42.4
36	59	59	53.5
37	135	135	83.8
38	40	40	47.4
39	18	18	40.4
40	103	103	72.7
41	110	110	74.7
42	75	75	58.5
43	42	42	49.4
44	195	195	98.9
45	172	172	93.9
46	40	40	47.4
47	100	100	70.7
48	120	120	79.7
49	156	156	90.9
50	113	113	75.7
51	99	99	68.6
52	71	71	57.5
53	95	95	66.6
54	175	175	94.9
55	68	68	56.5
56	140	140	86.8
57	99	99	68.6
58	66	66	55.5
59	52	52	50.5
60	120	120	79.7
61	55	55	51.5
62	180	180	95.9
63	130	130	82.8
64	76	76	59.5
65	105	105	73.7
66	5	5	34.3
67	90	90	65.6
68	148	148	89.8
69	83	83	64.6
70	4	4	33.3
71	80	80	63.6
72	61	61	54.5
73	24	24	41.4
74	119	119	78.7
75	146	146	88.8
76	127	127	81.8
77	33	33	45.4
78	100	100	70.7
79	79	79	62.6
80	16	16	39.3
81	115	115	76.7
82	145	145	87.8
83	135	135	83.8
84	55	55	51.5
85	162	162	92.9
86	180	180	95.9
87	78	78	61.6
88	183	183	97.9
89	15	15	38.3
90	32	32	44.4
91	36	36	46.4
92	76	76	59.5
93	29	29	43.4
94	138	138	85.8
95	195	195	98.9
96	8	8	35.3
97	95	95	66.6
98	115	115	76.7
99	11	11	36.3
100	160	160	91.9

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	<2	1	0
35	<2	1	0
36	<2	1	0
37	<2	1	0
38	<2	1	0
39	<2	1	0
40	<2	1	0
41	80	80	58.5
42	155	155	86.8
43	45	45	50.5
44	162	162	91.9
45	131	131	77.7
46	19	19	43.4
47	140	140	80.8
48	55	55	53.5
49	91	91	63.6
50	91	91	63.6
51	125	125	74.7
52	160	160	89.8
53	175	175	93.9
54	140	140	80.8
55	125	125	74.7
56	157	157	88.8
57	111	111	71.7
58	115	115	72.7
59	140	140	80.8
60	30	30	45.4
61	80	80	58.5
62	55	55	53.5
63	90	90	62.6
64	82	82	60.6
65	20	20	44.4
66	190	190	94.9
67	161	161	90.9
68	100	100	67.6
69	105	105	68.6
70	145	145	84.8
71	135	135	78.7
72	96	96	66.6
73	50	50	51.5
74	53	53	52.5
75	142	142	83.8
76	165	165	92.9
77	191	191	96.9
78	150	150	85.8
79	200	200	98.9
80	135	135	78.7
81	190	190	94.9
82	195	195	97.9
83	65	65	55.5
84	33	33	49.4
85	31	31	46.4
86	110	110	70.7
87	120	120	73.7
88	4	4	40.4
89	32	32	48.4
90	155	155	86.8
91	10	10	42.4
92	8	8	41.4
93	73	73	57.5
94	71	71	56.5
95	210	210	100
96	31	31	46.4
97	105	105	68.6
98	85	85	61.6
99	125	125	74.7
100	92	92	65.6

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	<2	1	0
35	<2	1	0
36	<2	1	0
37	<2	1	0
38	<2	1	0
39	<2	1	0
40	<2	1	0
41	17	17	45.4
42	120	120	85.8
43	15	15	43.4
44	160	160	97.9
45	158	158	96.9
46	95	95	77.7
47	7	7	41.4
48	18	18	46.4
49	145	145	90.9
50	140	140	89.8
51	100	100	79.7
52	15	15	43.4
53	65	65	63.6
54	91	91	75.7
55	52	52	61.6
56	35	35	53.5
57	82	82	72.7
58	92	92	76.7
59	66	66	65.6
60	98	98	78.7
61	104	104	81.8
62	65	65	63.6
63	47	47	59.5
64	120	120	85.8
65	115	115	84.8
66	190	190	100
67	83	83	74.7
68	27	27	51.5
69	39	39	55.5
70	126	126	88.8
71	41	41	57.5
72	47	47	59.5
73	103	103	80.8
74	150	150	92.9
75	110	110	83.8
76	25	25	50.5
77	125	125	87.8
78	150	150	92.9
79	37	37	54.5
80	28	28	52.5
81	23	23	48.4
82	23	23	48.4
83	75	75	69.6
84	67	67	66.6
85	41	41	57.5
86	21	21	47.4
87	105	105	82.8
88	11	11	42.4
89	52	52	61.6
90	155	155	95.9
91	40	40	56.5
92	75	75	69.6
93	75	75	69.6
94	175	175	98.9
95	145	145	90.9
96	67	67	66.6
97	150	150	92.9
98	82	82	72.7
99	69	69	68.6
100	6	6	40.4

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank
1	<2	1	0
2	<2	1	0
3	<2	1	0
4	<2	1	0
5	<2	1	0
6	<2	1	0
7	<2	1	0
8	<2	1	0
9	<2	1	0
10	<2	1	0
11	<2	1	0
12	<2	1	0
13	<2	1	0
14	<2	1	0
15	<2	1	0
16	<2	1	0
17	<2	1	0
18	<2	1	0
19	<2	1	0
20	<2	1	0
21	<2	1	0
22	<2	1	0
23	<2	1	0
24	<2	1	0
25	<2	1	0
26	<2	1	0
27	<2	1	0
28	<2	1	0
29	<2	1	0
30	<2	1	0
31	<2	1	0
32	<2	1	0
33	<2	1	0
34	<2	1	0
35	<2	1	0
36	<2	1	0
37	<2	1	0
38	<2	1	0
39	105	105	86.8
40	28	28	52.5
41	18	18	48.4
42	12	12	44.4
43	100	100	83.8
44	68	68	64.6
45	3	3	38.3
46	75	75	68.6
47	145	145	98.9
48	15	15	47.4
49	65	65	63.6
50	68	68	64.6
51	100	100	83.8
52	109	109	89.8
53	4	4	40.4
54	108	108	87.8
55	30	30	53.5
56	102	102	85.8
57	4	4	40.4
58	120	120	95.9
59	57	57	59.5
60	78	78	70.7
61	109	109	89.8
62	140	140	97.9
63	25	25	51.5
64	30	30	53.5
65	3	3	38.3
66	152	152	100
67	18	18	48.4
68	85	85	72.7
69	58	58	60.6
70	12	12	44.4
71	119	119	94.9
72	77	77	69.6
73	108	108	87.8
74	89	89	75.7
75	69	69	66.6
76	33	33	56.5
77	80	80	71.7
78	87	87	73.7
79	88	88	74.7
80	46	46	58.5
81	31	31	55.5
82	59	59	62.6
83	7	7	42.4
84	112	112	92.9
85	72	72	67.6
86	95	95	77.7
87	95	95	77.7
88	14	14	46.4
89	9	9	43.4
90	93	93	76.7
91	112	112	92.9
92	95	95	77.7
93	58	58	60.6
94	95	95	77.7
95	123	123	96.9
96	24	24	50.5
97	97	97	81.8
98	45	45	57.5
99	110	110	91.9
100	98	98	82.8

count	size (mm)	Size (mn replace "<2" wit 1
1	<2	1
2	<2	1
3	<2	1
4	<2	1
5	<2	1
6	<2	1
7	<2	1
8	<2	1
9	<2	1
10	<2	1
11	<2	1
12	<2	1
13	<2	1
14	<2	1
15	<2	1
16	<2	1
17	<2	1
18	<2	1
19	<2	1
20	<2	1
21	<2	1
22	<2	1
23	<2	1
24	<2	1
25	<2	1
26	<2	1
27	<2	1
28	<2	1
29	<2	1
30	<2	1
31	<2	1
32	<2	1
33	<2	1
34	<2	1
35	<2	1
36	<2	1
37	<2	1
38	<2	1
39	<2	1
40	<2	1
41	24	24
42	45	45
43	39	39
44	115	115
45	115	115
46	100	100
47	101	101
48	15	15
49	180	180
50	130	130
51	160	160
52	8	8
53	41	41
54	17	17
55	5	5
56	33	33
57	70	70
58	16	16
59	30	30
60	85	85
61	65	65
62	190	190
63	75	75
64	120	120
65	131	131
66	75	75
67	125	125
68	195	195
69	96	96
70	182	182
71	100	100
72	145	145
73	129	129
74	20	20
75	115	115
76	105	105
77	103	103
78	105	105
79	130	130
80	126	126
81	135	135
82	130	130
83	195	195
84	90	90
85	130	130
86	76	76
87	79	79
88	110	110
89	180	180
90	115	115
91	62	62
92	34	34
93	25	25
94	120	120
95	95	95
96	91	91
97	71	71
98	74	74
99	26	26
100	46	46

46	14	12	54	-5.5	37	9	13	63	-5.5	44	10	6	56	-5.5	38	17	8	62	-5.5	36	13	16
32	10	14	68	-6.0	28	12	9	72	-6.0	34	15	10	66	-6.0	21	6	17	79	-6.0	23	9	13
22	16	10	78	-6.5	16	8	12	84	-6.5	19	5	15	81	-6.5	15	12	6	85	-6.5	14	10	9
6	5	16	94	-7.0	8	7	8	92	-7.0	14	10	5	86	-7.0	3	3	12	97	-7.0	4	4	10
1	1	5	99	-7.5	1	1	7	99	-7.5	4	4	10	96	-7.5	0	0	3	100	-7.5	0	0	4
0	0	1	100	-8.0	0	0	1	100	-8.0	0	0	4	100	-8.0	0	0	0	100	-8.0	0	0	0
0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	0
		0	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0			0
	100					**100**					**100**					**100**					**100**	
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**			
15	17	-3.0	-3.5	10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
21	30	-4.0	-4.5	19	25	27	-3.0	-3.5	8	#N/A	#N/A	#N/A	#N/A	#N/A	24	26	-1.0	-2.5	3	25	26	-1.0
42	54	-5.0	-5.5	40	50	63	-5.0	-5.5	32	50	56	-5.0	-5.5	32	45	54	-4.5	-5.0	27	48	64	-5.0
68	78	-6.0	-6.5	81	72	84	-6.0	-6.5	70	66	81	-6.0	-6.5	79	62	79	-5.5	-6.0	59	64	77	-5.5
78	94	-6.5	-7.0	103	84	92	-6.5	-7.0	90	81	86	-6.5	-7.0	111	79	85	-6.0	-6.5	85	77	86	-6.0
78	94	-6.5	-7.0	117	84	92	-6.5	-7.0	117	86	96	-7.0	-7.5	147	85	97	-6.5	-7.0	104	86	96	-6.5

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (m replac "<2" wi 1
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1
9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1
10	22	22	29.2	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2	1
11	17	17	21.2	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2	1
12	56	56	65.6	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2	1
13	156	156	96.9	13	<2	1	0	13	<2	1	0	13	<2	1	0	13	<2	1
14	29	29	39.3	14	<2	1	0	14	<2	1	0	14	<2	1	0	14	<2	1
15	33	33	42.4	15	<2	1	0	15	<2	1	0	15	<2	1	0	15	<2	1
16	27	27	37.3	16	<2	1	0	16	<2	1	0	16	<2	1	0	16	<2	1
17	181	181	100	17	<2	1	0	17	<2	1	0	17	<2	1	0	17	<2	1
18	96	96	81.8	18	<2	1	0	18	<2	1	0	18	<2	1	0	18	<2	1
19	170	170	97.9	19	<2	1	0	19	<2	1	0	19	<2	1	0	19	<2	1
20	26	26	33.3	20	95	95	84.8	20	<2	1	0	20	<2	1	0	20	<2	1
21	52	52	62.6	21	50	50	65.6	21	<2	1	0	21	<2	1	0	21	<2	1
22	30	30	40.4	22	15	15	29.2	22	<2	1	0	22	<2	1	0	22	<2	1
23	125	125	91.9	23	110	110	86.8	23	<2	1	0	23	<2	1	0	23	<2	1
24	45	45	52.5	24	19	19	32.3	24	<2	1	0	24	<2	1	0	24	<2	1
25	35	35	46.4	25	65	65	72.7	25	<2	1	0	25	75	75	79.7	25	<2	1
26	88	88	77.7	26	70	70	74.7	26	<2	1	0	26	8	8	30.3	26	9	9
27	26	26	33.3	27	120	120	89.8	27	<2	1	0	27	14	14	36.3	27	25	25
28	43	43	49.4	28	45	45	59.5	28	<2	1	0	28	32	32	52.5	28	45	45
29	13	13	19.1	29	115	115	88.8	29	<2	1	0	29	12	12	31.3	29	6	6
30	84	84	75.7	30	35	35	51.5	30	10	10	34.3	30	6	6	26.2	30	44	44
31	50	50	57.5	31	75	75	78.7	31	81	81	73.7	31	20	20	40.4	31	35	35
32	44	44	51.5	32	20	20	34.3	32	6	6	30.3	32	30	30	50.5	32	26	26
33	10	10	15.1	33	125	125	91.9	33	140	140	89.8	33	32	32	52.5	33	34	34
34	120	120	89.8	34	20	20	34.3	34	114	114	85.8	34	47	47	63.6	34	41	41
35	123	123	90.9	35	85	85	80.8	35	32	32	49.4	35	58	58	71.7	35	40	40
36	51	51	60.6	36	87	87	81.8	36	58	58	61.6	36	12	12	31.3	36	131	131
37	5	5	11.1	37	5	5	22.2	37	75	75	68.6	37	7	7	28.2	37	59	59
38	46	46	54.5	38	130	130	92.9	38	165	165	93.9	38	53	53	66.6	38	100	100
39	3	3	9	39	68	68	73.7	39	90	90	77.7	39	125	125	95.9	39	145	145
40	18	18	22.2	40	70	70	74.7	40	135	135	87.8	40	26	26	48.4	40	100	100
41	19	19	25.2	41	130	130	92.9	41	80	80	72.7	41	62	62	74.7	41	50	50
42	83	83	74.7	42	10	10	25.2	42	82	82	74.7	42	29	29	49.4	42	39	39
43	93	93	79.7	43	135	135	94.9	43	55	55	59.5	43	63	63	77.7	43	110	110
44	43	43	49.4	44	55	55	69.6	44	45	45	52.5	44	3	3	24.2	44	46	46
45	113	113	87.8	45	41	41	56.5	45	72	72	66.6	45	120	120	94.9	45	40	40
46	25	25	31.3	46	53	53	68.6	46	113	113	84.8	46	16	16	38.3	46	21	21
47	85	85	76.7	47	48	48	64.6	47	168	168	94.9	47	3	3	24.2	47	50	50
48	91	91	78.7	48	35	35	51.5	48	150	150	90.9	48	42	42	58.5	48	9	9
49	28	28	38.3	49	40	40	55.5	49	13	13	38.3	49	13	13	35.3	49	140	140
50	125	125	91.9	50	190	190	100	50	60	60	64.6	50	90	90	83.8	50	20	20
51	47	47	55.5	51	70	70	74.7	51	75	75	68.6	51	100	100	86.8	51	14	14
52	18	18	22.2	52	42	42	57.5	52	45	45	52.5	52	19	19	39.3	52	90	90
53	12	12	17.1	53	87	87	81.8	53	30	30	47.4	53	56	56	68.6	53	31	31
54	4	4	10.1	54	56	56	71.7	54	25	25	43.4	54	90	90	83.8	54	92	92
55	20	20	27.2	55	30	30	46.4	55	205	205	96.9	55	87	87	82.8	55	70	70
56	18	18	22.2	56	135	135	94.9	56	3	3	29.2	56	133	133	97.9	56	9	9
57	12	12	17.1	57	120	120	89.8	57	230	230	100	57	25	25	47.4	57	160	160
58	41	41	48.4	58	90	90	83.8	58	29	29	46.4	58	24	24	46.4	58	65	65
59	58	58	67.6	59	29	29	45.4	59	220	220	98.9	59	80	80	80.8	59	50	50
60	75	75	71.7	60	46	46	63.6	60	56	56	60.6	60	6	6	26.2	60	88	88
61	55	55	63.6	61	25	25	41.4	61	210	210	97.9	61	38	38	57.5	61	34	34
62	50	50	57.5	62	25	25	41.4	62	11	11	36.3	62	56	56	68.6	62	9	9
63	103	103	84.8	63	15	15	29.2	63	46	46	56.5	63	21	21	42.4	63	12	12
64	51	51	60.6	64	45	45	59.5	64	58	58	61.6	64	60	60	72.7	64	34	34
65	19	19	25.2	65	14	14	28.2	65	90	90	77.7	65	45	45	61.6	65	110	110
66	8	8	14.1	66	45	45	59.5	66	26	26	45.4	66	50	50	64.6	66	73	73
67	70	70	70.7	67	149	149	98.9	67	112	112	83.8	67	46	46	62.6	67	78	78
68	31	31	41.4	68	20	20	34.3	68	18	18	40.4	68	61	61	73.7	68	92	92
69	26	26	33.3	69	25	25	41.4	69	45	45	52.5	69	55	55	67.6	69	54	54
70	5	5	11.1	70	140	140	96.9	70	59	59	63.6	70	20	20	40.4	70	14	14
71	55	55	63.6	71	21	21	38.3	71	157	157	92.9	71	85	85	81.8	71	34	34
72	33	33	42.4	72	30	30	46.4	72	36	36	50.5	72	91	91	85.8	72	91	91
73	78	78	73.7	73	7	7	24.2	73	46	46	56.5	73	119	119	93.9	73	19	19
74	113	113	87.8	74	145	145	97.9	74	15	15	39.3	74	110	110	88.8	74	111	111
75	20	20	27.2	75	25	25	41.4	75	9	9	33.3	75	115	115	91.9	75	60	60
76	180	180	98.9	76	45	45	59.5	76	155	155	91.9	76	23	23	45.4	76	31	31
77	56	56	65.6	77	12	12	27.2	77	85	85	76.7	77	175	175	100	77	39	39
78	34	34	45.4	78	3	3	19.1	78	8	8	32.3	78	105	105	87.8	78	15	15
79	66	66	69.6	79	50	50	65.6	79	90	90	77.7	79	43	43	59.5	79	31	31
80	110	110	86.8	80	23	23	40.4	80	10	10	34.3	80	141	141	98.9	80	35	35
81	10	10	15.1	81	80	80	79.7	81	130	130	86.8	81	118	118	92.9	81	60	60
82	24	24	30.3	82	35	35	51.5	82	25	25	43.4	82	35	35	55.5	82	91	91
83	38	38	47.4	83	95	95	84.8	83	12	12	37.3	83	51	51	65.6	83	52	52
84	15	15	20.2	84	50	50	65.6	84	20	20	41.4	84	113	113	90.9	84	42	42
85	5	5	11.1	85	32	32	49.4	85	138	138	88.8	85	63	63	77.7	85	51	51
86	93	93	79.7	86	16	16	31.3	86	110	110	82.8	86	34	34	54.5	86	30	30
87	50	50	57.5	87	11	11	26.2	87	103	103	81.8	87	44	44	60.6	87	56	56
88	96	96	81.8	88	3	3	19.1	88	175	175	95.9	88	57	57	70.7	88	9	9
89	65	65	68.6	89	21	21	38.3	89	82	82	74.7	89	21	21	42.4	89	85	85
90	105	105	85.8	90	4	4	21.2	90	90	90	77.7	90	62	62	74.7	90	88	88
91	47	47	55.5	91	19	19	32.3	91	78	78	71.7	91	7	7	28.2	91	36	36
92	33	33	42.4	92	20	20	34.3	92	63	63	65.6	92	12	12	31.3	92	60	60
93	128	128	93.9	93	110	110	86.8	93	50	50	58.5	93	62	62	74.7	93	62	62
94	77	77	72.7	94	5	5	22.2	94	45	45	52.5	94	31	31	51.5	94	90	90
95	45	45	52.5	95	34	34	50.5	95	41	41	51.5	95	35	35	55.5	95	11	11
96	26	26	33.3	96	55	55	69.6	96	22	22	42.4	96	22	22	44.4	96	20	20
97	143	143	94.9	97	42	42	57.5	97	31	31	48.4	97	125	125	95.9	97	3	3
98	150	150	95.9	98	70	70	74.7	98	75	75	68.6	98	14	14	36.3	98	120	120
99	102	102	83.8	99	39	39	54.5	99	7	7	31.3	99	110	110	88.8	99	33	33
100	25	25	31.3	100	31	31	48.4	100	72	72	66.6	100	12	12	31.3	100	27	27

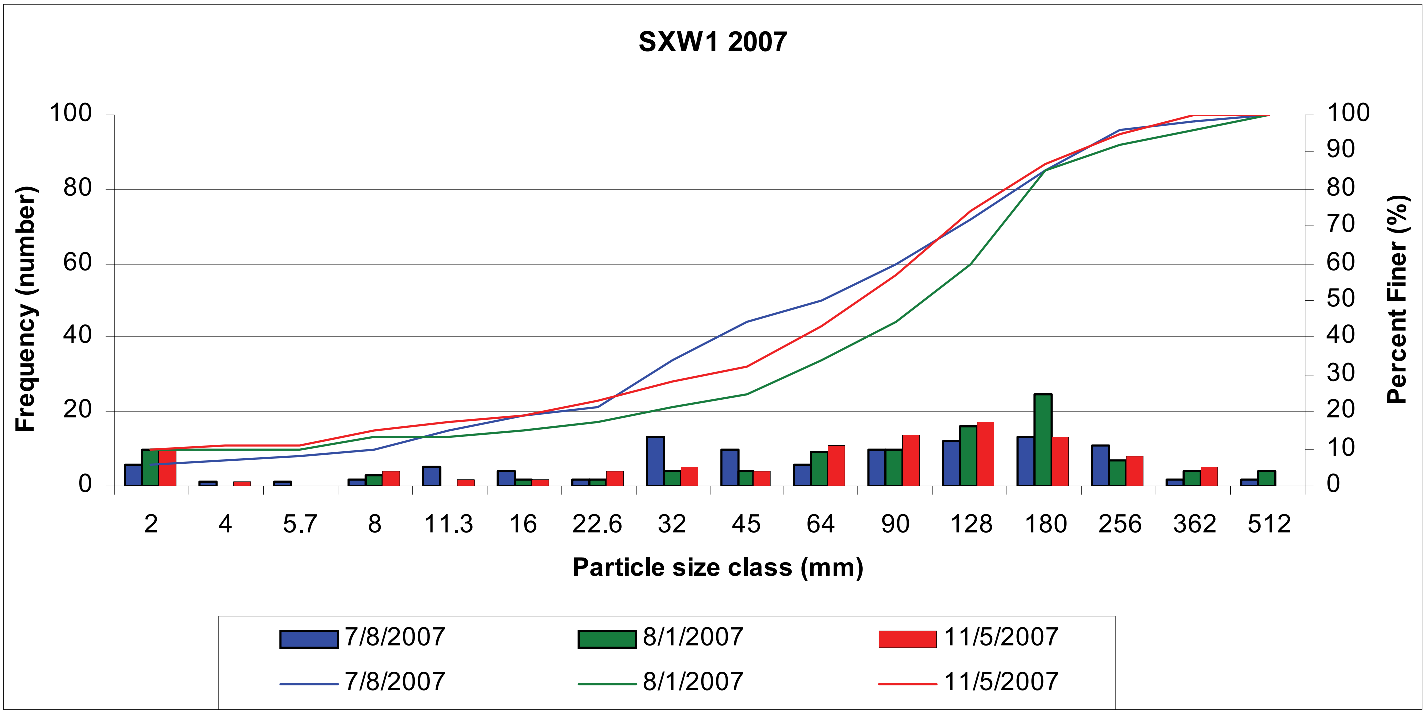
67	9	7	33	-5.5	75	12	3	25	-5.5	63	9	11	37	-5.5	52	8	8	48	-5.5	62	8
58	24	9	42	-6.0	63	18	12	37	-6.0	54	22	9	46	-6.0	44	15	8	56	-6.0	54	23
34	18	24	66	-6.5	45	26	18	55	-6.5	32	12	22	68	-6.5	29	20	15	71	-6.5	31	12
16	11	18	84	-7.0	19	17	26	81	-7.0	20	12	12	80	-7.0	9	4	20	91	-7.0	19	17
5	4	11	95	-7.5	2	2	17	98	-7.5	8	8	12	92	-7.5	5	4	4	95	-7.5	2	2
1	0	4	99	-8.0	0	0	2	100	-8.0	0	0	8	100	-8.0	1	1	4	99	-8.0	0	0
1	1	0	99	-8.5	0	0	0	100	-8.5	0	0	0	100	-8.5	0	0	1	100	-8.5	0	0
		1	100	-9.0			0	100	-9.0			0	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
14	18	-3.5	-4.5	16	16	17	-3.0	-3.5	8	16	17	-3.5	-4.0	11	#N/A	#N/A	#N/A	#N/A	#N/A	16	18
18	26	-4.5	-5.0	31	25	37	-5.5	-6.0	45	21	26	-4.5	-5.0	30	23	28	-3.5	-4.0	13	22	26
42	66	-6.0	-6.5	72	37	55	-6.0	-6.5	82	46	68	-6.0	-6.5	68	48	56	-5.5	-6.0	49	46	69
66	84	-6.5	-7.0	107	55	81	-6.5	-7.0	118	68	80	-6.5	-7.0	111	71	91	-6.5	-7.0	97	69	81
84	95	-7.0	-7.5	128	81	98	-7.0	-7.5	136	80	92	-7.0	-7.5	143	71	91	-6.5	-7.0	113	81	98
84	95	-7.0	-7.5	154	81	98	-7.0	-7.5	153	80	92	-7.0	-7.5	170	71	91	-6.5	-7.0	126	81	98

count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2
10	138	138	88.8	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	<2
11	163	163	90.9	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	<2
12	155	155	89.8	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	<2
13	49	49	33.3	13	<2	1	0	13	<2	1	0	13	<2	1	0	13	<2
14	8	8	12.1	14	<2	1	0	14	125	125	78.7	14	<2	1	0	14	<2
15	71	71	46.4	15	<2	1	0	15	152	152	87.8	15	<2	1	0	15	<2
16	75	75	51.5	16	<2	1	0	16	170	170	89.8	16	<2	1	0	16	20
17	110	110	73.7	17	113	113	70.7	17	67	67	48.4	17	<2	1	0	17	105
18	45	45	31.3	18	150	150	91.9	18	40	40	32.3	18	<2	1	0	18	130
19	64	64	40.4	19	48	48	25.2	19	141	141	84.8	19	<2	1	0	19	120
20	85	85	57.5	20	110	110	68.6	20	49	49	39.3	20	<2	1	0	20	65
21	65	65	42.4	21	116	116	74.7	21	192	192	95.9	21	50	50	51.5	21	50
22	87	87	61.6	22	128	128	80.8	22	38	38	29.2	22	120	120	86.8	22	85
23	135	135	86.8	23	165	165	94.9	23	100	100	70.7	23	75	75	61.6	23	89
24	135	135	86.8	24	119	119	76.7	24	160	160	88.8	24	110	110	81.8	24	78
25	15	15	14.1	25	144	144	87.8	25	178	178	91.9	25	98	98	75.7	25	33
26	50	50	34.3	26	144	144	87.8	26	211	211	100	26	38	38	44.4	26	99
27	53	53	36.3	27	100	100	59.5	27	89	89	64.6	27	60	60	54.5	27	110
28	23	23	18.1	28	105	105	63.6	28	13	13	16.1	28	110	110	81.8	28	120
29	78	78	53.5	29	71	71	41.4	29	22	22	20.2	29	110	110	81.8	29	45
30	90	90	62.6	30	131	131	81.8	30	189	189	94.9	30	105	105	77.7	30	180
31	123	123	83.8	31	125	125	79.7	31	29	29	23.2	31	15	15	25.2	31	135
32	90	90	62.6	32	115	115	71.7	32	43	43	35.3	32	108	108	79.7	32	250
33	38	38	27.2	33	75	75	42.4	33	130	130	80.8	33	94	94	73.7	33	60
34	24	24	19.1	34	205	205	98.9	34	47	47	37.3	34	10	10	22.2	34	120
35	110	110	73.7	35	75	75	42.4	35	95	95	69.6	35	95	95	74.7	35	130
36	100	100	70.7	36	105	105	63.6	36	80	80	59.5	36	46	46	48.4	36	45
37	31	31	25.2	37	70	70	39.3	37	110	110	76.7	37	110	110	81.8	37	160
38	365	365	100	38	24	24	18.1	38	80	80	59.5	38	29	29	36.3	38	130
39	115	115	76.7	39	60	60	34.3	39	210	210	97.9	39	70	70	56.5	39	65
40	80	80	54.5	40	55	55	31.3	40	75	75	56.5	40	175	175	93.9	40	130
41	200	200	95.9	41	56	56	33.3	41	125	125	78.7	41	83	83	67.6	41	120
42	26	26	20.2	42	78	78	46.4	42	183	183	92.9	42	20	20	31.3	42	80
43	43	43	30.3	43	115	115	71.7	43	68	68	49.4	43	108	108	79.7	43	35
44	90	90	62.6	44	65	65	37.3	44	81	81	61.6	44	15	15	25.2	44	78
45	55	55	38.3	45	109	109	67.6	45	100	100	70.7	45	125	125	88.8	45	75
46	7	7	11.1	46	105	105	63.6	46	105	105	73.7	46	52	52	52.5	46	180
47	133	133	85.8	47	30	30	21.2	47	20	20	18.1	47	30	30	37.3	47	155
48	15	15	14.1	48	105	105	63.6	48	110	110	76.7	48	131	131	92.9	48	56
49	53	53	36.3	49	208	208	100	49	65	65	46.4	49	8	8	21.2	49	75
50	97	97	67.6	50	111	111	69.6	50	70	70	51.5	50	86	86	70.7	50	25
51	75	75	51.5	51	52	52	29.2	51	79	79	57.5	51	48	48	49.4	51	36
52	105	105	72.7	52	138	138	85.8	52	28	28	22.2	52	80	80	63.6	52	75
53	70	70	44.4	53	75	75	42.4	53	72	72	53.5	53	71	71	59.5	53	130
54	4	4	10.1	54	48	48	25.2	54	94	94	68.6	54	37	37	43.4	54	151
55	120	120	79.7	55	145	145	89.8	55	19	19	17.1	55	130	130	91.9	55	170
56	60	60	39.3	56	120	120	77.7	56	149	149	85.8	56	38	38	44.4	56	60
57	16	16	16.1	57	120	120	77.7	57	187	187	93.9	57	15	15	25.2	57	166
58	28	28	24.2	58	155	155	92.9	58	55	55	42.4	58	180	180	94.9	58	75
59	205	205	96.9	59	26	26	19.1	59	57	57	43.4	59	7	7	20.2	59	90
60	120	120	79.7	60	85	85	53.5	60	40	40	32.3	60	48	48	49.4	60	80
61	41	41	29.2	61	60	60	34.3	61	36	36	27.2	61	23	23	35.3	61	45
62	120	120	79.7	62	170	170	96.9	62	38	38	29.2	62	80	80	63.6	62	81
63	85	85	57.5	63	80	80	48.4	63	105	105	73.7	63	120	120	86.8	63	42
64	205	205	96.9	64	100	100	59.5	64	106	106	75.7	64	106	106	78.7	64	64
65	98	98	68.6	65	93	93	55.5	65	135	135	81.8	65	22	22	34.3	65	44
66	119	119	78.7	66	100	100	59.5	66	137	137	82.8	66	128	128	90.9	66	87
67	26	26	20.2	67	117	117	75.7	67	61	61	44.4	67	115	115	85.8	67	133
68	85	85	57.5	68	50	50	27.2	68	52	52	41.4	68	19	19	28.2	68	113
69	100	100	70.7	69	145	145	89.8	69	81	81	61.6	69	240	240	98.9	69	26
70	45	45	31.3	70	29	29	20.2	70	26	26	21.2	70	36	36	42.4	70	66
71	3	3	9	71	98	98	58.5	71	31	31	24.2	71	34	34	41.4	71	25
72	9	9	13.1	72	100	100	59.5	72	100	100	70.7	72	92	92	72.7	72	68
73	173	173	94.9	73	155	155	92.9	73	66	66	47.4	73	82	82	66.6	73	33
74	73	73	49.4	74	140	140	86.8	74	47	47	37.3	74	30	30	37.3	74	129
75	99	99	69.6	75	60	60	34.3	75	41	41	34.3	75	71	71	59.5	75	21
76	68	68	43.4	76	90	90	54.5	76	149	149	85.8	76	61	61	55.5	76	70
77	64	64	40.4	77	37	37	22.2	77	198	198	96.9	77	19	19	28.2	77	20
78	50	50	34.3	78	135	135	82.8	78	7	7	15.1	78	59	59	53.5	78	88
79	170	170	91.9	79	175	175	97.9	79	36	36	27.2	79	84	84	68.6	79	91
80	27	27	22.2	80	84	84	51.5	80	39	39	31.3	80	14	14	24.2	80	82
81	74	74	50.5	81	75	75	42.4	81	72	72	53.5	81	100	100	76.7	81	63
82	116	116	77.7	82	55	55	31.3	82	3	3	13.1	82	31	31	39.3	82	10
83	39	39	28.2	83	44	44	24.2	83	63	63	45.4	83	21	21	33.3	83	11
84	220	220	98.9	84	50	50	27.2	84	90	90	66.6	84	19	19	28.2	84	66
85	80	80	54.5	85	135	135	82.8	85	89	89	64.6	85	272	272	100	85	170
86	172	172	93.9	86	70	70	39.3	86	51	51	40.4	86	225	225	97.9	86	187
87	86	86	60.6	87	80	80	48.4	87	20	20	18.1	87	205	205	95.9	87	120
88	130	130	84.8	88	54	54	30.3	88	82	82	63.6	88	70	70	56.5	88	56
89	90	90	62.6	89	12	12	17.1	89	72	72	53.5	89	91	91	71.7	89	35
90	110	110	73.7	90	80	80	48.4	90	69	69	50.5	90	84	84	68.6	90	44
91	120	120	79.7	91	11	11	16.1	91	31	31	24.2	91	80	80	63.6	91	49
92	72	72	47.4	92	78	78	46.4	92	35	35	26.2	92	75	75	61.6	92	121
93	16	16	16.1	93	115	115	71.7	93	210	210	97.9	93	40	40	47.4	93	115
94	84	84	56.5	94	40	40	23.2	94	6	6	14.1	94	220	220	96.9	94	90
95	72	72	47.4	95	68	68	38.3	95	139	139	83.8	95	20	20	31.3	95	130
96	27	27	22.2	96	135	135	82.8	96	90	90	66.6	96	13	13	23.2	96	15
97	33	33	26.2	97	84	84	51.5	97	174	174	90.9	97	70	70	56.5	97	6
98	91	91	66.6	98	95	95	57.5	98	79	79	57.5	98	38	38	44.4	98	70
99	70	70	44.4	99	165	165	94.9	99	70	70	51.5	99	33	33	40.4	99	41
100	170	170	91.9	100	94	94	56.5	100	45	45	36.3	100	125	125	88.8	100	32

67	13	8	33	-5.5	51	12	9	49	-5.5	55	5	15	45	-5.5	65	12	6	35	-5.5	61	13
54	19	13	46	-6.0	39	9	12	61	-6.0	50	17	5	50	-6.0	53	20	12	47	-6.0	48	20
35	15	19	65	-6.5	30	15	9	70	-6.5	33	20	17	67	-6.5	33	22	20	67	-6.5	28	15
20	19	15	80	-7.0	15	12	15	85	-7.0	13	10	20	87	-7.0	11	10	22	89	-7.0	13	7
1	1	19	99	-7.5	3	3	12	97	-7.5	3	2	10	97	-7.5	1	0	10	99	-7.5	6	5
0	0	1	100	-8.0	0	0	3	100	-8.0	1	0	2	99	-8.0	1	1	0	99	-8.0	1	1
0	0	0	100	-8.5	0	0	0	100	-8.5	1	1	0	99	-8.5	0	0	1	100	-8.5	0	0
		0	100	-9.0			0	100	-9.0			1	100	-9.0			0	100	-9.0		
	100					**100**					**100**					**100**					**100**
				Percentile (mm)					**Percentile (mm)**					**Percentile (mm)**					**Percentile (mm)**		
15	18	-4.0	-4.5	18	15	17	-2.0	-2.5	5	13	17	-2.5	-3.0	7	15	18	-2.5	-3.0	6	14	17
25	33	-5.0	-5.5	32	22	32	-3.5	-4.0	13	19	26	-3.5	-4.0	15	25	26	-4.0	-4.5	16	24	30
46	65	-6.0	-6.5	69	49	61	-5.5	-6.0	46	50	67	-6.0	-6.5	64	47	67	-6.0	-6.5	67	39	52
65	80	-6.5	-7.0	114	70	85	-6.5	-7.0	101	67	87	-6.5	-7.0	104	67	89	-6.5	-7.0	102	72	87
80	99	-7.0	-7.5	138	70	85	-6.5	-7.0	125	67	87	-6.5	-7.0	121	67	89	-6.5	-7.0	118	72	87
80	99	-7.0	-7.5	153	85	97	-7.0	-7.5	148	87	97	-7.0	-7.5	142	89	99	-7.0	-8.0	137	87	94

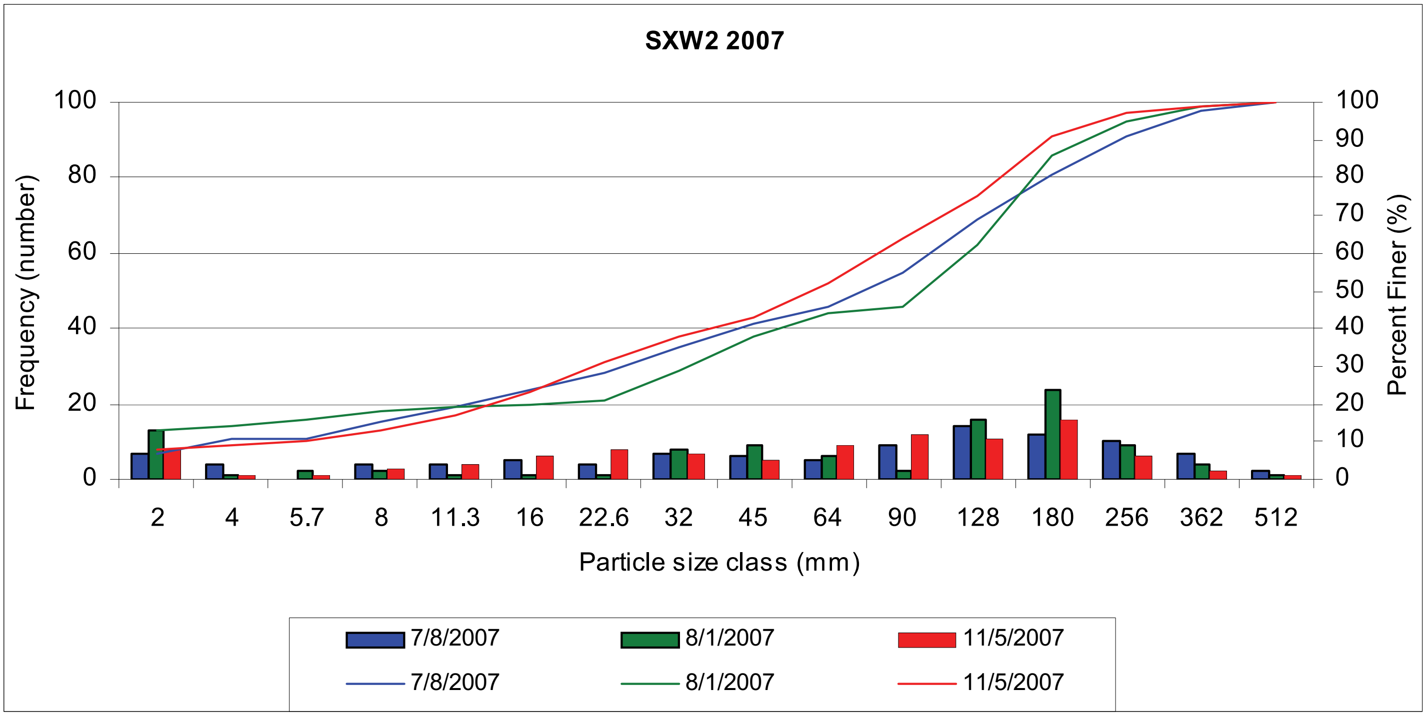
count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)	Size (mm) replace "<2" with 1	Percent Rank	count	size (mm)
1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2	1	0	1	<2
2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2	1	0	2	<2
3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2	1	0	3	<2
4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2	1	0	4	<2
5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2	1	0	5	<2
6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2	1	0	6	<2
7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2	1	0	7	<2
8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2	1	0	8	<2
9	92	92	65.6	9	<2	1	0	9	<2	1	0	9	<2	1	0	9	<2
10	18	18	15.1	10	<2	1	0	10	<2	1	0	10	<2	1	0	10	43
11	100	100	71.7	11	<2	1	0	11	<2	1	0	11	<2	1	0	11	46
12	71	71	49.4	12	<2	1	0	12	<2	1	0	12	<2	1	0	12	35
13	80	80	53.5	13	<2	1	0	13	4	4	12.1	13	<2	1	0	13	95
14	86	86	63.6	14	13	13	23.2	14	70	70	56.5	14	105	105	74.7	14	105
15	130	130	80.8	15	135	135	86.8	15	370	370	100	15	9	9	18.1	15	60
16	50	50	35.3	16	12	12	22.2	16	110	110	78.7	16	8	8	16.1	16	85
17	44	44	31.3	17	40	40	42.4	17	67	67	51.5	17	13	13	24.2	17	87
18	31	31	23.2	18	110	110	76.7	18	85	85	60.6	18	65	65	47.4	18	75
19	143	143	90.9	19	13	13	23.2	19	57	57	48.4	19	290	290	100	19	190
20	130	130	80.8	20	57	57	55.5	20	42	42	36.3	20	130	130	89.8	20	7
21	93	93	66.6	21	105	105	74.7	21	130	130	87.8	21	24	24	27.2	21	190
22	7	7	9	22	110	110	76.7	22	45	45	41.4	22	24	24	27.2	22	71
23	46	46	33.3	23	50	50	52.5	23	17	17	26.2	23	36	36	30.3	23	19
24	85	85	60.6	24	125	125	83.8	24	130	130	87.8	24	165	165	96.9	24	15
25	100	100	71.7	25	79	79	62.6	25	48	48	45.4	25	96	96	69.6	25	110
26	137	137	87.8	26	100	100	72.7	26	160	160	93.9	26	125	125	85.8	26	9
27	50	50	35.3	27	95	95	71.7	27	44	44	40.4	27	12	12	23.2	27	145
28	130	130	80.8	28	205	205	100	28	38	38	32.3	28	103	103	71.7	28	50
29	78	78	52.5	29	80	80	63.6	29	95	95	69.6	29	78	78	58.5	29	58
30	80	80	53.5	30	200	200	97.9	30	67	67	51.5	30	19	19	25.2	30	90
31	9	9	10.1	31	45	45	46.4	31	35	35	30.3	31	80	80	60.6	31	89
32	98	98	70.7	32	130	130	85.8	32	26	26	28.2	32	73	73	56.5	32	20
33	19	19	17.1	33	165	165	94.9	33	115	115	81.8	33	105	105	74.7	33	40
34	135	135	85.8	34	4	4	14.1	34	45	45	41.4	34	170	170	97.9	34	70
35	35	35	27.2	35	150	150	89.8	35	100	100	73.7	35	11	11	22.2	35	51
36	27	27	20.2	36	113	113	80.8	36	95	95	69.6	36	126	126	87.8	36	18
37	145	145	91.9	37	152	152	90.9	37	37	37	31.3	37	5	5	14.1	37	86
38	40	40	30.3	38	32	32	39.3	38	55	55	47.4	38	110	110	78.7	38	99
39	59	59	42.4	39	49	49	50.5	39	68	68	54.5	39	81	81	61.6	39	3
40	132	132	84.8	40	15	15	27.2	40	117	117	84.8	40	67	67	49.4	40	22
41	160	160	95.9	41	15	15	27.2	41	120	120	85.8	41	10	10	20.2	41	63
42	64	64	45.4	42	10	10	21.2	42	81	81	58.5	42	65	65	47.4	42	64
43	160	160	95.9	43	110	110	76.7	43	115	115	81.8	43	125	125	85.8	43	72
44	45	45	32.3	44	21	21	33.3	44	150	150	91.9	44	120	120	81.8	44	20
45	52	52	40.4	45	30	30	37.3	45	27	27	29.2	45	68	68	52.5	45	90
46	62	62	44.4	46	5	5	15.1	46	170	170	95.9	46	35	35	29.2	46	210
47	82	82	58.5	47	58	58	56.5	47	43	43	38.3	47	75	75	57.5	47	100
48	125	125	78.7	48	55	55	53.5	48	115	115	81.8	48	7	7	15.1	48	125
49	142	142	89.8	49	62	62	58.5	49	67	67	51.5	49	46	46	35.3	49	9
50	51	51	39.3	50	90	90	69.6	50	101	101	75.7	50	105	105	74.7	50	70
51	50	50	35.3	51	15	15	27.2	51	93	93	67.6	51	120	120	81.8	51	185
52	130	130	80.8	52	38	38	41.4	52	190	190	97.9	52	103	103	71.7	52	80
53	118	118	77.7	53	45	45	46.4	53	107	107	76.7	53	120	120	81.8	53	46
54	96	96	68.6	54	22	22	34.3	54	14	14	24.2	54	52	52	39.3	54	110
55	155	155	94.9	55	110	110	76.7	55	90	90	65.6	55	170	170	97.9	55	41
56	135	135	85.8	56	8	8	19.1	56	12	12	19.1	56	143	143	90.9	56	80
57	100	100	71.7	57	64	64	60.6	57	112	112	80.8	57	120	120	81.8	57	75
58	82	82	58.5	58	136	136	87.8	58	140	140	89.8	58	92	92	67.6	58	100
59	165	165	98.9	59	22	22	34.3	59	8	8	14.1	59	112	112	79.7	59	360
60	108	108	74.7	60	113	113	80.8	60	150	150	91.9	60	23	23	26.2	60	160
61	73	73	50.5	61	85	85	65.6	61	12	12	19.1	61	55	55	41.4	61	14
62	96	96	68.6	62	15	15	27.2	62	8	8	14.1	62	67	67	49.4	62	44
63	85	85	60.6	63	153	153	91.9	63	125	125	86.8	63	84	84	64.6	63	15
64	115	115	75.7	64	115	115	82.8	64	45	45	41.4	64	8	8	16.1	64	10
65	56	56	41.4	65	40	40	42.4	65	73	73	57.5	65	128	128	88.8	65	14
66	160	160	95.9	66	8	8	19.1	66	109	109	77.7	66	72	72	54.5	66	41
67	80	80	53.5	67	55	55	53.5	67	10	10	18.1	67	50	50	37.3	67	83
68	29	29	21.2	68	180	180	96.9	68	160	160	93.9	68	39	39	32.3	68	53
69	13	13	13.1	69	43	43	45.4	69	140	140	89.8	69	64	64	46.4	69	56
70	70	70	47.4	70	45	45	46.4	70	43	43	38.3	70	70	70	53.5	70	110
71	145	145	91.9	71	62	62	58.5	71	39	39	35.3	71	55	55	41.4	71	3
72	26	26	18.1	72	100	100	72.7	72	50	50	46.4	72	63	63	45.4	72	37
73	50	50	35.3	73	155	155	92.9	73	66	66	50.5	73	90	90	65.6	73	98
74	26	26	18.1	74	137	137	88.8	74	42	42	36.3	74	94	94	68.6	74	101
75	18	18	15.1	75	85	85	65.6	75	16	16	25.2	75	41	41	33.3	75	6
76	81	81	56.5	76	127	127	84.8	76	12	12	19.1	76	52	52	39.3	76	73
77	33	33	25.2	77	5	5	15.1	77	13	13	23.2	77	160	160	94.9	77	75
78	240	240	100	78	85	85	65.6	78	38	38	32.3	78	67	67	49.4	78	70
79	4	4	8	79	200	200	97.9	79	61	61	49.4	79	49	49	36.3	79	100
80	95	95	67.6	80	160	160	93.9	80	68	68	54.5	80	150	150	92.9	80	6
81	115	115	75.7	81	36	36	40.4	81	93	93	67.6	81	97	97	70.7	81	145
82	10	10	12.1	82	80	80	63.6	82	7	7	13.1	82	90	90	65.6	82	175
83	150	150	93.9	83	40	40	42.4	83	85	85	60.6	83	41	41	33.3	83	16
84	9	9	10.1	84	7	7	17.1	84	190	190	97.9	84	55	55	41.4	84	202
85	16	16	14.1	85	30	30	37.3	85	21	21	27.2	85	36	36	30.3	85	69
86	140	140	88.8	86	23	23	36.3	86	100	100	73.7	86	160	160	94.9	86	120
87	81	81	56.5	87	69	69	61.6	87	110	110	78.7	87	10	10	20.2	87	103
88	46	46	33.3	88	19	19	32.3	88	99	99	72.7	88	145	145	91.9	88	88
89	85	85	60.6	89	15	15	27.2	89	45	45	41.4	89	104	104	73.7	89	14
90	74	74	51.5	90	59	59	57.5	90	9	9	17.1	90	81	81	61.6	90	38
91	38	38	28.2	91	7	7	17.1	91	82	82	59.5	91	81	81	61.6	91	123
92	65	65	46.4	92	14	14	26.2	92	95	95	69.6	92	109	109	77.7	92	129
93	34	34	26.2	93	49	49	50.5	93	12	12	19.1	93	72	72	54.5	93	150
94	60	60	43.4	94	88	88	68.6	94	38	38	32.3	94	55	55	41.4	94	14
95	30	30	22.2	95	108	108	75.7	95	90	90	65.6	95	158	158	93.9	95	52
96	70	70	47.4	96	13	13	23.2	96	86	86	62.6	96	50	50	37.3	96	19
97	38	38	28.2	97	179	179	95.9	97	89	89	64.6	97	3	3	13.1	97	55
98	31	31	23.2	98	48	48	49.4	98	8	8	14.1	98	78	78	58.5	98	26
99	125	125	78.7	99	3	3	13.1	99	87	87	63.6	99	112	112	79.7	99	138
100	86	86	63.6	100	92	92	70.7	100	175	175	96.9	100	9	9	18.1	100	56

APPENDIX 4.2B: PEBBLE COUNT PLOTS

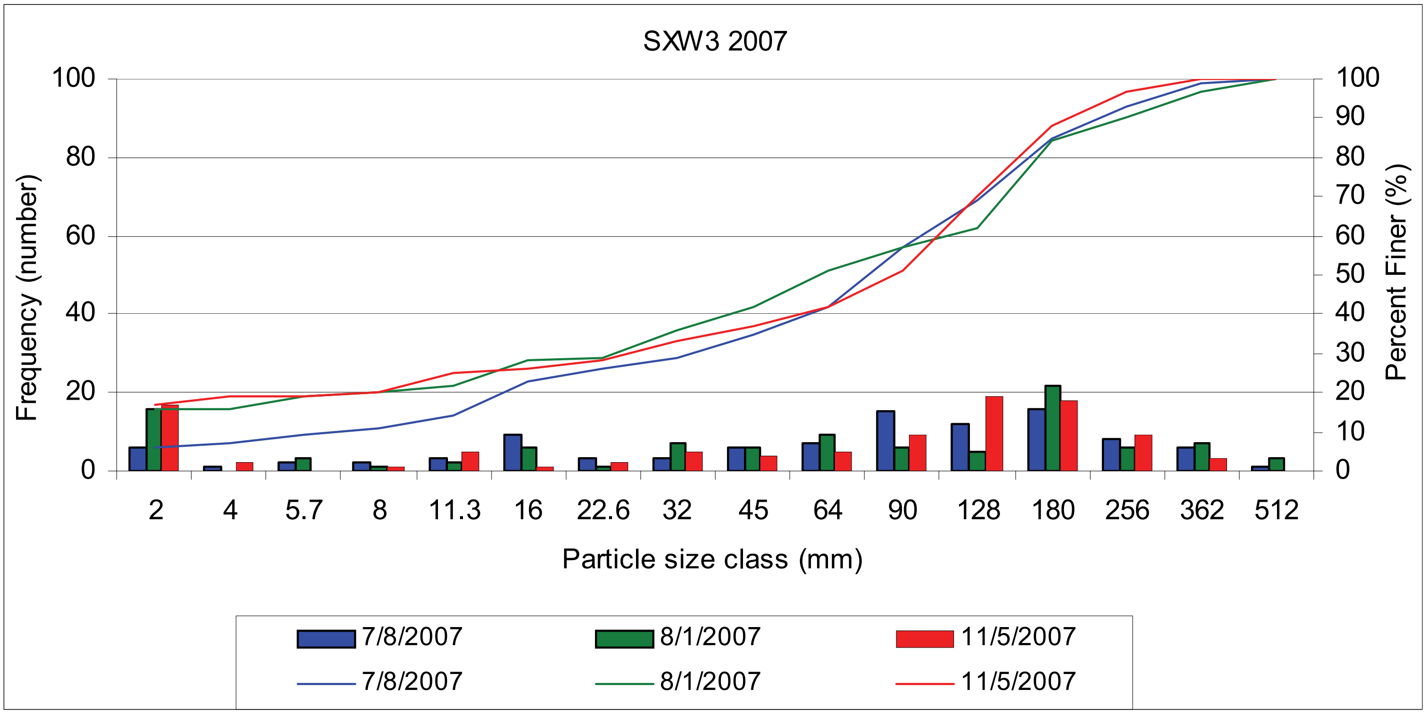


SXW1 2007

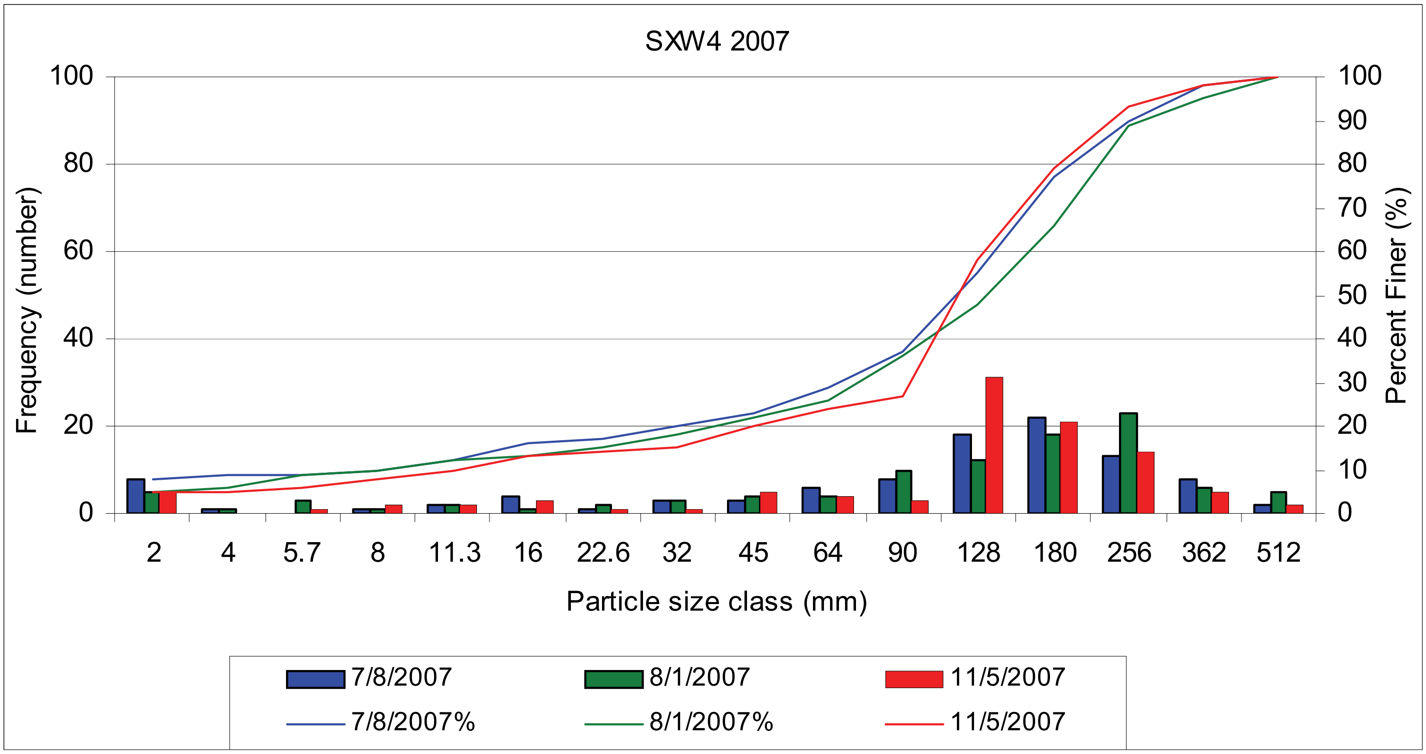
SXW1	7/8/2007	7/8/2007	8/1/2007	8/1/2007	11/5/2007	11/5/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	6	6	10	10	10	10
4	1	7	0	10	1	11
5.7	1	8	0	10	0	11
8	2	10	3	13	4	15
11.3	5	15	0	13	2	17
16	4	19	2	15	2	19
22.6	2	21	2	17	4	23
32	13	34	4	21	5	28
45	10	44	4	25	4	32
64	6	50	9	34	11	43
90	10	60	10	44	14	57
128	12	72	16	60	17	74
180	13	85	25	85	13	87
256	11	96	7	92	8	95
362	2	98	4	96	5	100
512	2	100	4	100	0	100



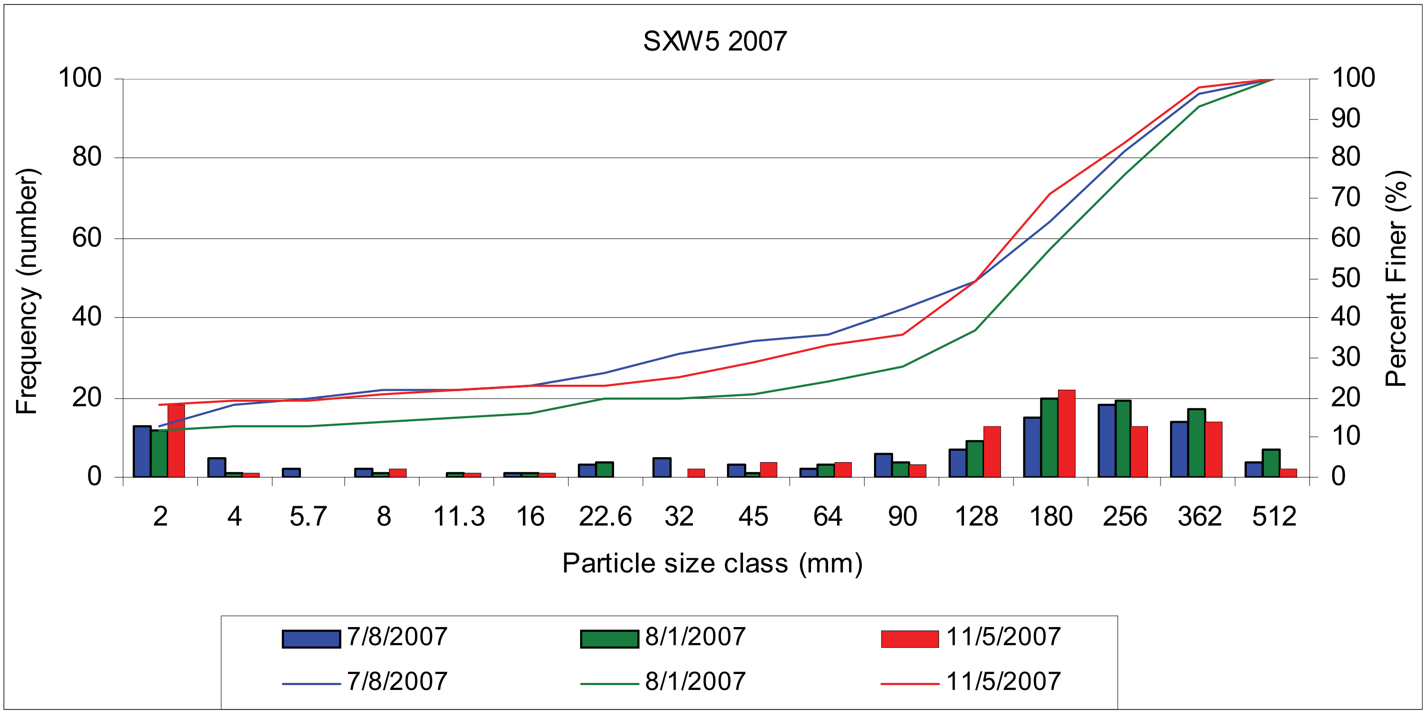
SXW2	7/8/2007	7/8/2007	8/1/2007	8/1/2007	11/5/2007	11/5/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7	7	13	13	8	8
4	4	11	1	14	1	9
5.7	0	11	2	16	1	10
8	4	15	2	18	3	13
11.3	4	19	1	19	4	17
16	5	24	1	20	6	23
22.6	4	28	1	21	8	31
32	7	35	8	29	7	38
45	6	41	9	38	5	43
64	5	46	6	44	9	52
90	9	55	2	46	12	64
128	14	69	16	62	11	75
180	12	81	24	86	16	91
256	10	91	9	95	6	97
362	7	98	4	99	2	99
512	2	100	1	100	1	100



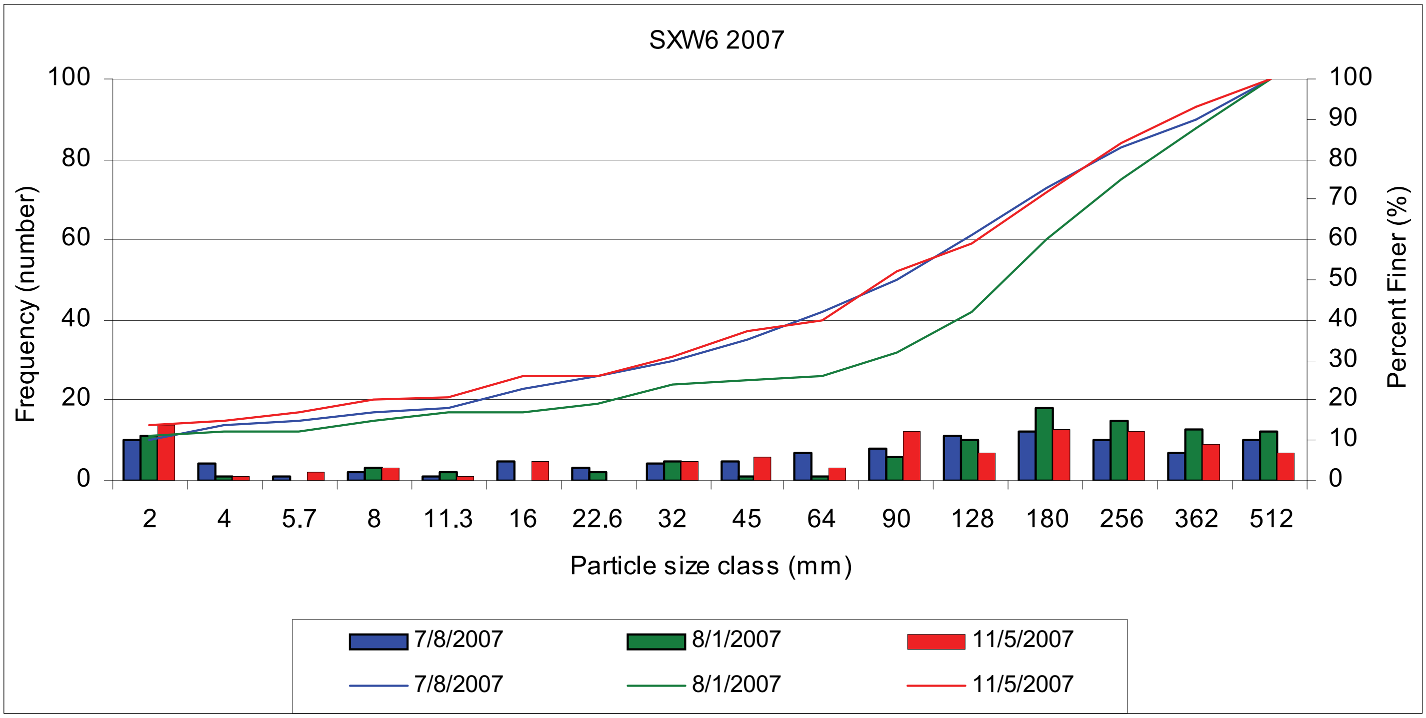
SXW3	7/8/2007	7/8/2007	8/1/2007	8/1/2007	11/5/2007	11/5/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	6	6	16	16	17	17
4	1	7	0	16	2	19
5.7	2	9	3	19	0	19
8	2	11	1	20	1	20
11.3	3	14	2	22	5	25
16	9	23	6	28	1	26
22.6	3	26	1	29	2	28
32	3	29	7	36	5	33
45	6	35	6	42	4	37
64	7	42	9	51	5	42
90	15	57	6	57	9	51
128	12	69	5	62	19	70
180	16	85	22	84	18	88
256	8	93	6	90	9	97
362	6	99	7	97	3	100
512	1	100	3	100	0	100



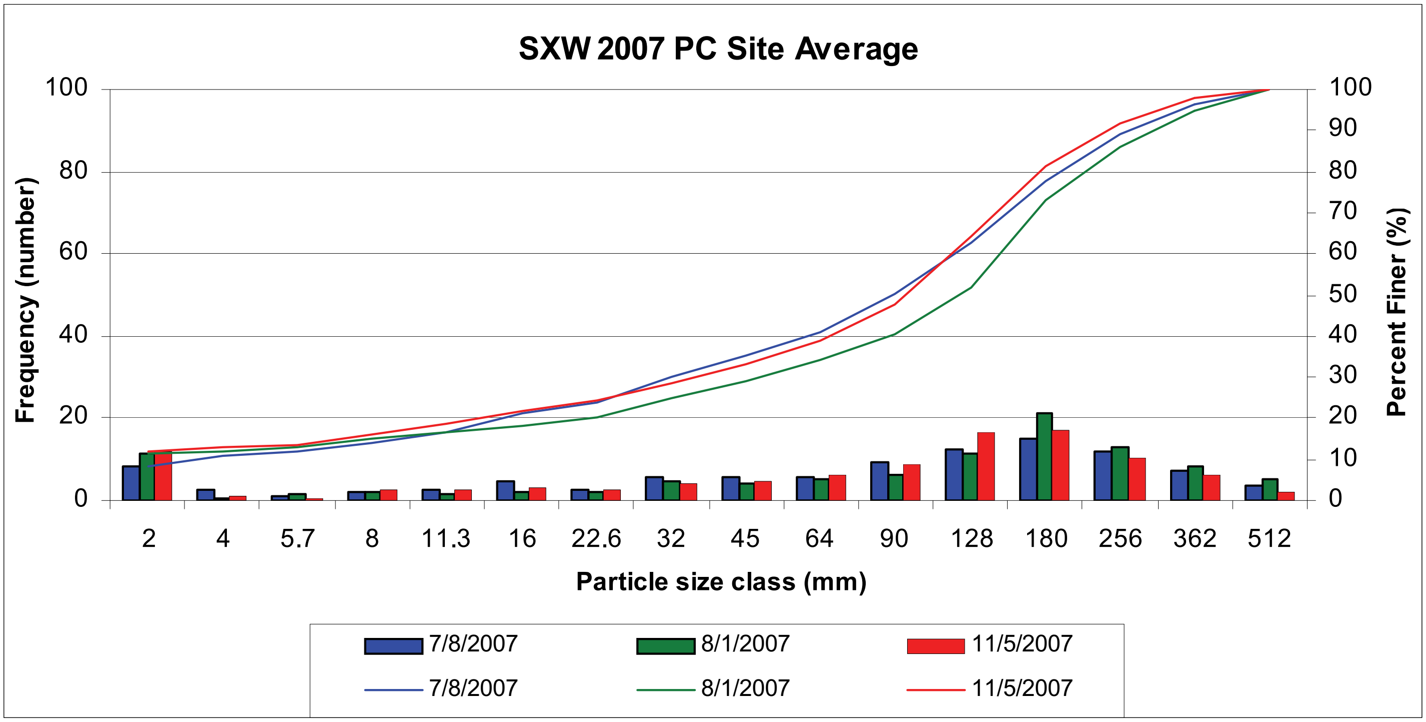
SXW4	7/8/2007	7/8/2007%	8/1/2007	8/1/2007%	11/5/2007	11/5/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	8	8	5	5	5	5
4	1	9	1	6	0	5
5.7	0	9	3	9	1	6
8	1	10	1	10	2	8
11.3	2	12	2	12	2	10
16	4	16	1	13	3	13
22.6	1	17	2	15	1	14
32	3	20	3	18	1	15
45	3	23	4	22	5	20
64	6	29	4	26	4	24
90	8	37	10	36	3	27
128	18	55	12	48	31	58
180	22	77	18	66	21	79
256	13	90	23	89	14	93
362	8	98	6	95	5	98
512	2	100	5	100	2	100



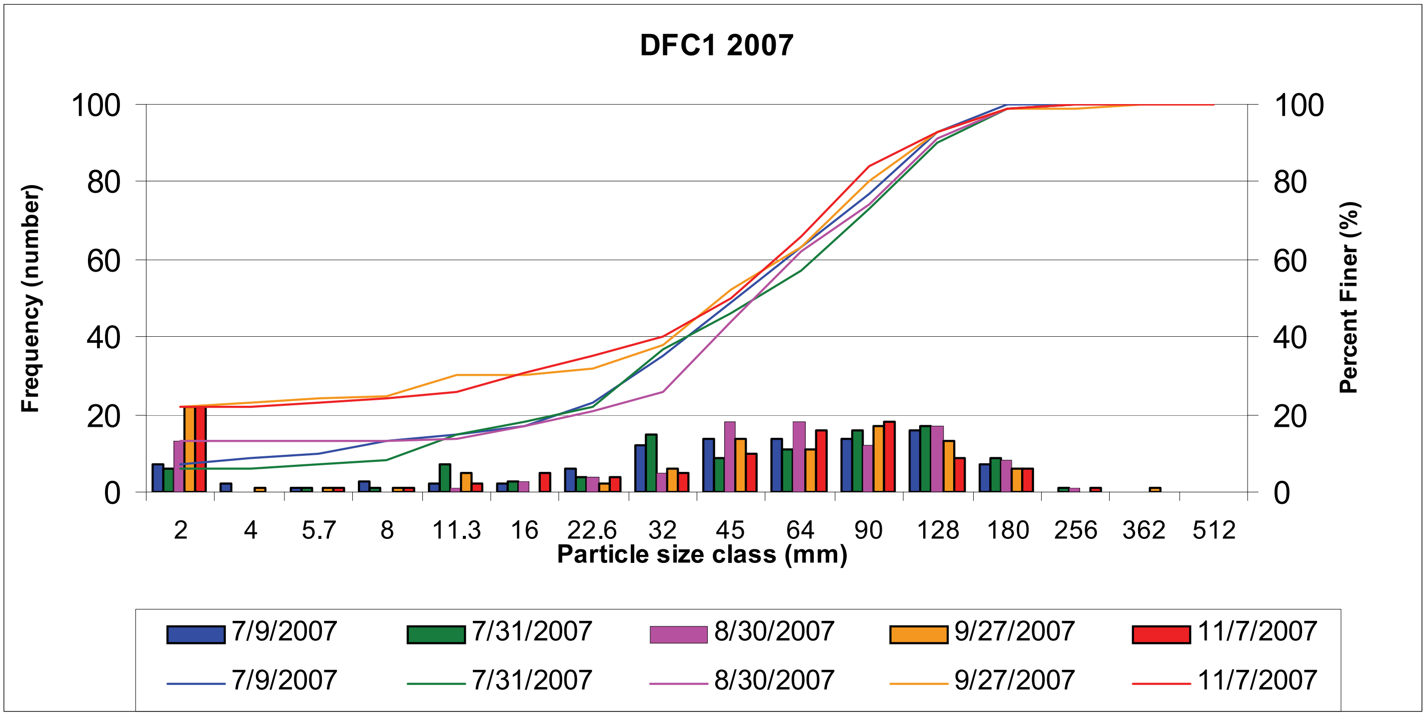
SXW5	7/8/2007	7/8/2007	8/1/2007	8/1/2007	11/5/2007	11/5/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	13	13	12	12	18	18
4	5	18	1	13	1	19
5.7	2	20	0	13	0	19
8	2	22	1	14	2	21
11.3	0	22	1	15	1	22
16	1	23	1	16	1	23
22.6	3	26	4	20	0	23
32	5	31	0	20	2	25
45	3	34	1	21	4	29
64	2	36	3	24	4	33
90	6	42	4	28	3	36
128	7	49	9	37	13	49
180	15	64	20	57	22	71
256	18	82	19	76	13	84
362	14	96	17	93	14	98
512	4	100	7	100	2	100



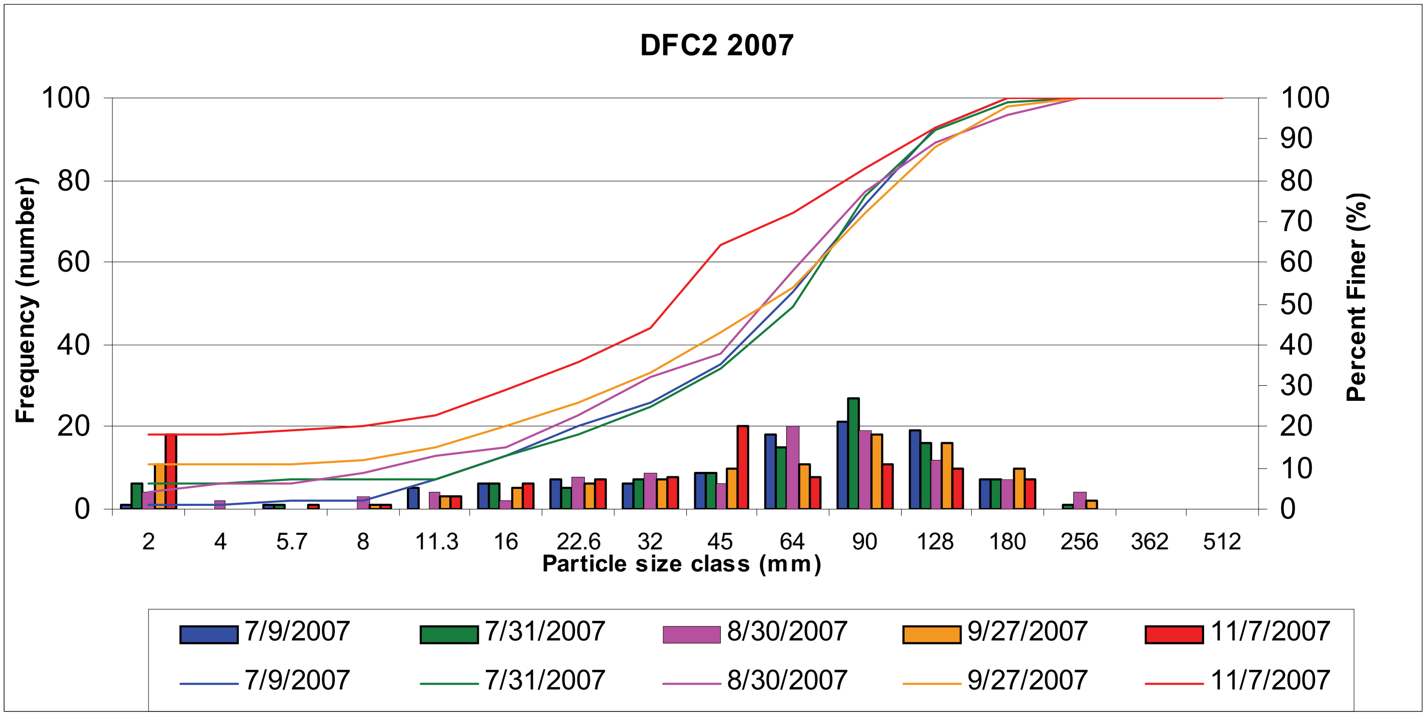
SXW6	7/8/2007	7/8/2007	8/1/2007	8/1/2007	11/5/2007	11/5/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	10	10	11	11	14	14
4	4	14	1	12	1	15
5.7	1	15	0	12	2	17
8	2	17	3	15	3	20
11.3	1	18	2	17	1	21
16	5	23	0	17	5	26
22.6	3	26	2	19	0	26
32	4	30	5	24	5	31
45	5	35	1	25	6	37
64	7	42	1	26	3	40
90	8	50	6	32	12	52
128	11	61	10	42	7	59
180	12	73	18	60	13	72
256	10	83	15	75	12	84
362	7	90	13	88	9	93
512	10	100	12	100	7	100



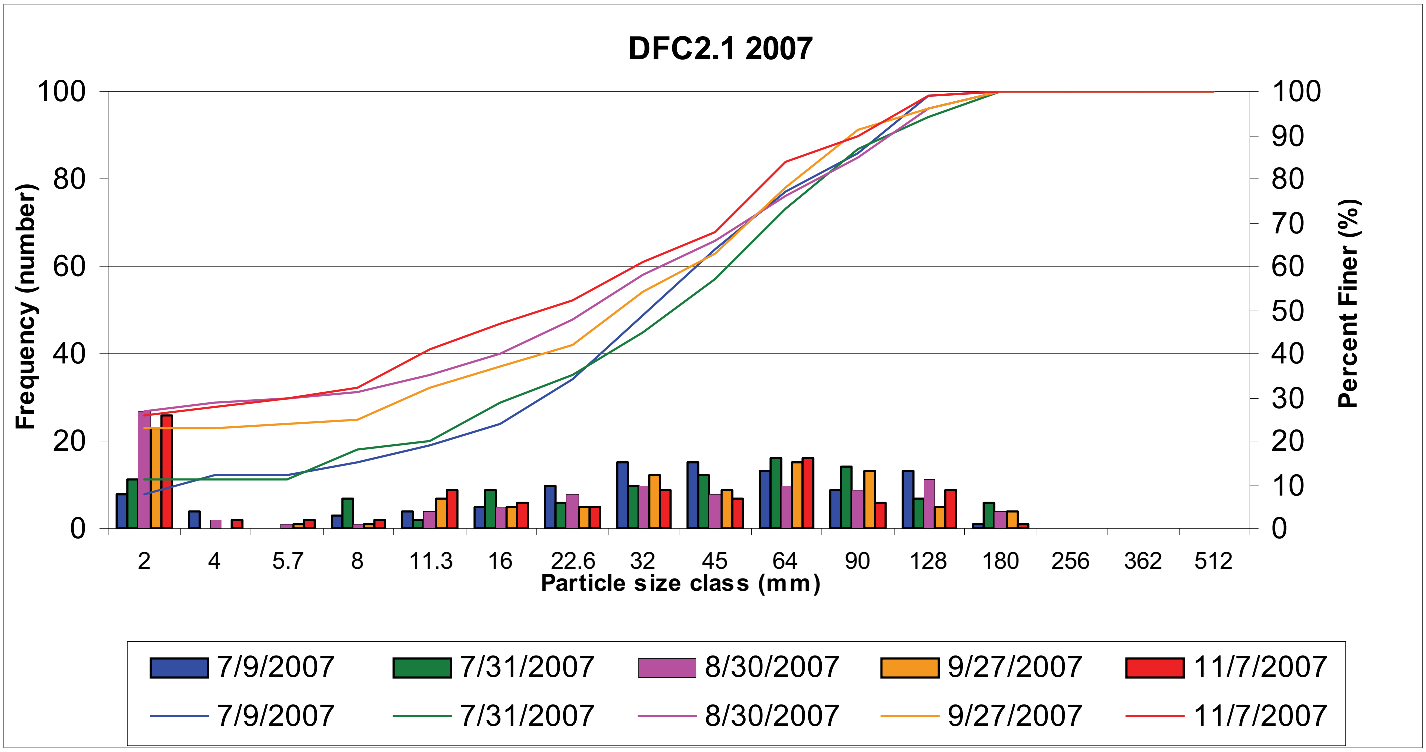
Avg SXW	7/8/2007	7/8/2007	8/1/2007	8/1/2007	11/5/2007	11/5/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	8	8	11	11	12	12
4	3	11	1	12	1	13
5.7	1	12	1	13	1	14
8	2	14	2	15	3	16
11.3	3	17	1	16	3	19
16	5	21	2	18	3	22
22.6	3	24	2	20	3	24
32	6	30	5	25	4	28
45	6	35	4	29	5	33
64	6	41	5	34	6	39
90	9	50	6	41	9	48
128	12	63	11	52	16	64
180	15	78	21	73	17	81
256	12	89	13	86	10	92
362	7	97	9	95	6	98
512	4	100	5	100	2	100



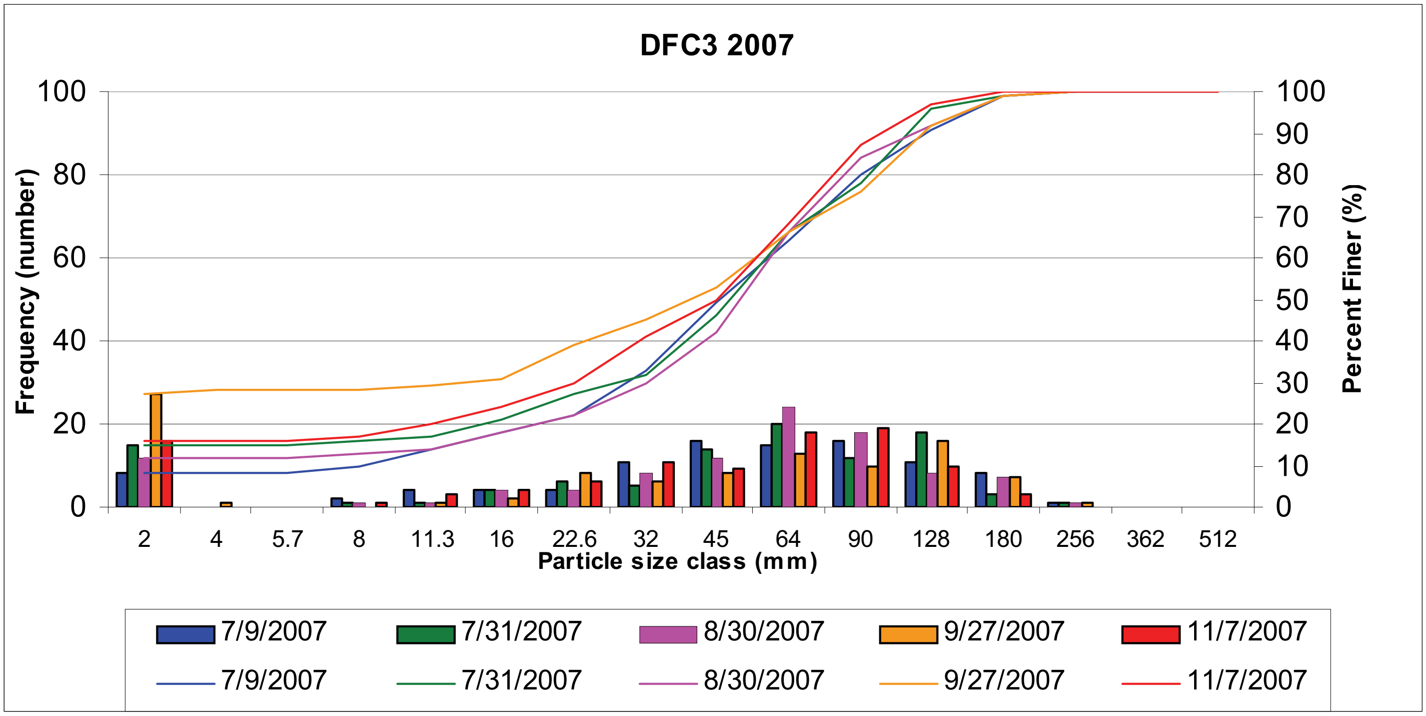
DFC1	7/9/2007	7/9/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7	7	6	6	13	13	22	22	22	22
4	2	9	0	6	0	13	1	23	0	22
5.7	1	10	1	7	0	13	1	24	1	23
8	3	13	1	8	0	13	1	25	1	24
11.3	2	15	7	15	1	14	5	30	2	26
16	2	17	3	18	3	17	0	30	5	31
22.6	6	23	4	22	4	21	2	32	4	35
32	12	35	15	37	5	26	6	38	5	40
45	14	49	9	46	18	44	14	52	10	50
64	14	63	11	57	18	62	11	63	16	66
90	14	77	16	73	12	74	17	80	18	84
128	16	93	17	90	17	91	13	93	9	93
180	7	100	9	99	8	99	6	99	6	99
256	0	100	1	100	1	100	0	99	1	100
362	0	100	0	100	0	100	1	100	0	100
512	0	100	0	100	0	100	0	100	0	100



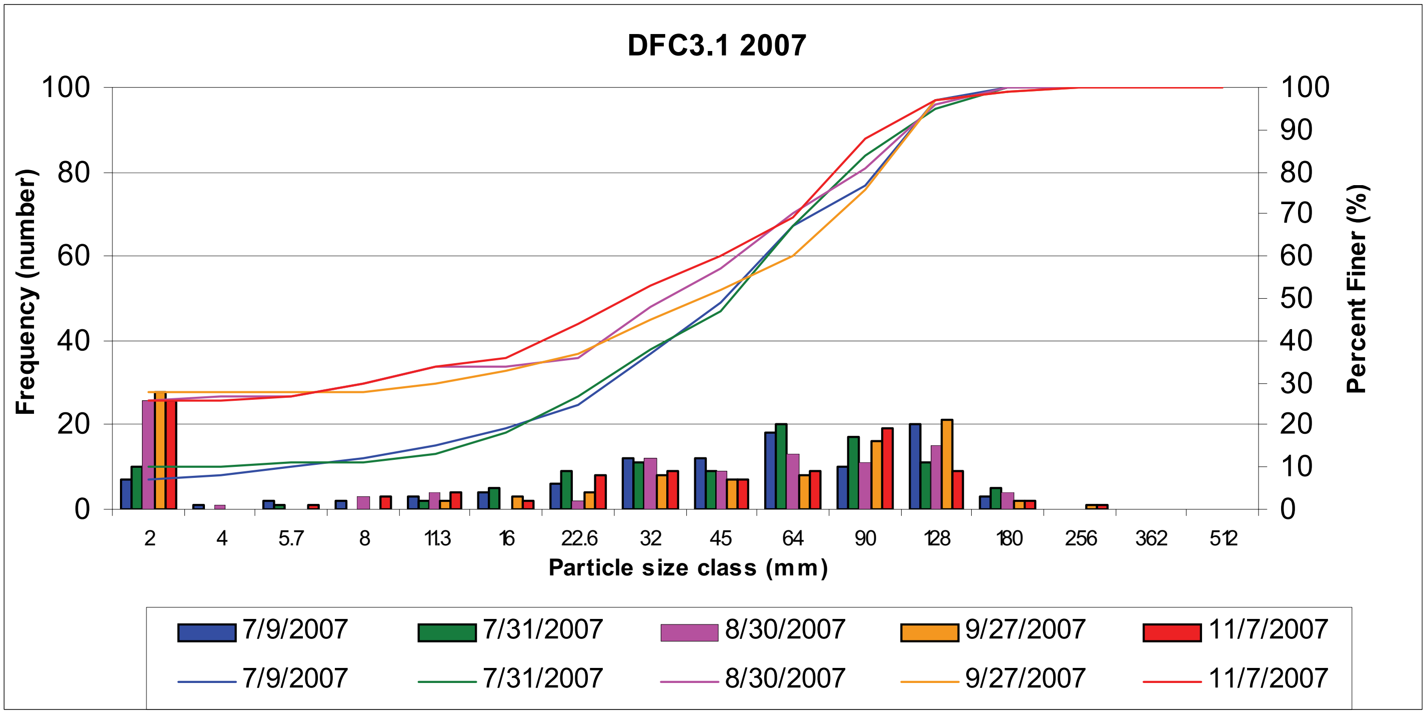
DFC2	7/9/2007	7/9/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	1	1	6	6	4	4	11	11	18	18
4	0	1	0	6	2	6	0	11	0	18
5.7	1	2	1	7	0	6	0	11	1	19
8	0	2	0	7	3	9	1	12	1	20
11.3	5	7	0	7	4	13	3	15	3	23
16	6	13	6	13	2	15	5	20	6	29
22.6	7	20	5	18	8	23	6	26	7	36
32	6	26	7	25	9	32	7	33	8	44
45	9	35	9	34	6	38	10	43	20	64
64	18	53	15	49	20	58	11	54	8	72
90	21	74	27	76	19	77	18	72	11	83
128	19	93	16	92	12	89	16	88	10	93
180	7	100	7	99	7	96	10	98	7	100
256	0	100	1	100	4	100	2	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



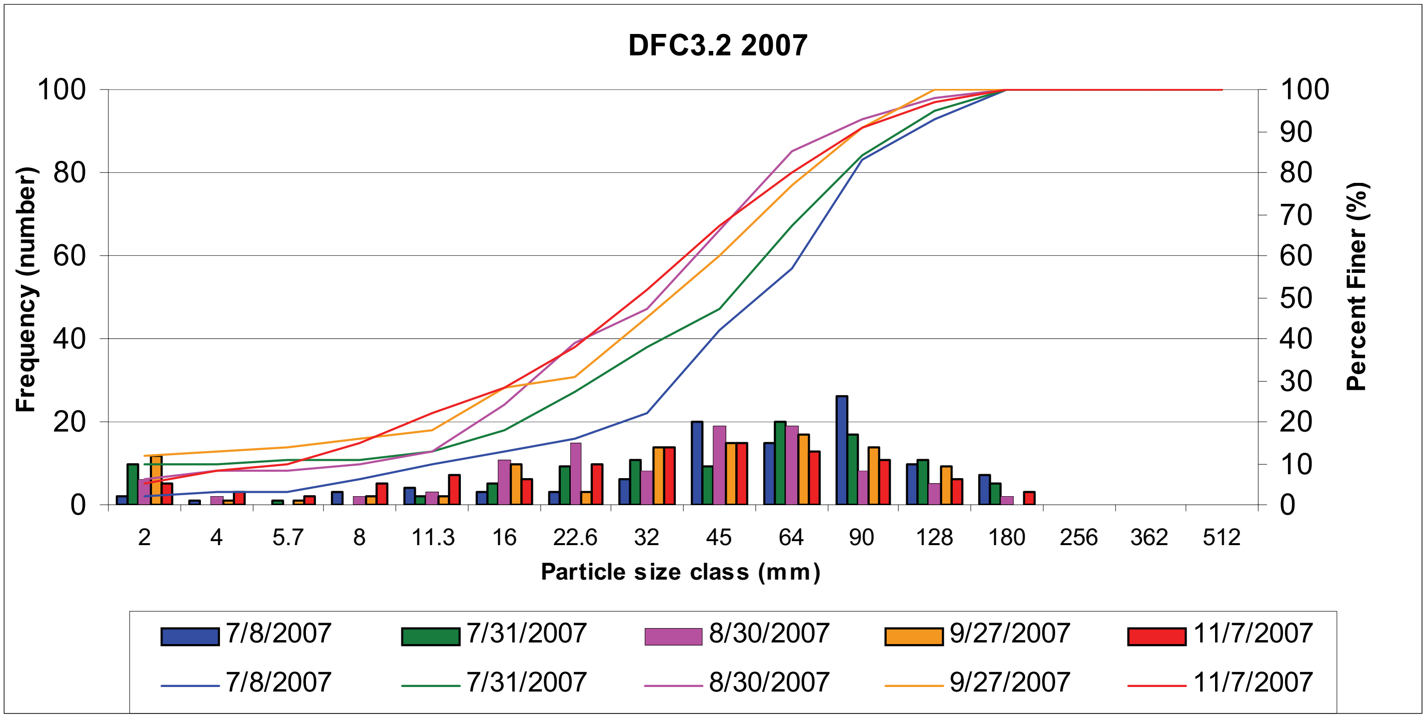
DFC2.1	7/9/2007	7/9/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	8	8	11	11	27	27	23	23	26	26
4	4	12	0	11	2	29	0	23	2	28
5.7	0	12	0	11	1	30	1	24	2	30
8	3	15	7	18	1	31	1	25	2	32
11.3	4	19	2	20	4	35	7	32	9	41
16	5	24	9	29	5	40	5	37	6	47
22.6	10	34	6	35	8	48	5	42	5	52
32	15	49	10	45	10	58	12	54	9	61
45	15	64	12	57	8	66	9	63	7	68
64	13	77	16	73	10	76	15	78	16	84
90	9	86	14	87	9	85	13	91	6	90
128	13	99	7	94	11	96	5	96	9	99
180	1	100	6	100	4	100	4	100	1	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



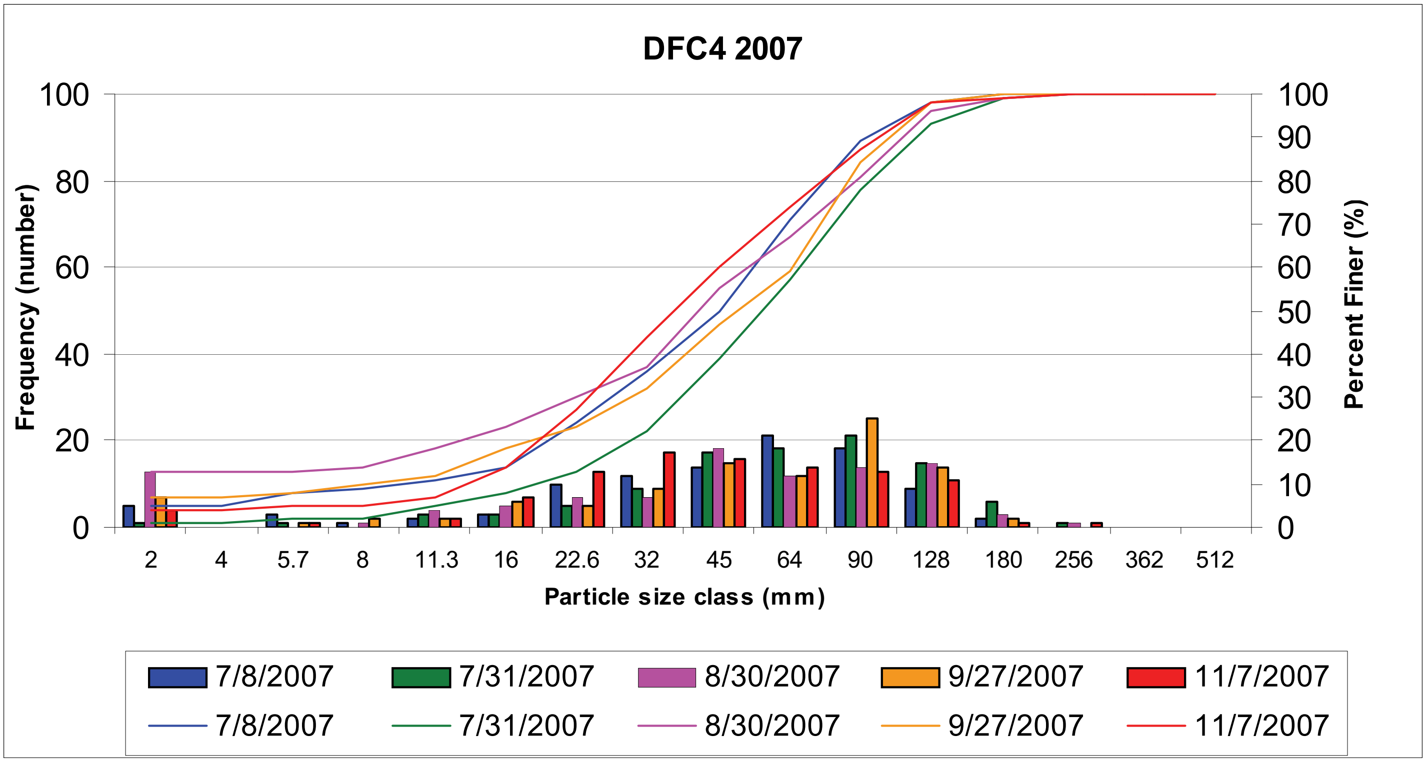
DFC3	7/9/2007	7/9/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	8	8	15	15	12	12	27	27	16	16
4	0	8	0	15	0	12	1	28	0	16
5.7	0	8	0	15	0	12	0	28	0	16
8	2	10	1	16	1	13	0	28	1	17
11.3	4	14	1	17	1	14	1	29	3	20
16	4	18	4	21	4	18	2	31	4	24
22.6	4	22	6	27	4	22	8	39	6	30
32	11	33	5	32	8	30	6	45	11	41
45	16	49	14	46	12	42	8	53	9	50
64	15	64	20	66	24	66	13	66	18	68
90	16	80	12	78	18	84	10	76	19	87
128	11	91	18	96	8	92	16	92	10	97
180	8	99	3	99	7	99	7	99	3	100
256	1	100	1	100	1	100	1	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



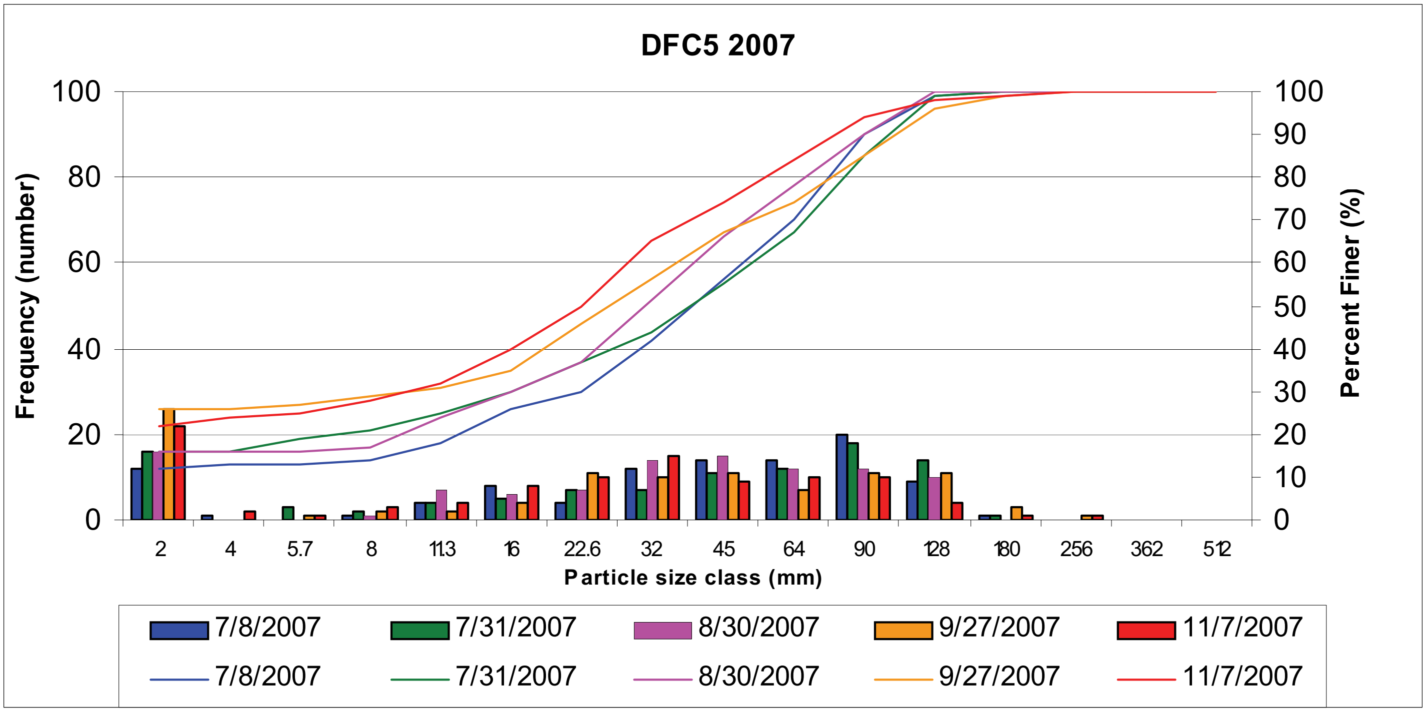
DFC3.1	7/9/2007	7/9/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7	7	10	10	26	26	28	28	26	26
4	1	8	0	10	1	27	0	28	0	26
5.7	2	10	1	11	0	27	0	28	1	27
8	2	12	0	11	3	30	0	28	3	30
11.3	3	15	2	13	4	34	2	30	4	34
16	4	19	5	18	0	34	3	33	2	36
22.6	6	25	9	27	2	36	4	37	8	44
32	12	37	11	38	12	48	8	45	9	53
45	12	49	9	47	9	57	7	52	7	60
64	18	67	20	67	13	70	8	60	9	69
90	10	77	17	84	11	81	16	76	19	88
128	20	97	11	95	15	96	21	97	9	97
180	3	100	5	100	4	100	2	99	2	99
256	0	100	0	100	0	100	1	100	1	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



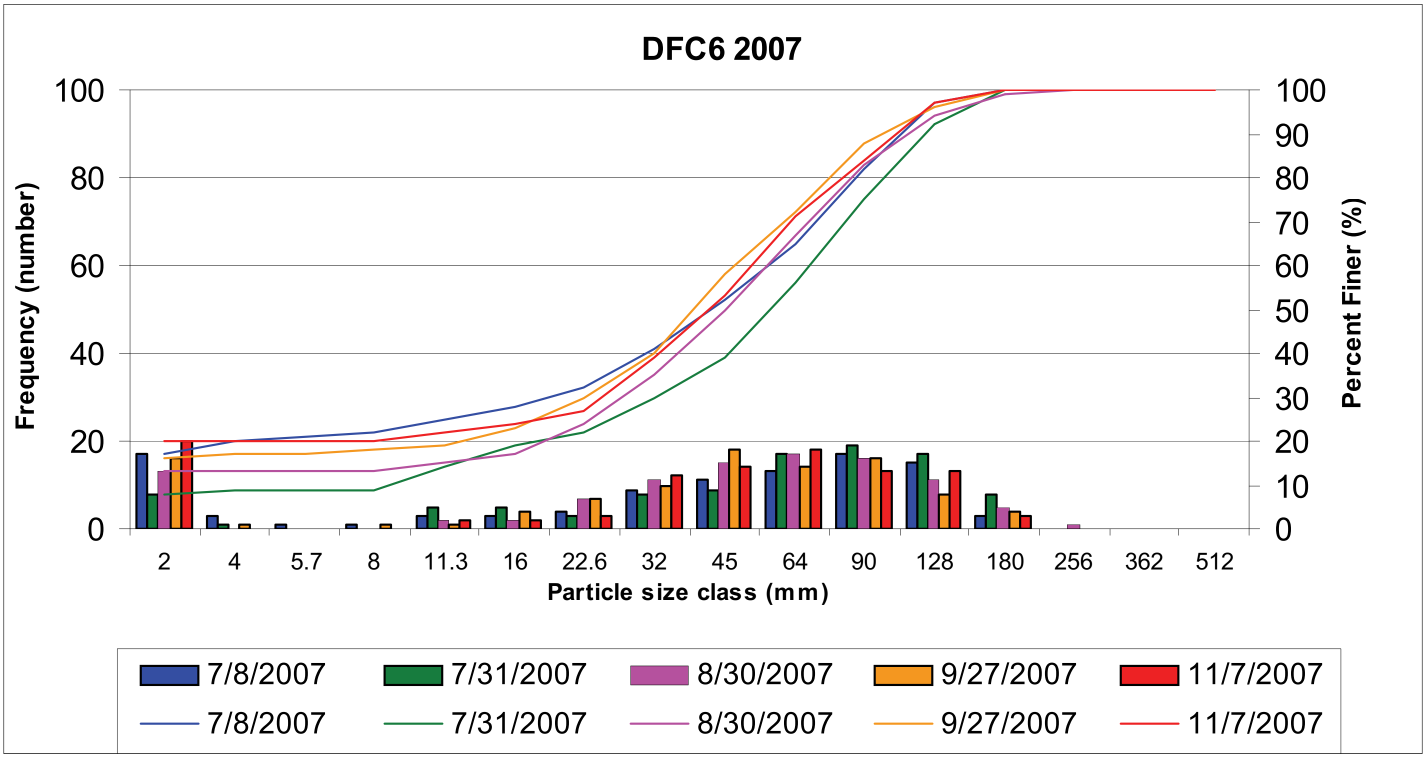
DFC3.2	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	2	2	10	10	6	6	12	12	5	5
4	1	3	0	10	2	8	1	13	3	8
5.7	0	3	1	11	0	8	1	14	2	10
8	3	6	0	11	2	10	2	16	5	15
11.3	4	10	2	13	3	13	2	18	7	22
16	3	13	5	18	11	24	10	28	6	28
22.6	3	16	9	27	15	39	3	31	10	38
32	6	22	11	38	8	47	14	45	14	52
45	20	42	9	47	19	66	15	60	15	67
64	15	57	20	67	19	85	17	77	13	80
90	26	83	17	84	8	93	14	91	11	91
128	10	93	11	95	5	98	9	100	6	97
180	7	100	5	100	2	100	0	100	3	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



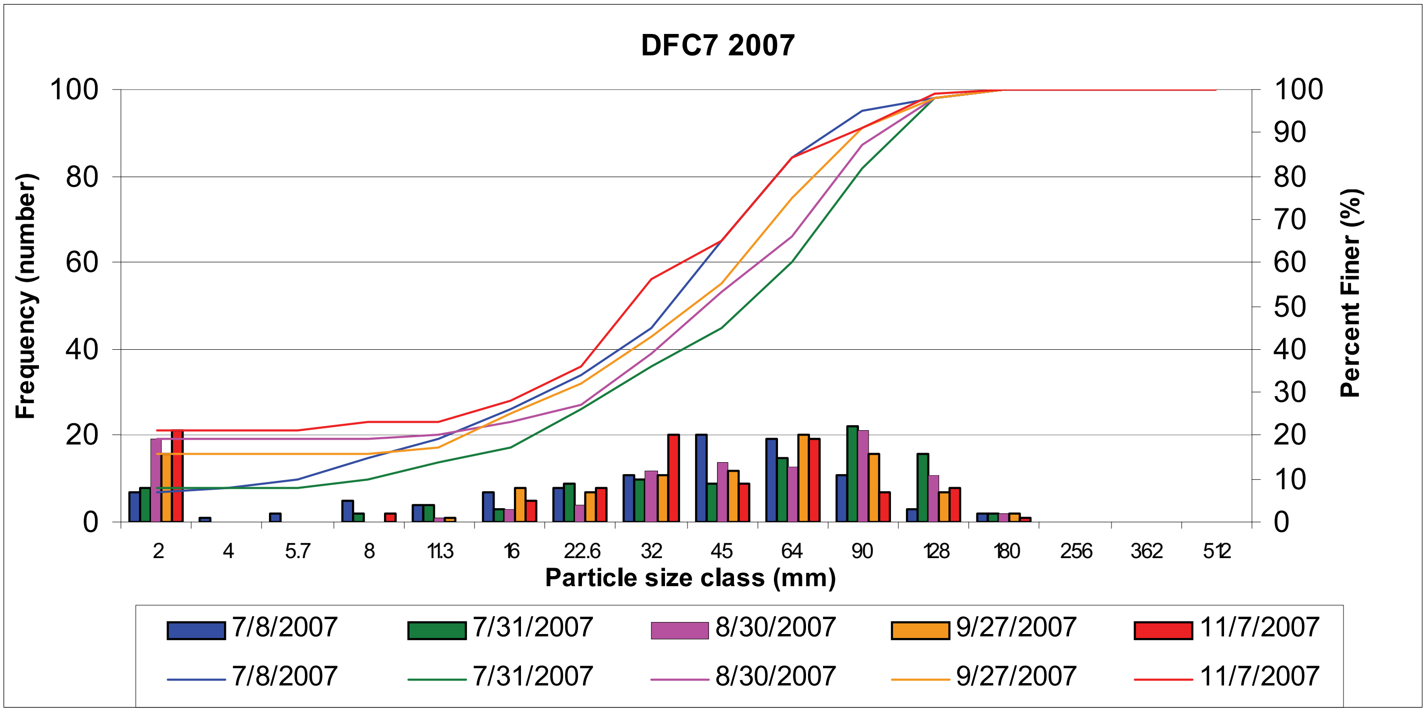
DFC4	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	5	5	1	1	13	13	7	7	4	4
4	0	5	0	1	0	13	0	7	0	4
5.7	3	8	1	2	0	13	1	8	1	5
8	1	9	0	2	1	14	2	10	0	5
11.3	2	11	3	5	4	18	2	12	2	7
16	3	14	3	8	5	23	6	18	7	14
22.6	10	24	5	13	7	30	5	23	13	27
32	12	36	9	22	7	37	9	32	17	44
45	14	50	17	39	18	55	15	47	16	60
64	21	71	18	57	12	67	12	59	14	74
90	18	89	21	78	14	81	25	84	13	87
128	9	98	15	93	15	96	14	98	11	98
180	2	100	6	99	3	99	2	100	1	99
256	0	100	1	100	1	100	0	100	1	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



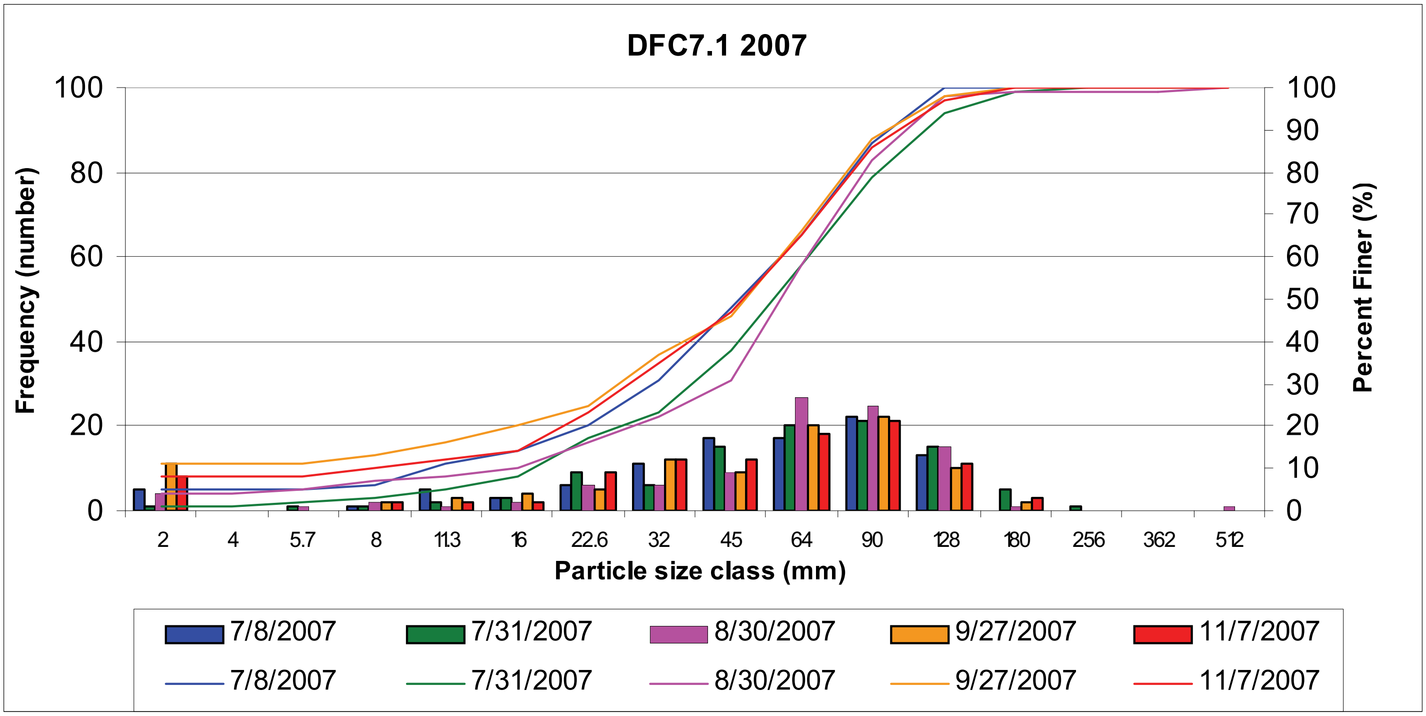
DFC5	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	12	12	16	16	16	16	26	26	22	22
4	1	13	0	16	0	16	0	26	2	24
5.7	0	13	3	19	0	16	1	27	1	25
8	1	14	2	21	1	17	2	29	3	28
11.3	4	18	4	25	7	24	2	31	4	32
16	8	26	5	30	6	30	4	35	8	40
22.6	4	30	7	37	7	37	11	46	10	50
32	12	42	7	44	14	51	10	56	15	65
45	14	56	11	55	15	66	11	67	9	74
64	14	70	12	67	12	78	7	74	10	84
90	20	90	18	85	12	90	11	85	10	94
128	9	99	14	99	10	100	11	96	4	98
180	1	100	1	100	0	100	3	99	1	99
256	0	100	0	100	0	100	1	100	1	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



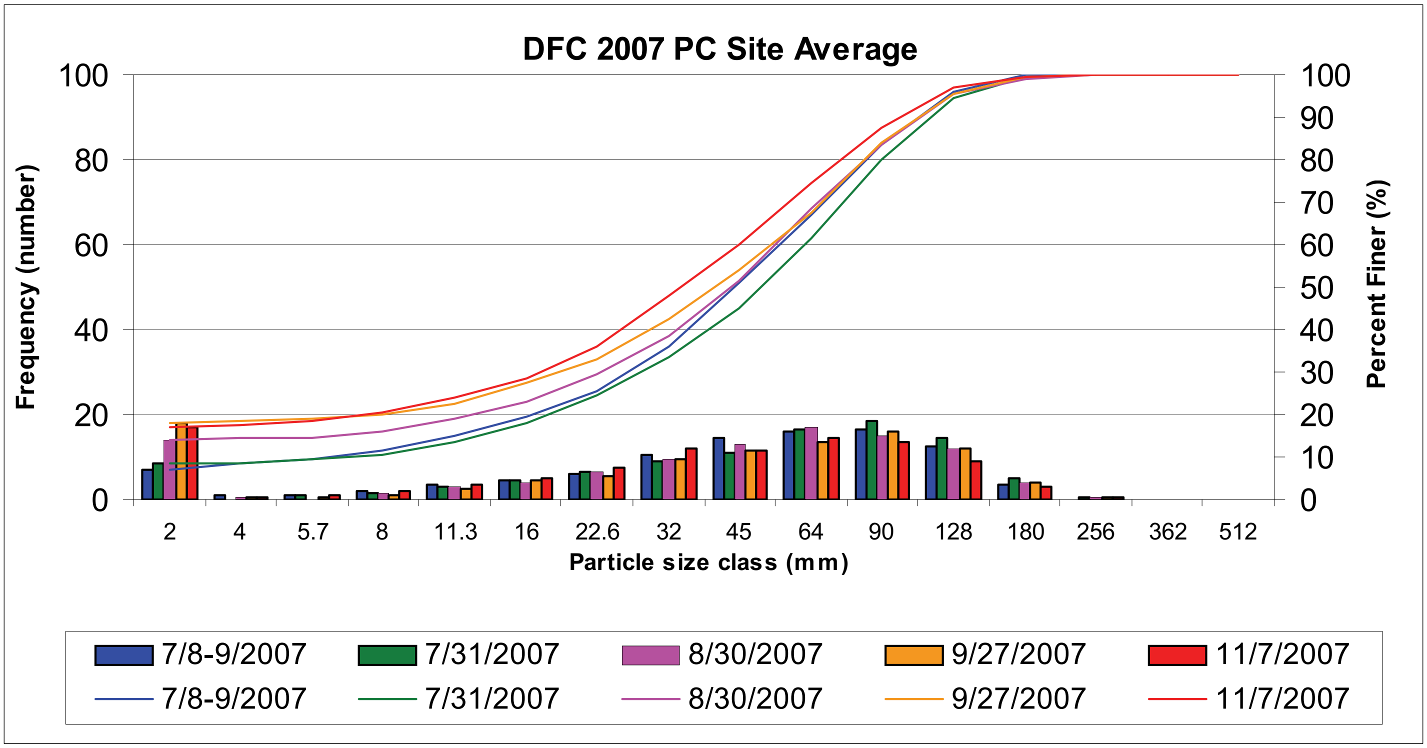
DFC6	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	17	17	8	8	13	13	16	16	20	20
4	3	20	1	9	0	13	1	17	0	20
5.7	1	21	0	9	0	13	0	17	0	20
8	1	22	0	9	0	13	1	18	0	20
11.3	3	25	5	14	2	15	1	19	2	22
16	3	28	5	19	2	17	4	23	2	24
22.6	4	32	3	22	7	24	7	30	3	27
32	9	41	8	30	11	35	10	40	12	39
45	11	52	9	39	15	50	18	58	14	53
64	13	65	17	56	17	67	14	72	18	71
90	17	82	19	75	16	83	16	88	13	84
128	15	97	17	92	11	94	8	96	13	97
180	3	100	8	100	5	99	4	100	3	100
256	0	100	0	100	1	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



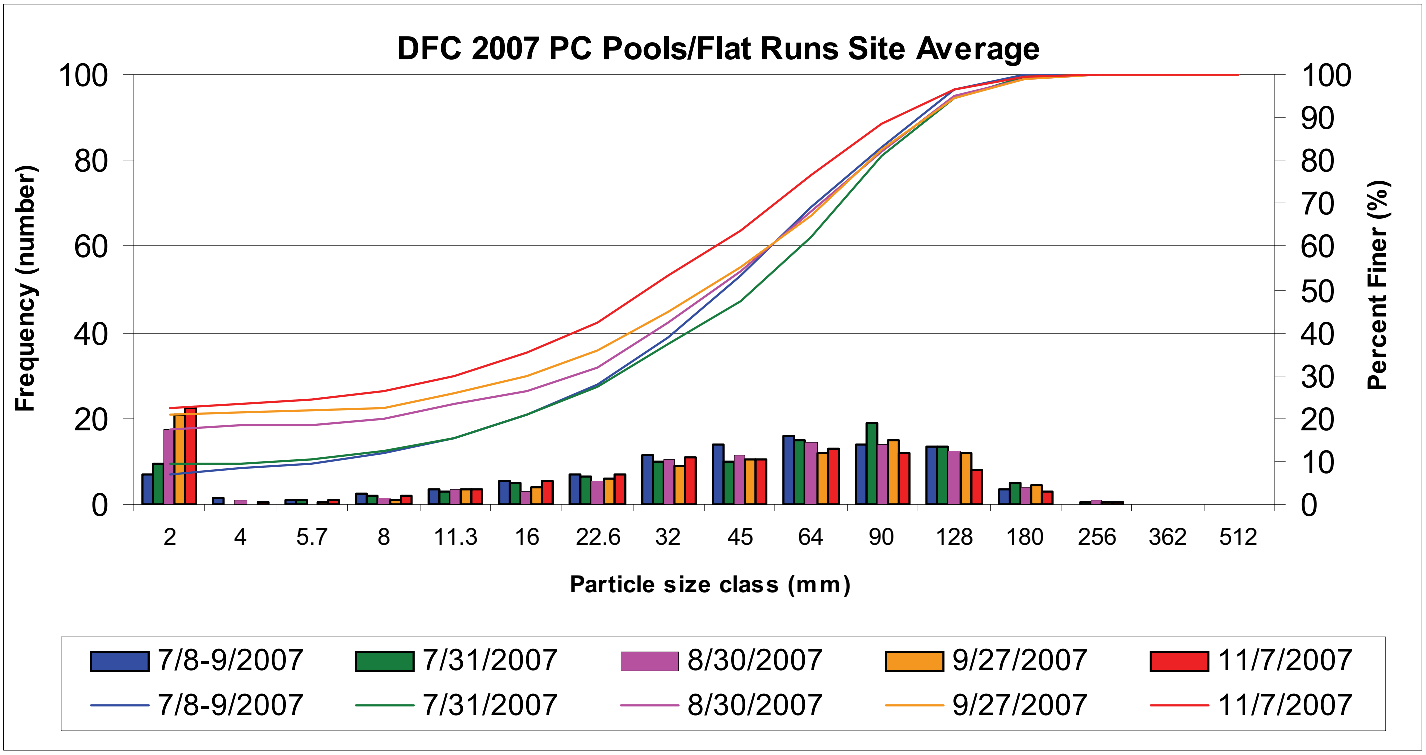
DFC7	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7	7	8	8	19	19	16	16	21	21
4	1	8	0	8	0	19	0	16	0	21
5.7	2	10	0	8	0	19	0	16	0	21
8	5	15	2	10	0	19	0	16	2	23
11.3	4	19	4	14	1	20	1	17	0	23
16	7	26	3	17	3	23	8	25	5	28
22.6	8	34	9	26	4	27	7	32	8	36
32	11	45	10	36	12	39	11	43	20	56
45	20	65	9	45	14	53	12	55	9	65
64	19	84	15	60	13	66	20	75	19	84
90	11	95	22	82	21	87	16	91	7	91
128	3	98	16	98	11	98	7	98	8	99
180	2	100	2	100	2	100	2	100	1	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



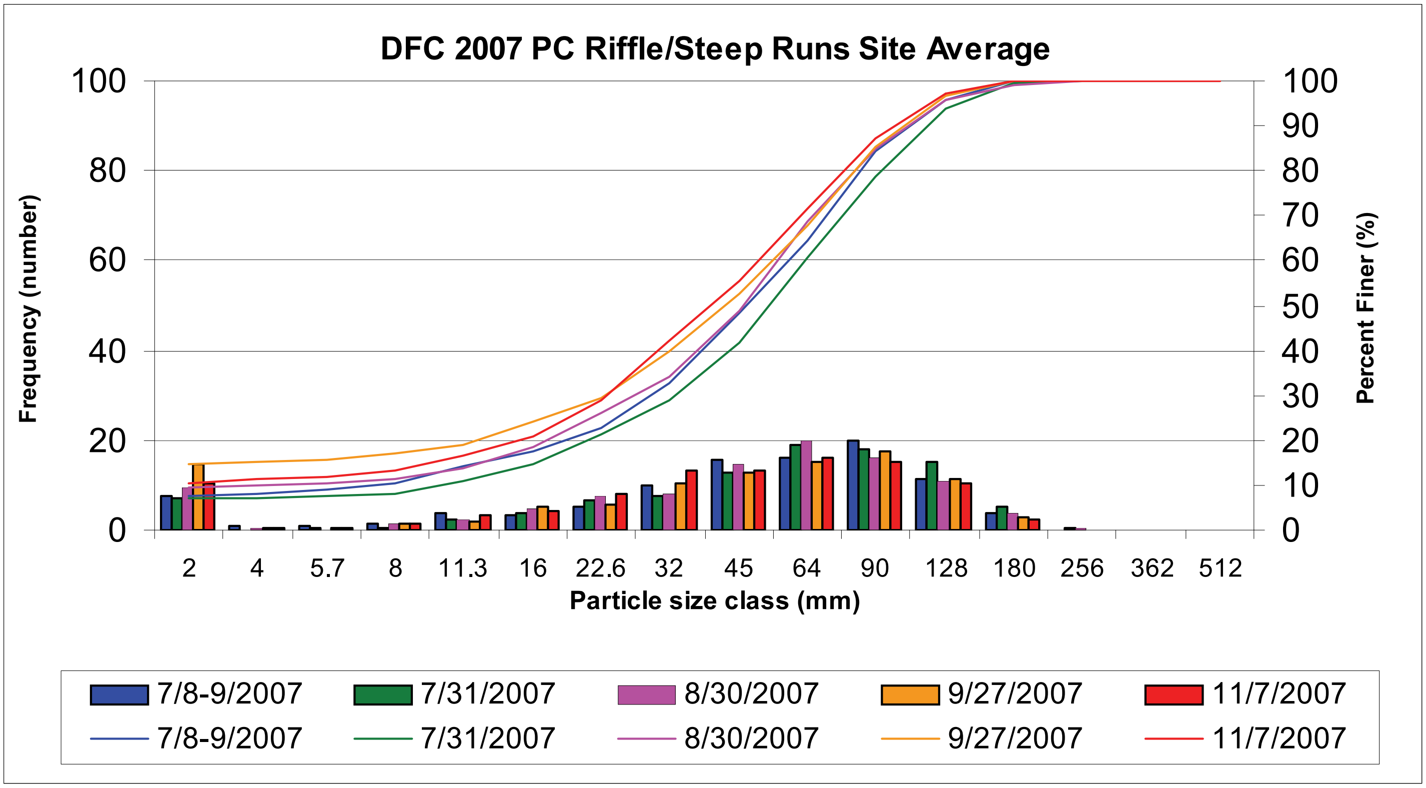
DFC7.1	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	5	5	1	1	4	4	11	11	8	8
4	0	5	0	1	0	4	0	11	0	8
5.7	0	5	1	2	1	5	0	11	0	8
8	1	6	1	3	2	7	2	13	2	10
11.3	5	11	2	5	1	8	3	16	2	12
16	3	14	3	8	2	10	4	20	2	14
22.6	6	20	9	17	6	16	5	25	9	23
32	11	31	6	23	6	22	12	37	12	35
45	17	48	15	38	9	31	9	46	12	47
64	17	65	20	58	27	58	20	66	18	65
90	22	87	21	79	25	83	22	88	21	86
128	13	100	15	94	15	98	10	98	11	97
180	0	100	5	99	1	99	2	100	3	100
256	0	100	1	100	0	99	0	100	0	100
362	0	100	0	100	0	99	0	100	0	100
512	0	100	0	100	1	100	0	100	0	100



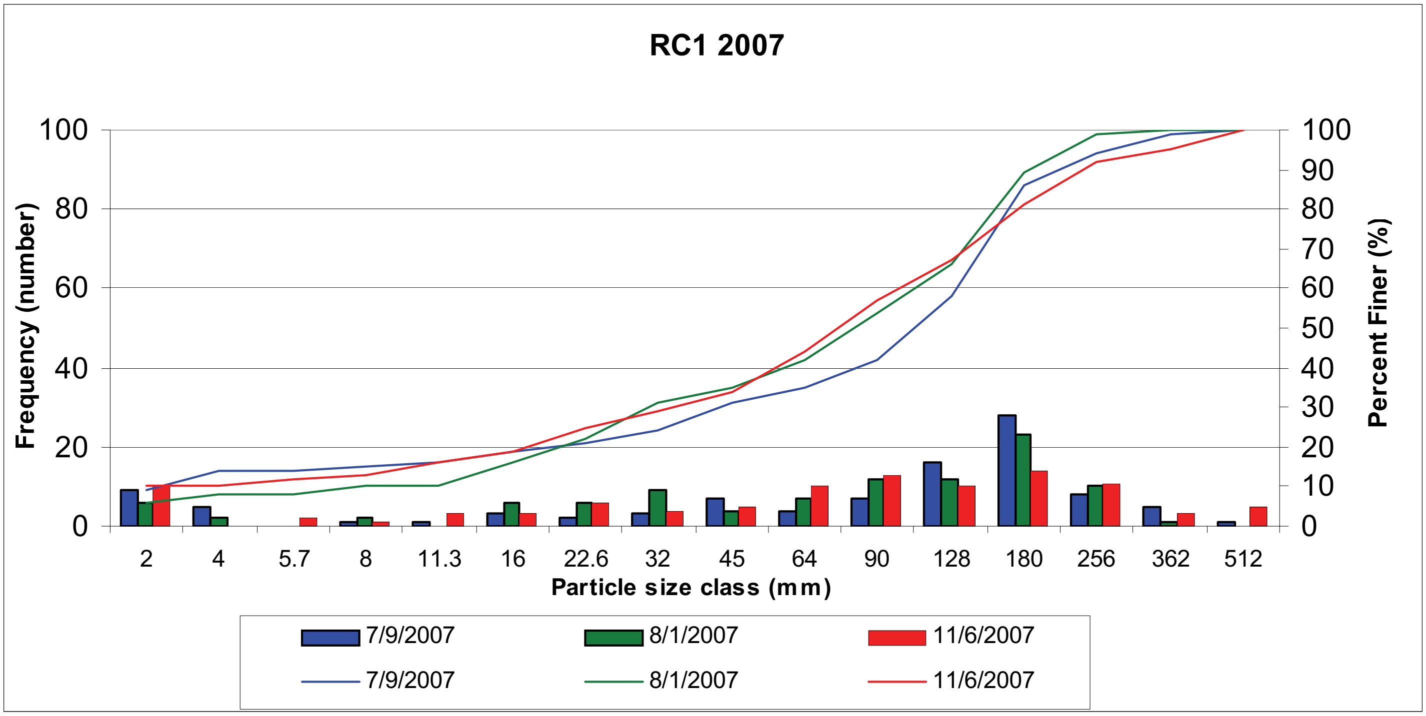
Average DFC	7/8-9/2007	7/8-9/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7.18	7.18	8.36	8.36	13.91	13.91	18.09	18.09	17.09	17.09
4	1.18	8.36	0.09	8.45	0.64	14.55	0.36	18.45	0.64	17.73
5.7	0.91	9.27	0.82	9.27	0.18	14.73	0.45	18.91	0.82	18.55
8	2.00	11.27	1.27	10.55	1.27	16.00	1.09	20.00	1.82	20.36
11.3	3.64	14.91	2.91	13.45	2.91	18.91	2.64	22.64	3.45	23.82
16	4.36	19.27	4.64	18.09	3.91	22.82	4.64	27.27	4.82	28.64
22.6	6.18	25.45	6.55	24.64	6.55	29.36	5.73	33.00	7.55	36.18
32	10.64	36.09	9.00	33.64	9.27	38.64	9.55	42.55	12.00	48.18
45	14.73	50.82	11.18	44.82	13.00	51.64	11.64	54.18	11.64	59.82
64	16.09	66.91	16.73	61.55	16.82	68.45	13.45	67.64	14.45	74.27
90	16.73	83.64	18.55	80.09	15.00	83.45	16.18	83.82	13.45	87.73
128	12.55	96.18	14.27	94.36	11.82	95.27	11.82	95.64	9.09	96.82
180	3.73	99.91	5.18	99.55	3.91	99.18	3.82	99.45	2.82	99.64
256	0.09	100.00	0.45	100.00	0.73	99.91	0.45	99.91	0.36	100.00
362	0.00	100.00	0.00	100.00	0.00	99.91	0.09	100.00	0.00	100.00
512	0.00	100.00	0.00	100.00	0.09	100.00	0.00	100.00	0.00	100.00



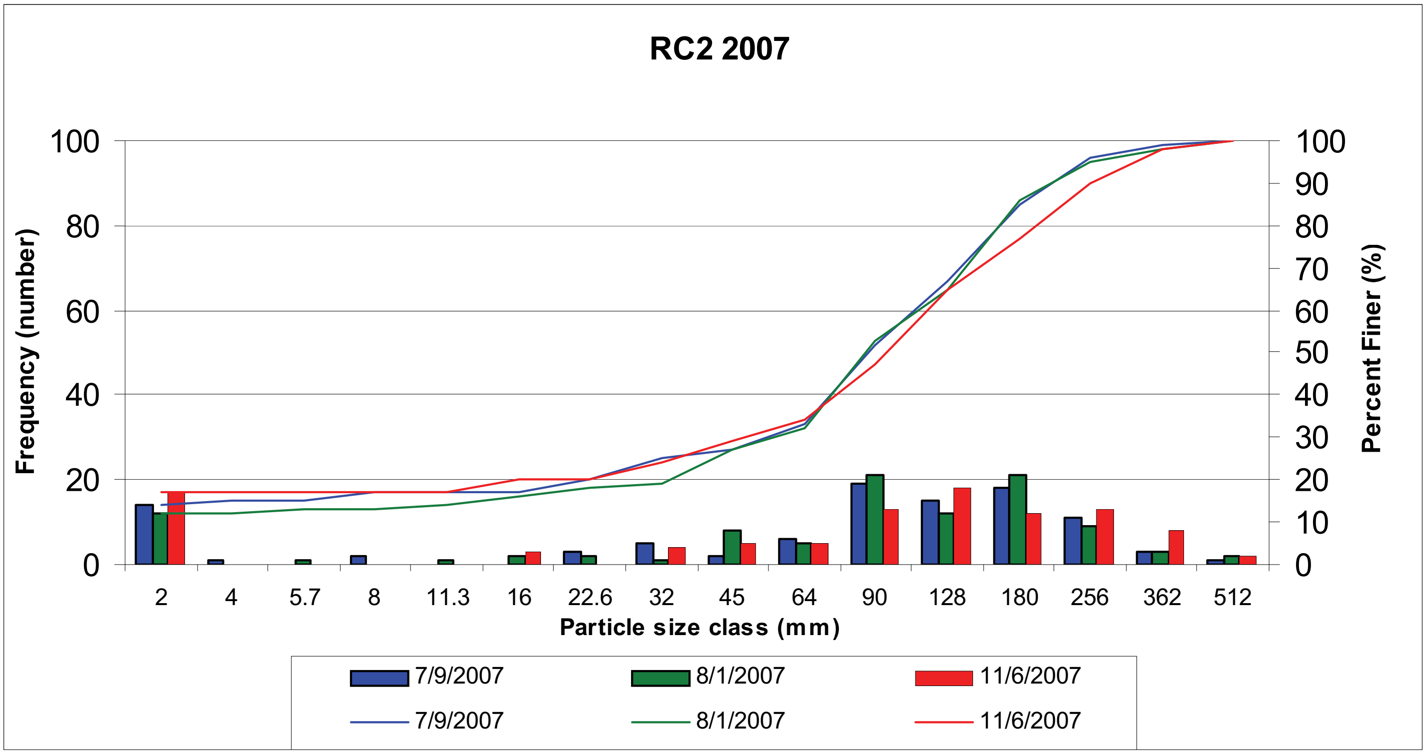
Average Pools/Flat Runs DFC	7/8-9/2007	7/8-9/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7.00	7.00	9.50	9.50	17.50	17.50	21.00	21.00	22.50	22.50
4	1.50	8.50	0.00	9.50	0.83	18.33	0.17	21.17	0.67	23.17
5.7	1.00	9.50	1.00	10.50	0.17	18.50	0.50	21.67	1.00	24.17
8	2.33	11.83	2.00	12.50	1.33	19.83	0.83	22.50	2.00	26.17
11.3	3.67	15.50	3.17	15.67	3.50	23.33	3.33	25.83	3.67	29.83
16	5.33	20.83	5.17	20.83	3.17	26.50	4.17	30.00	5.33	35.17
22.6	6.83	27.67	6.67	27.50	5.50	32.00	5.83	35.83	7.00	42.17
32	11.33	39.00	10.00	37.50	10.33	42.33	9.00	44.83	11.00	53.17
45	14.00	53.00	9.83	47.33	11.67	54.00	10.50	55.33	10.33	63.50
64	16.00	69.00	14.83	62.17	14.33	68.33	12.00	67.33	13.00	76.50
90	14.17	83.17	19.00	81.17	14.00	82.33	15.17	82.50	11.83	88.33
128	13.33	96.50	13.50	94.67	12.67	95.00	12.17	94.67	8.17	96.50
180	3.50	100.00	5.00	99.67	4.17	99.17	4.50	99.17	3.00	99.50
256	0.00	100.00	0.33	100.00	0.83	100.00	0.67	99.83	0.50	100.00
362	0.00	100.00	0.00	100.00	0.00	100.00	0.17	100.00	0.00	100.00
512	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00



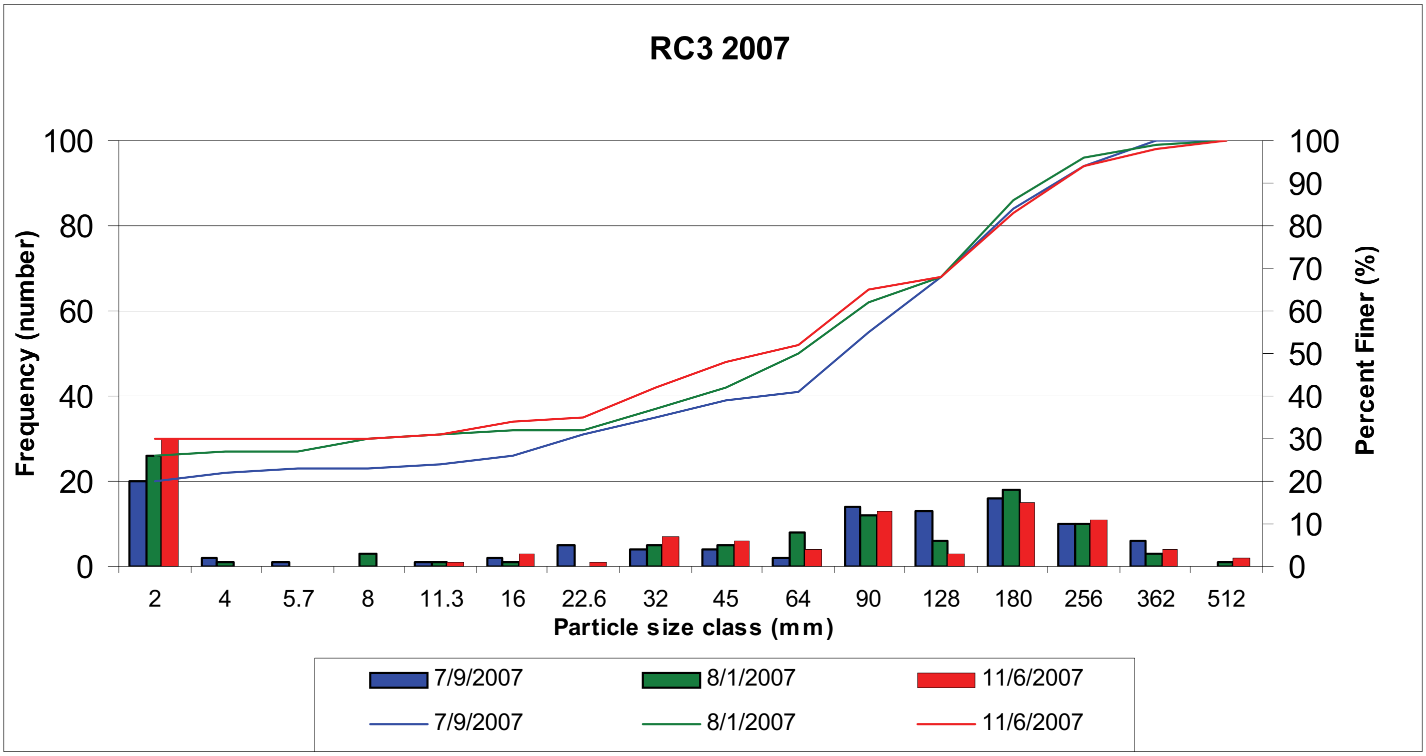
Average Riffles/ Steep Runs DFC	7/8-9/2007	7/8-9/2007	7/31/2007	7/31/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/7/2007	11/7/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7.40	7.40	7.00	7.00	9.60	9.60	14.60	14.60	10.60	10.60
4	0.80	8.20	0.20	7.20	0.40	10.00	0.60	15.20	0.60	11.20
5.7	0.80	9.00	0.60	7.80	0.20	10.20	0.40	15.60	0.60	11.80
8	1.60	10.60	0.40	8.20	1.20	11.40	1.40	17.00	1.60	13.40
11.3	3.60	14.20	2.60	10.80	2.20	13.60	1.80	18.80	3.20	16.60
16	3.20	17.40	4.00	14.80	4.80	18.40	5.20	24.00	4.20	20.80
22.6	5.40	22.80	6.40	21.20	7.80	26.20	5.60	29.60	8.20	29.00
32	9.80	32.60	7.80	29.00	8.00	34.20	10.20	39.80	13.20	42.20
45	15.60	48.20	12.80	41.80	14.60	48.80	13.00	52.80	13.20	55.40
64	16.20	64.40	19.00	60.80	19.80	68.60	15.20	68.00	16.20	71.60
90	19.80	84.20	18.00	78.80	16.20	84.80	17.40	85.40	15.40	87.00
128	11.60	95.80	15.20	94.00	10.80	95.60	11.40	96.80	10.20	97.20
180	4.00	99.80	5.40	99.40	3.60	99.20	3.00	99.80	2.60	99.80
256	0.20	100.00	0.60	100.00	0.60	99.80	0.20	100.00	0.20	100.00
362	0.00	100.00	0.00	100.00	0.00	99.80	0.00	100.00	0.00	100.00
512	0.00	100.00	0.00	100.00	0.20	100.00	0.00	100.00	0.00	100.00



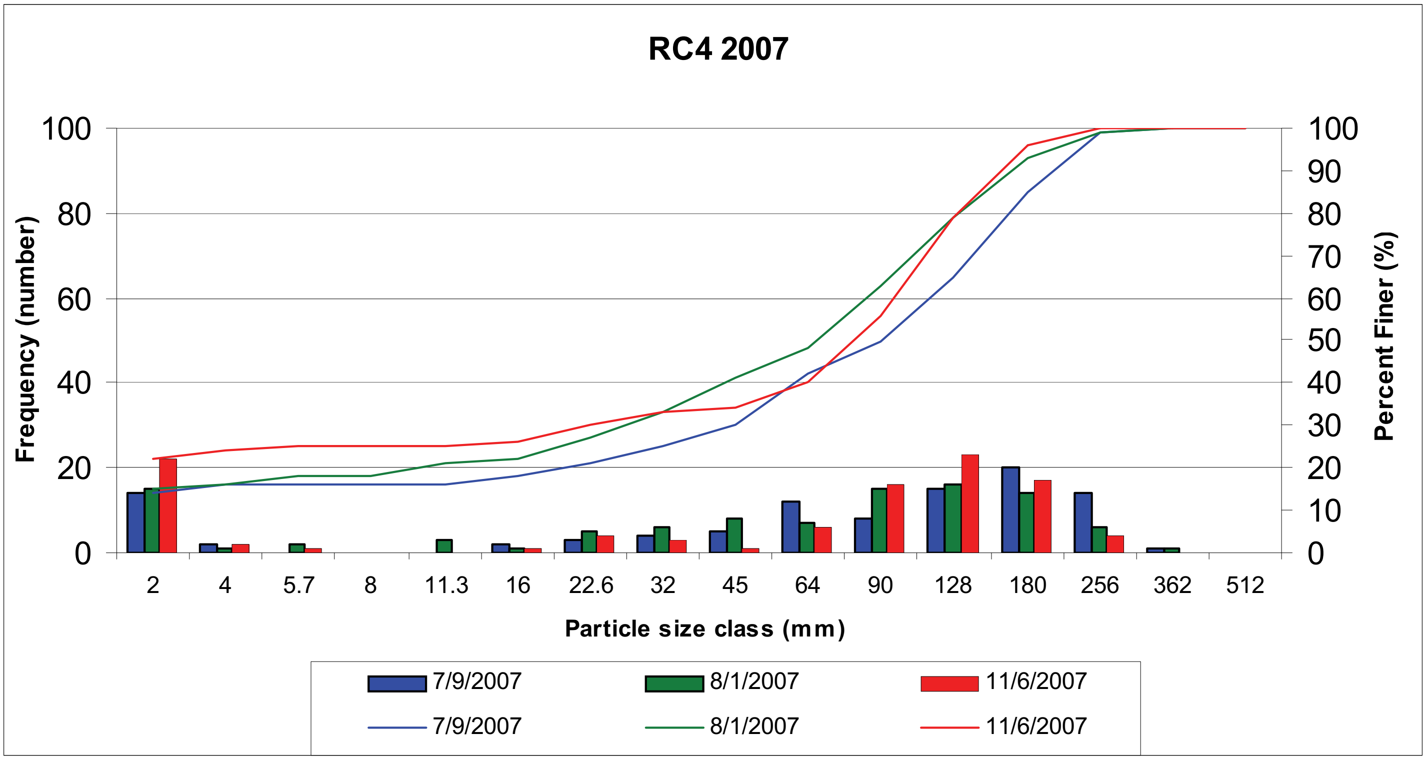
RC1	7/9/2007	7/9/2007	8/1/2007	8/1/2007	11/6/2007	11/6/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	9	9	6	6	10	10
4	5	14	2	8	0	10
5.7	0	14	0	8	2	12
8	1	15	2	10	1	13
11.3	1	16	0	10	3	16
16	3	19	6	16	3	19
22.6	2	21	6	22	6	25
32	3	24	9	31	4	29
45	7	31	4	35	5	34
64	4	35	7	42	10	44
90	7	42	12	54	13	57
128	16	58	12	66	10	67
180	28	86	23	89	14	81
256	8	94	10	99	11	92
362	5	99	1	100	3	95
512	1	100	0	100	5	100



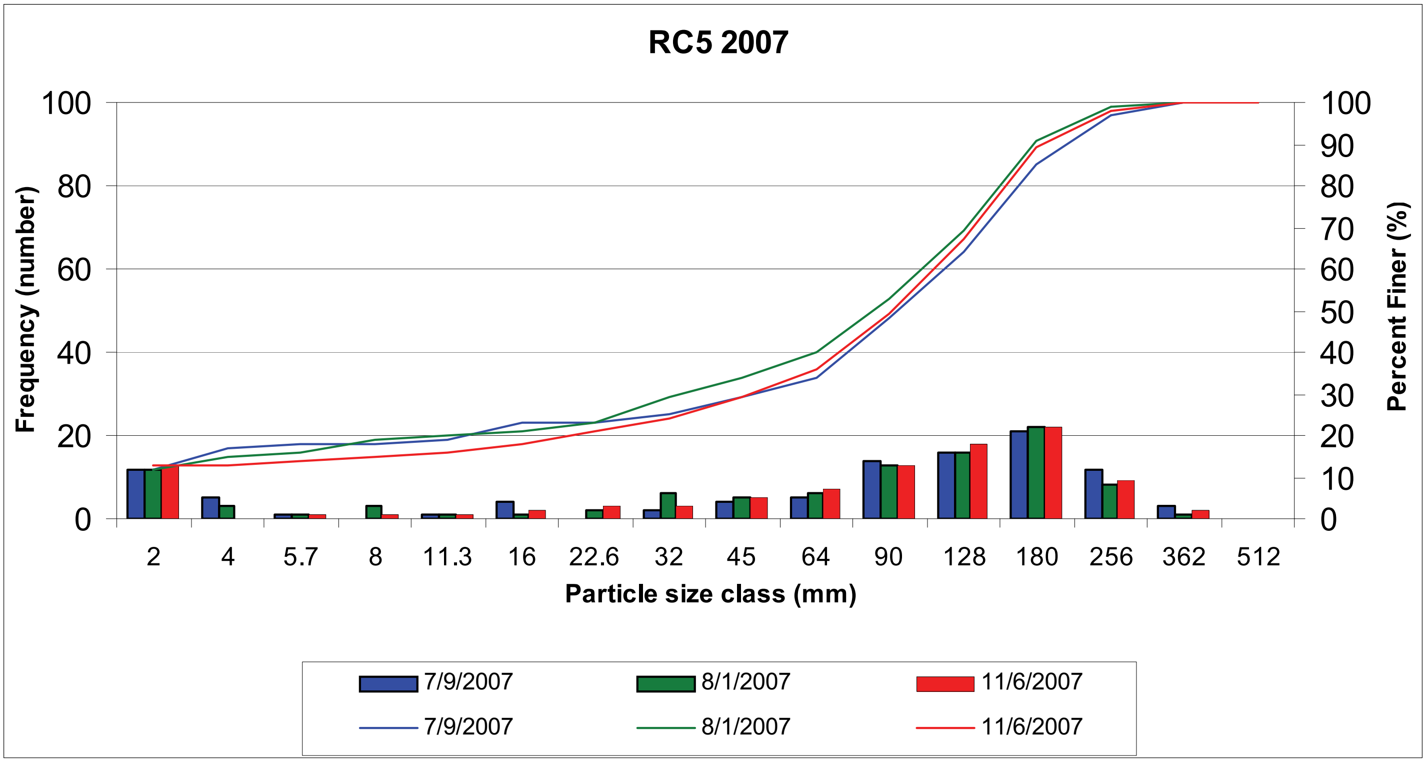
RC2	7/9/2007	7/9/2007	8/1/2007	8/1/2007	11/6/2007	11/6/2007
Size of particles (mm)	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer
2	14	14	12	12	17	17
4	1	15	0	12	0	17
5.7	0	15	1	13	0	17
8	2	17	0	13	0	17
11.3	0	17	1	14	0	17
16	0	17	2	16	3	20
22.6	3	20	2	18	0	20
32	5	25	1	19	4	24
45	2	27	8	27	5	29
64	6	33	5	32	5	34
90	19	52	21	53	13	47
128	15	67	12	65	18	65
180	18	85	21	86	12	77
256	11	96	9	95	13	90
362	3	99	3	98	8	98
512	1	100	2	100	2	100



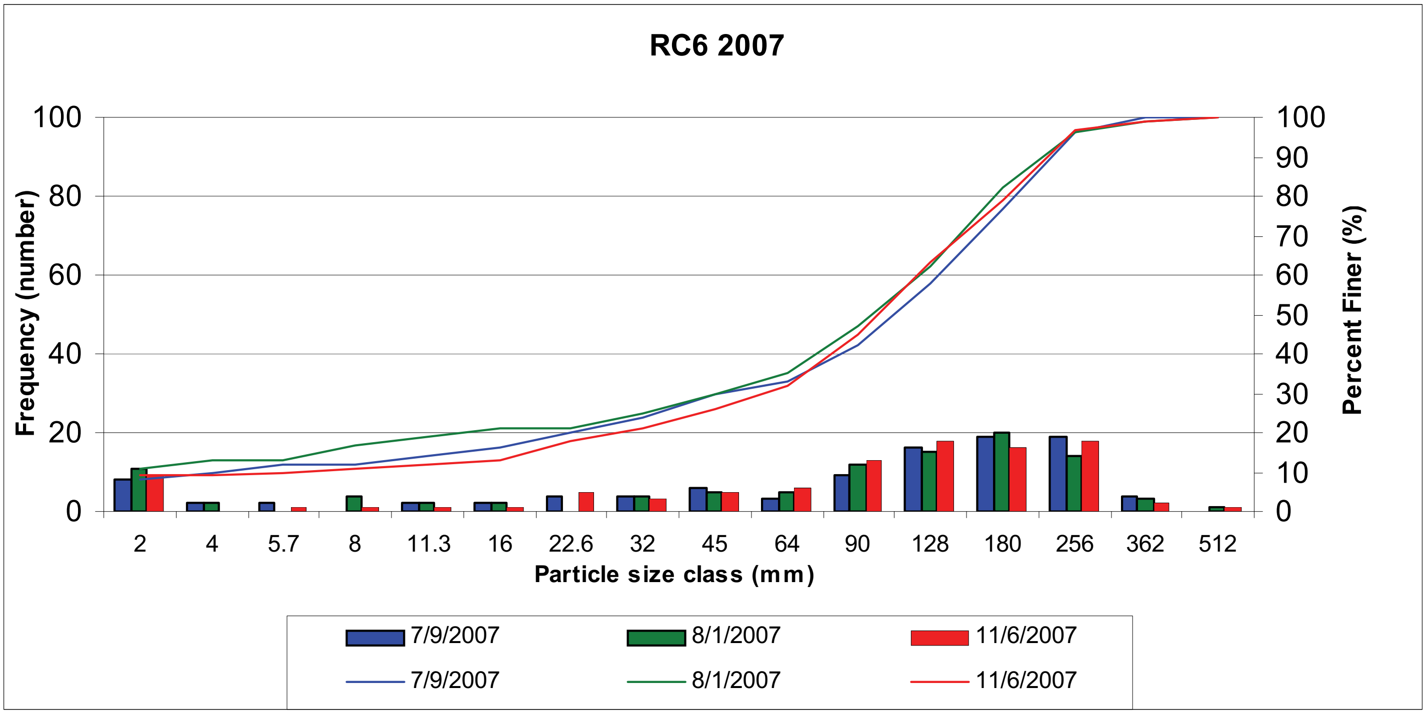
RC3	7/9/2007	7/9/2007	8/1/2007	8/1/2007	11/6/2007	11/6/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	20	20	26	26	30	30
4	2	22	1	27	0	30
5.7	1	23	0	27	0	30
8	0	23	3	30	0	30
11.3	1	24	1	31	1	31
16	2	26	1	32	3	34
22.6	5	31	0	32	1	35
32	4	35	5	37	7	42
45	4	39	5	42	6	48
64	2	41	8	50	4	52
90	14	55	12	62	13	65
128	13	68	6	68	3	68
180	16	84	18	86	15	83
256	10	94	10	96	11	94
362	6	100	3	99	4	98
512	0	100	1	100	2	100



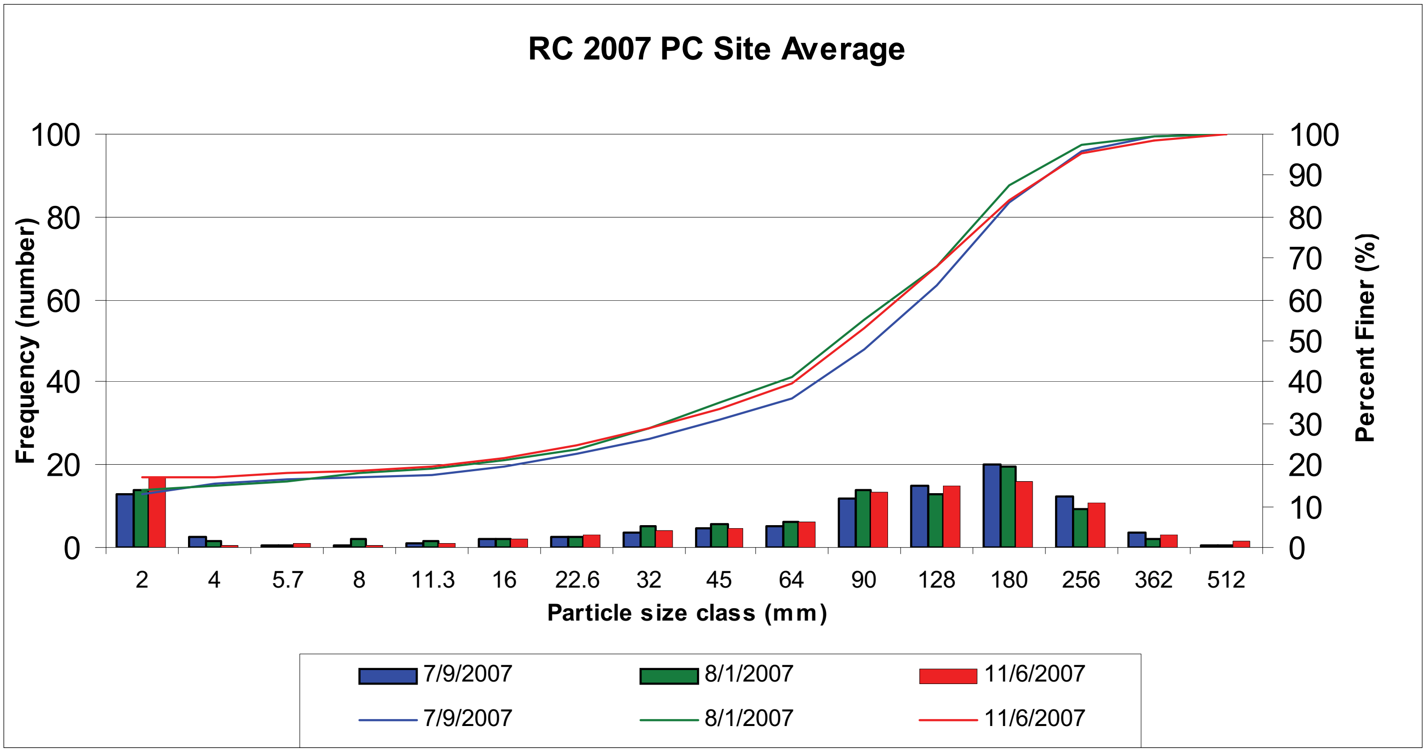
RC4	7/9/2007	7/9/2007	8/1/2007	8/1/2007	11/6/2007	11/6/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	14	14	15	15	22	22
4	2	16	1	16	2	24
5.7	0	16	2	18	1	25
8	0	16	0	18	0	25
11.3	0	16	3	21	0	25
16	2	18	1	22	1	26
22.6	3	21	5	27	4	30
32	4	25	6	33	3	33
45	5	30	8	41	1	34
64	12	42	7	48	6	40
90	8	50	15	63	16	56
128	15	65	16	79	23	79
180	20	85	14	93	17	96
256	14	99	6	99	4	100
362	1	100	1	100	0	100
512	0	100	0	100	0	100



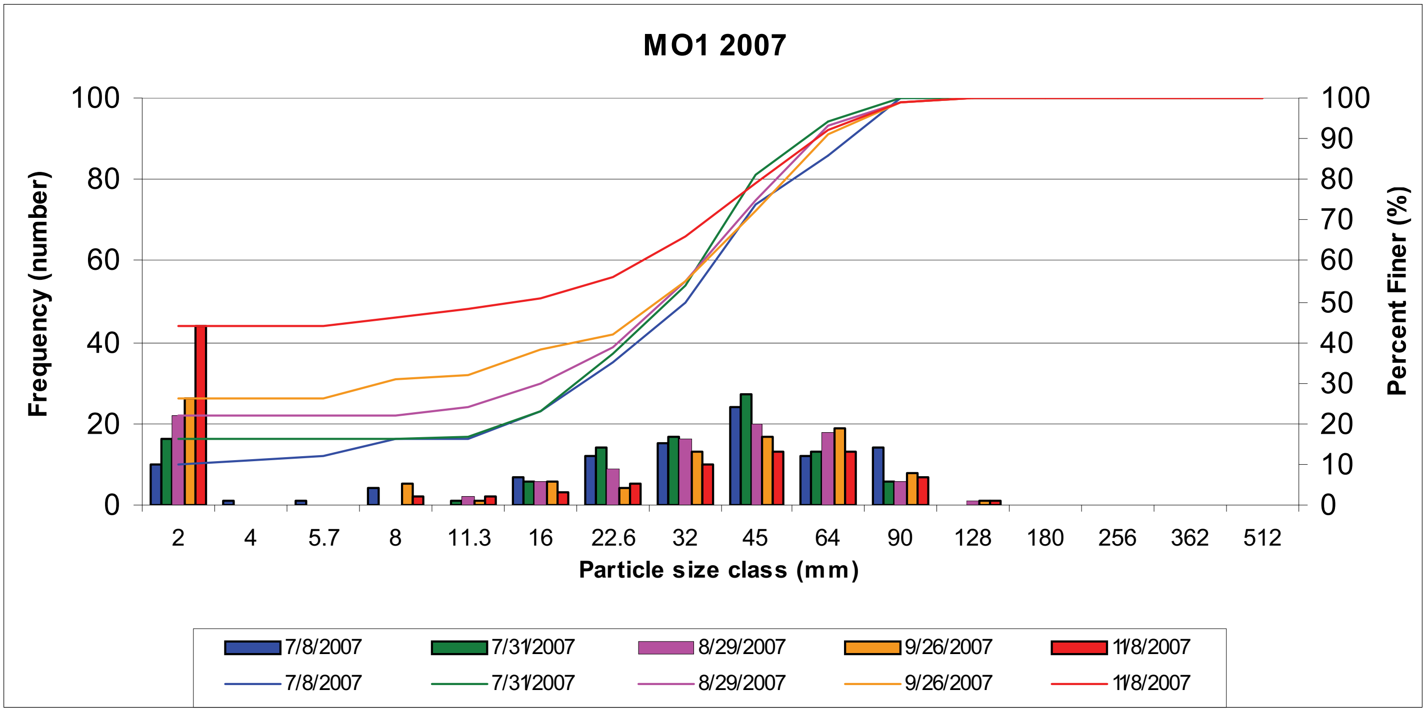
RC5	7/9/2007	7/9/2007	8/1/2007	8/1/2007	11/6/2007	11/6/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	12	12	12	12	13	13
4	5	17	3	15	0	13
5.7	1	18	1	16	1	14
8	0	18	3	19	1	15
11.3	1	19	1	20	1	16
16	4	23	1	21	2	18
22.6	0	23	2	23	3	21
32	2	25	6	29	3	24
45	4	29	5	34	5	29
64	5	34	6	40	7	36
90	14	48	13	53	13	49
128	16	64	16	69	18	67
180	21	85	22	91	22	89
256	12	97	8	99	9	98
362	3	100	1	100	2	100
512	0	100	0	100	0	100



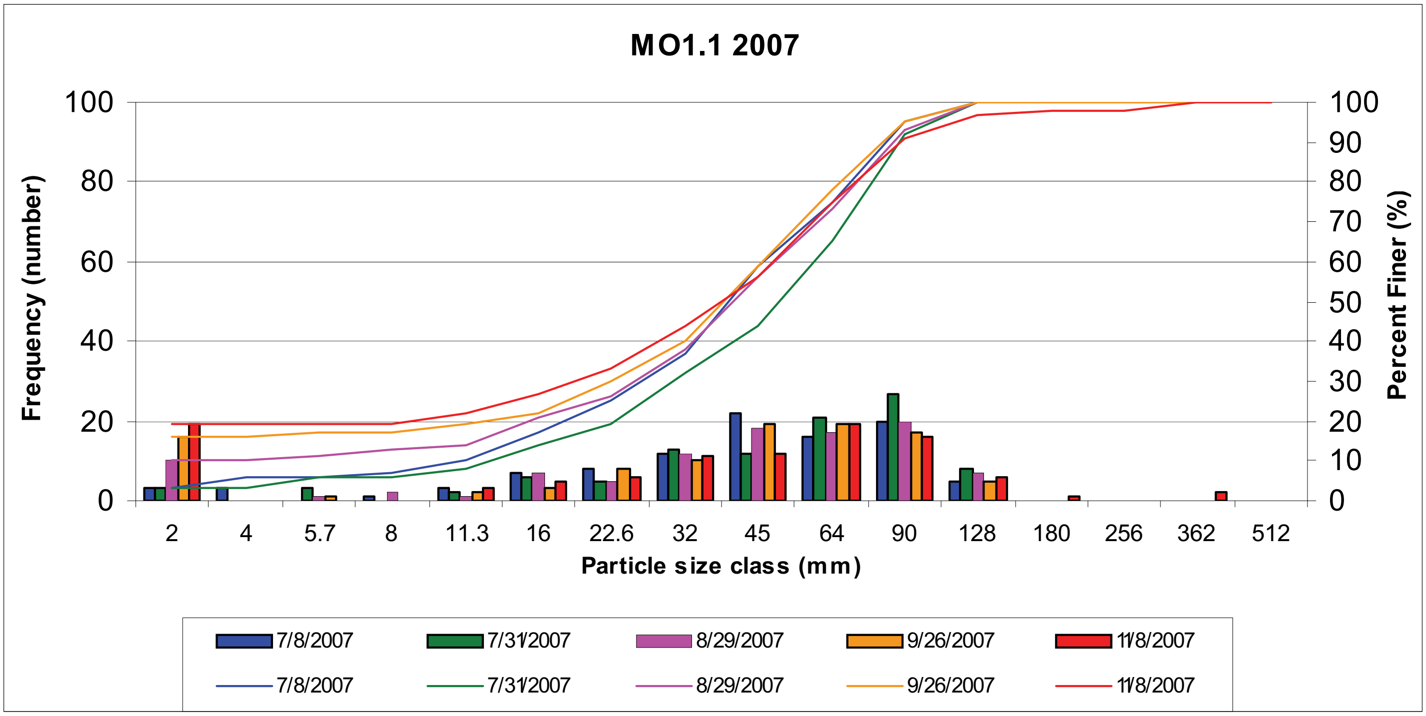
RC6	7/9/2007	7/9/2007	8/1/2007	8/1/2007	11/6/2007	11/6/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	8	8	11	11	9	9
4	2	10	2	13	0	9
5.7	2	12	0	13	1	10
8	0	12	4	17	1	11
11.3	2	14	2	19	1	12
16	2	16	2	21	1	13
22.6	4	20	0	21	5	18
32	4	24	4	25	3	21
45	6	30	5	30	5	26
64	3	33	5	35	6	32
90	9	42	12	47	13	45
128	16	58	15	62	18	63
180	19	77	20	82	16	79
256	19	96	14	96	18	97
362	4	100	3	99	2	99
512	0	100	1	100	1	100



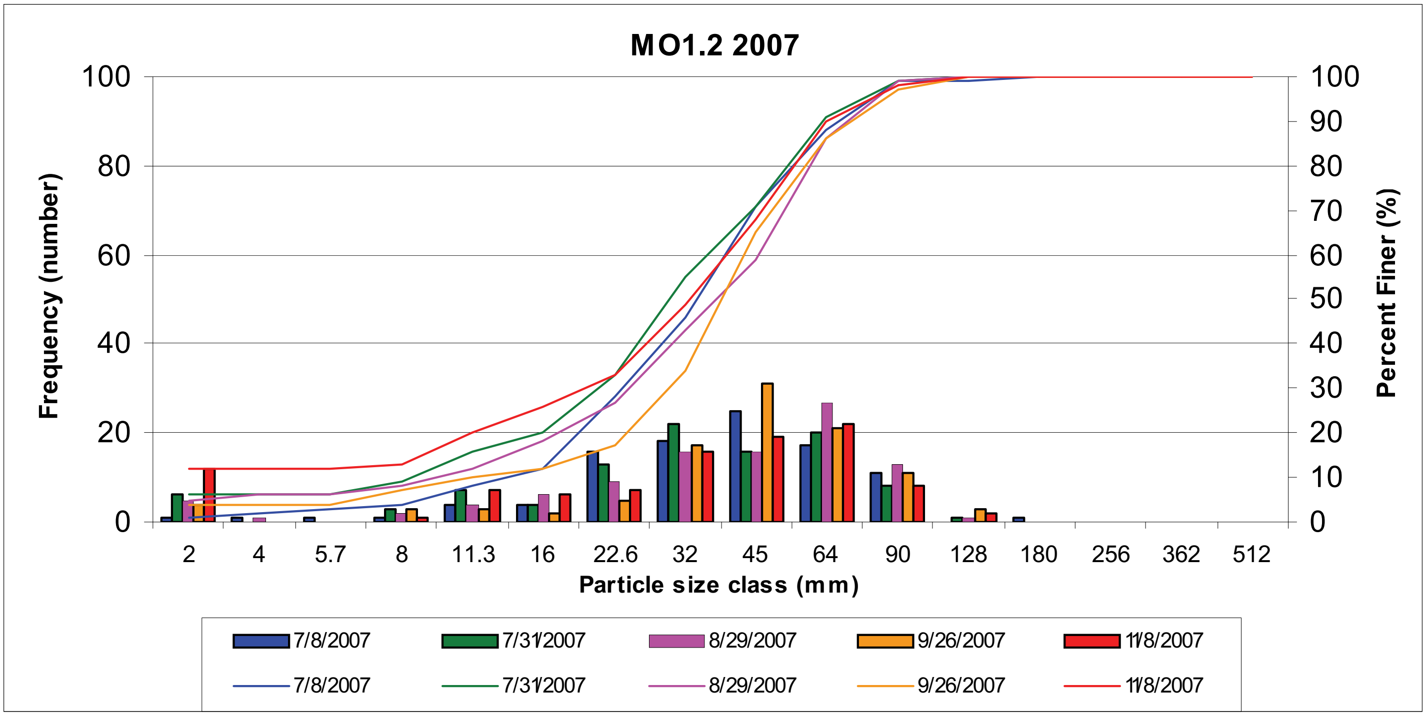
Average RC	7/9/2007	7/9/2007	8/1/2007	8/1/2007	11/6/2007	11/6/2007
Size of particles (mm)	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer
2	12.83	12.83	13.67	13.67	16.83	16.83
4	2.83	15.67	1.50	15.17	0.33	17.17
5.7	0.67	16.33	0.67	15.83	0.83	18.00
8	0.50	16.83	2.00	17.83	0.50	18.50
11.3	0.83	17.67	1.33	19.17	1.00	19.50
16	2.17	19.83	2.17	21.33	2.17	21.67
22.6	2.83	22.67	2.50	23.83	3.17	24.83
32	3.67	26.33	5.17	29.00	4.00	28.83
45	4.67	31.00	5.83	34.83	4.50	33.33
64	5.33	36.33	6.33	41.17	6.33	39.67
90	11.83	48.17	14.17	55.33	13.50	53.17
128	15.17	63.33	12.83	68.17	15.00	68.17
180	20.33	83.67	19.67	87.83	16.00	84.17
256	12.33	96.00	9.50	97.33	11.00	95.17
362	3.67	99.67	2.00	99.33	3.17	98.33
512	0.33	100.00	0.67	100.00	1.67	100.00



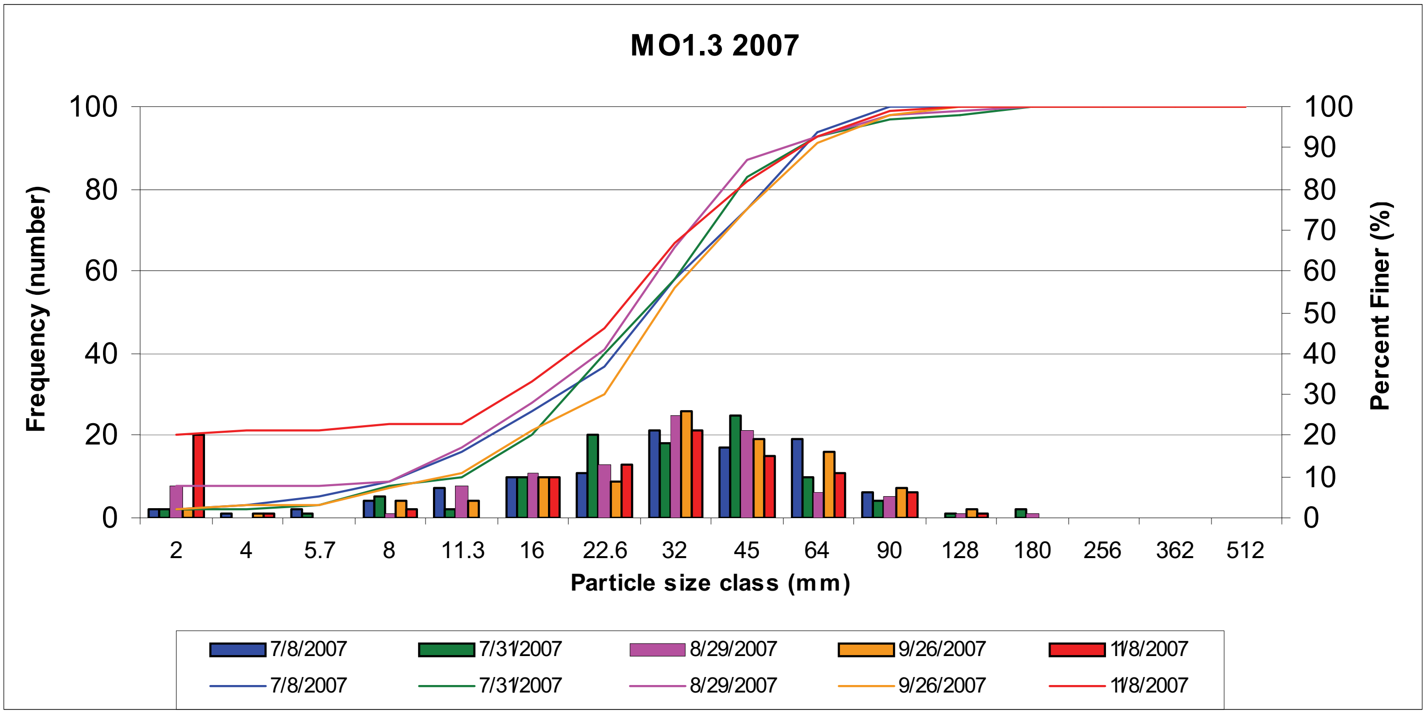
MO1	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	10	10	16	16	22	22	26	26	44	44
4	1	11	0	16	0	22	0	26	0	44
5.7	1	12	0	16	0	22	0	26	0	44
8	4	16	0	16	0	22	5	31	2	46
11.3	0	16	1	17	2	24	1	32	2	48
16	7	23	6	23	6	30	6	38	3	51
22.6	12	35	14	37	9	39	4	42	5	56
32	15	50	17	54	16	55	13	55	10	66
45	24	74	27	81	20	75	17	72	13	79
64	12	86	13	94	18	93	19	91	13	92
90	14	100	6	100	6	99	8	99	7	99
128	0	100	0	100	1	100	1	100	1	100
180	0	100	0	100	0	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



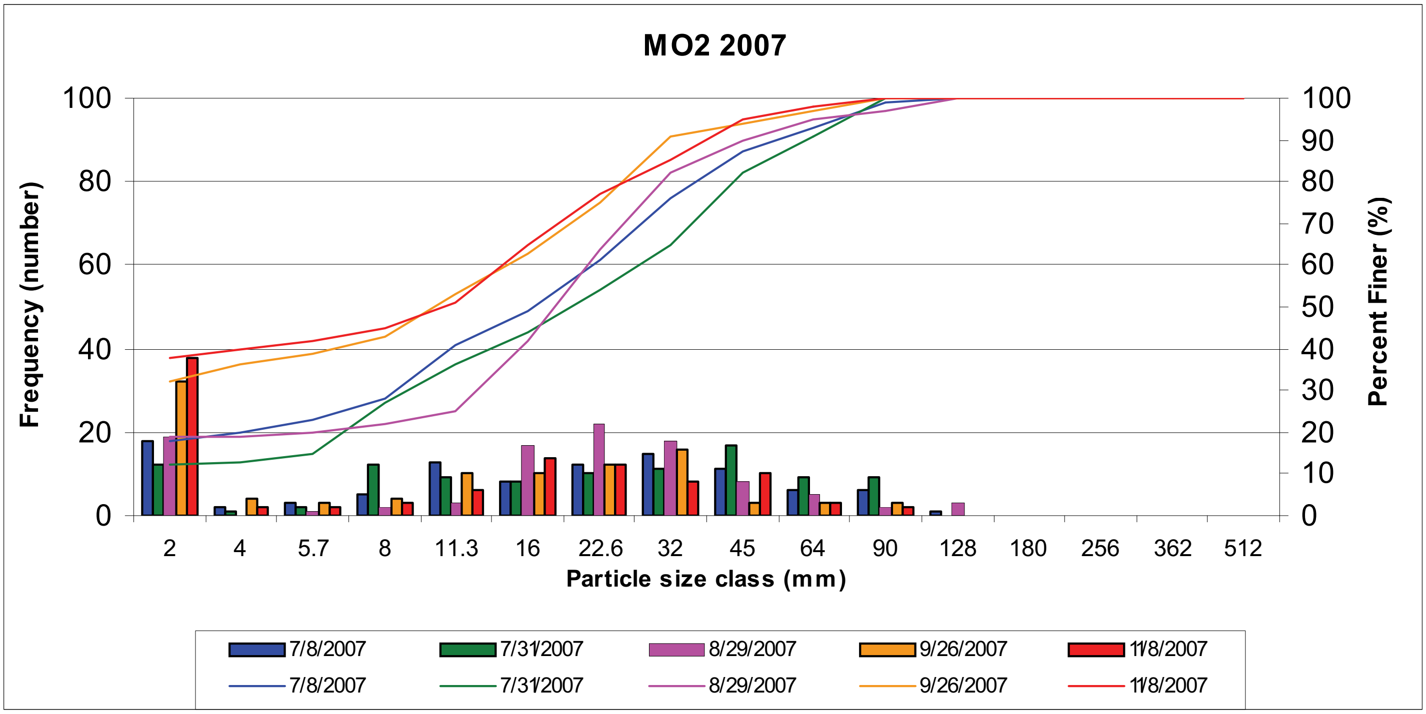
MO1.1	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	3	3	3	3	10	10	16	16	19	19
4	3	6	0	3	0	10	0	16	0	19
5.7	0	6	3	6	1	11	1	17	0	19
8	1	7	0	6	2	13	0	17	0	19
11.3	3	10	2	8	1	14	2	19	3	22
16	7	17	6	14	7	21	3	22	5	27
22.6	8	25	5	19	5	26	8	30	6	33
32	12	37	13	32	12	38	10	40	11	44
45	22	59	12	44	18	56	19	59	12	56
64	16	75	21	65	17	73	19	78	19	75
90	20	95	27	92	20	93	17	95	16	91
128	5	100	8	100	7	100	5	100	6	97
180	0	100	0	100	0	100	0	100	1	98
256	0	100	0	100	0	100	0	100	0	98
362	0	100	0	100	0	100	0	100	2	100
512	0	100	0	100	0	100	0	100	0	100



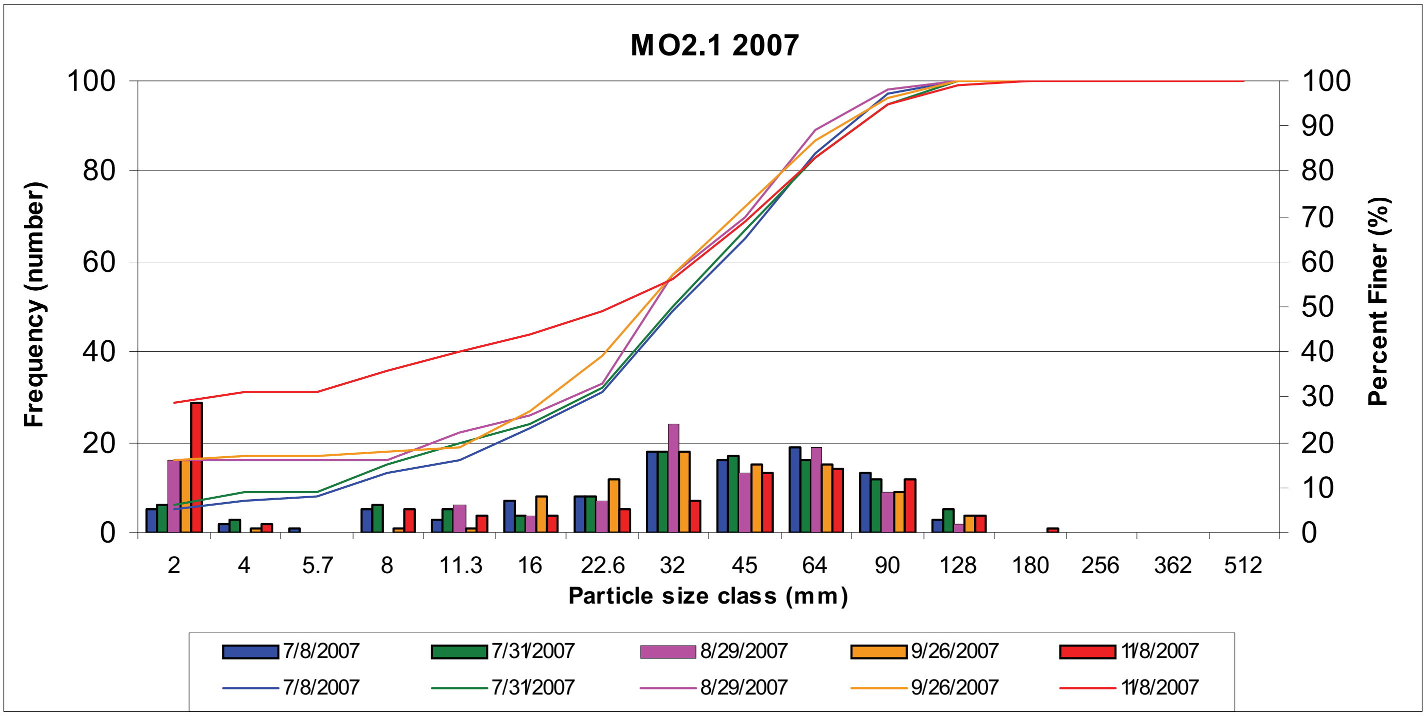
MO1.2	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer
2	1	1	6	6	5	5	4	4	12	12
4	1	2	0	6	1	6	0	4	0	12
5.7	1	3	0	6	0	6	0	4	0	12
8	1	4	3	9	2	8	3	7	1	13
11.3	4	8	7	16	4	12	3	10	7	20
16	4	12	4	20	6	18	2	12	6	26
22.6	16	28	13	33	9	27	5	17	7	33
32	18	46	22	55	16	43	17	34	16	49
45	25	71	16	71	16	59	31	65	19	68
64	17	88	20	91	27	86	21	86	22	90
90	11	99	8	99	13	99	11	97	8	98
128	0	99	1	100	1	100	3	100	2	100
180	1	100	0	100	0	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



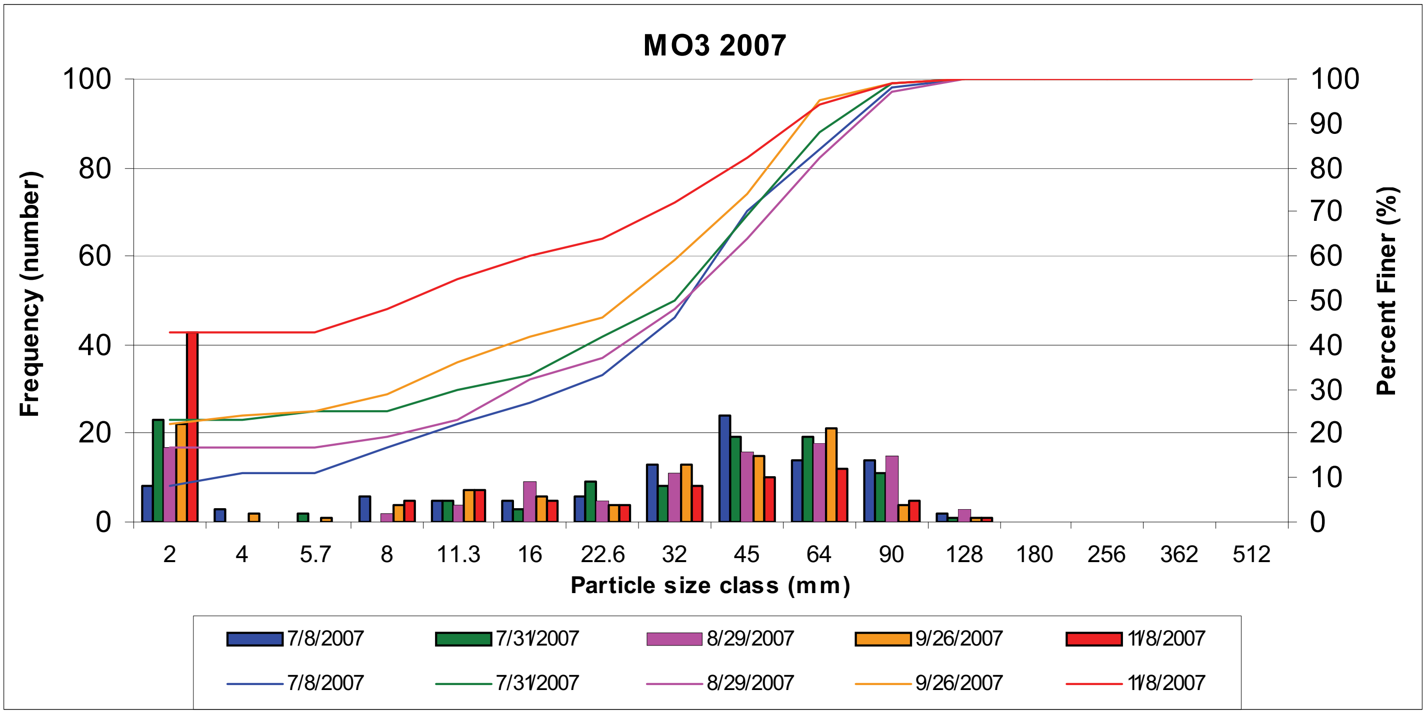
MO1.3	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	2	2	2	2	8	8	2	2	20	20
4	1	3	0	2	0	8	1	3	1	21
5.7	2	5	1	3	0	8	0	3	0	21
8	4	9	5	8	1	9	4	7	2	23
11.3	7	16	2	10	8	17	4	11	0	23
16	10	26	10	20	11	28	10	21	10	33
22.6	11	37	20	40	13	41	9	30	13	46
32	21	58	18	58	25	66	26	56	21	67
45	17	75	25	83	21	87	19	75	15	82
64	19	94	10	93	6	93	16	91	11	93
90	6	100	4	97	5	98	7	98	6	99
128	0	100	1	98	1	99	2	100	1	100
180	0	100	2	100	1	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



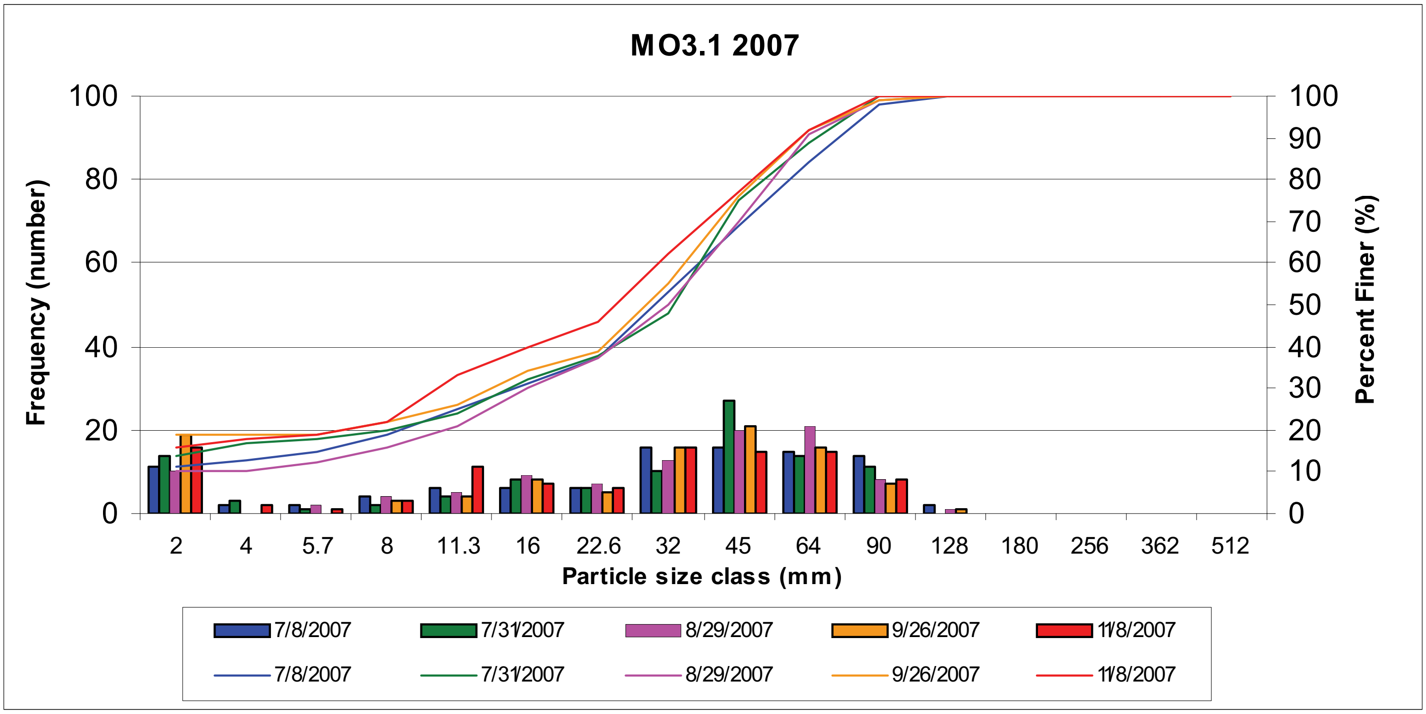
MO2	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	18	18	12	12	19	19	32	32	38	38
4	2	20	1	13	0	19	4	36	2	40
5.7	3	23	2	15	1	20	3	39	2	42
8	5	28	12	27	2	22	4	43	3	45
11.3	13	41	9	36	3	25	10	53	6	51
16	8	49	8	44	17	42	10	63	14	65
22.6	12	61	10	54	22	64	12	75	12	77
32	15	76	11	65	18	82	16	91	8	85
45	11	87	17	82	8	90	3	94	10	95
64	6	93	9	91	5	95	3	97	3	98
90	6	99	9	100	2	97	3	100	2	100
128	1	100	0	100	3	100	0	100	0	100
180	0	100	0	100	0	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



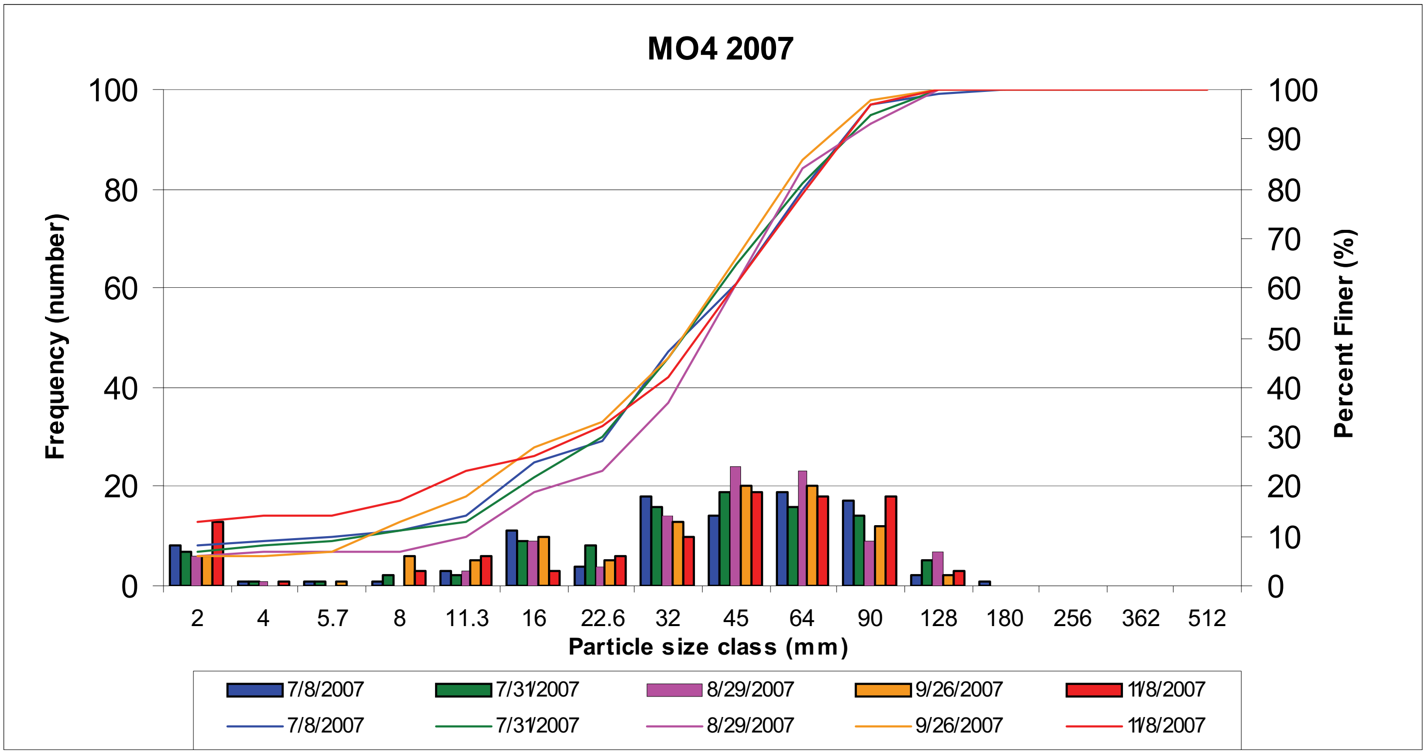
MO2.1	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	5	5	6	6	16	16	16	16	29	29
4	2	7	3	9	0	16	1	17	2	31
5.7	1	8	0	9	0	16	0	17	0	31
8	5	13	6	15	0	16	1	18	5	36
11.3	3	16	5	20	6	22	1	19	4	40
16	7	23	4	24	4	26	8	27	4	44
22.6	8	31	8	32	7	33	12	39	5	49
32	18	49	18	50	24	57	18	57	7	56
45	16	65	17	67	13	70	15	72	13	69
64	19	84	16	83	19	89	15	87	14	83
90	13	97	12	95	9	98	9	96	12	95
128	3	100	5	100	2	100	4	100	4	99
180	0	100	0	100	0	100	0	100	1	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



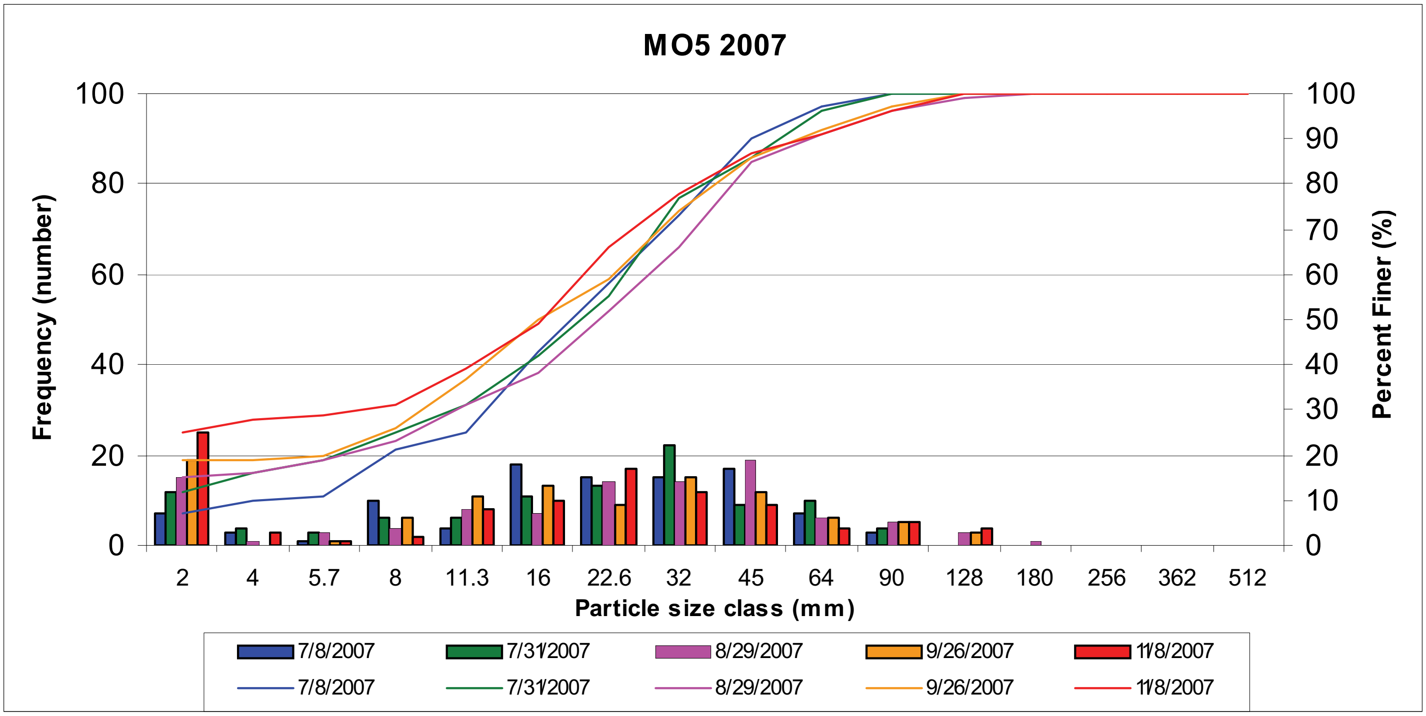
MO3	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	8	8	23	23	17	17	22	22	43	43
4	3	11	0	23	0	17	2	24	0	43
5.7	0	11	2	25	0	17	1	25	0	43
8	6	17	0	25	2	19	4	29	5	48
11.3	5	22	5	30	4	23	7	36	7	55
16	5	27	3	33	9	32	6	42	5	60
22.6	6	33	9	42	5	37	4	46	4	64
32	13	46	8	50	11	48	13	59	8	72
45	24	70	19	69	16	64	15	74	10	82
64	14	84	19	88	18	82	21	95	12	94
90	14	98	11	99	15	97	4	99	5	99
128	2	100	1	100	3	100	1	100	1	100
180	0	100	0	100	0	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



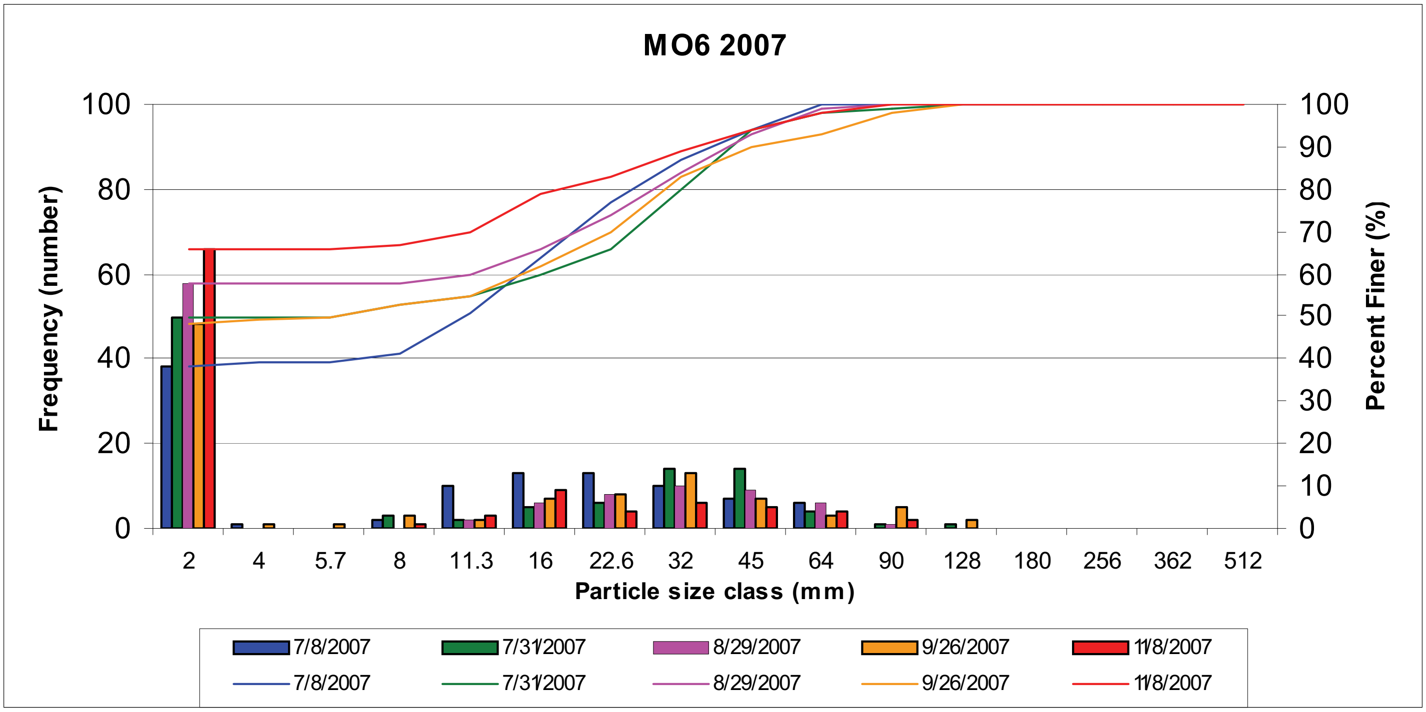
MO3.1	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	11	11	14	14	10	10	19	19	16	16
4	2	13	3	17	0	10	0	19	2	18
5.7	2	15	1	18	2	12	0	19	1	19
8	4	19	2	20	4	16	3	22	3	22
11.3	6	25	4	24	5	21	4	26	11	33
16	6	31	8	32	9	30	8	34	7	40
22.6	6	37	6	38	7	37	5	39	6	46
32	16	53	10	48	13	50	16	55	16	62
45	16	69	27	75	20	70	21	76	15	77
64	15	84	14	89	21	91	16	92	15	92
90	14	98	11	100	8	99	7	99	8	100
128	2	100	0	100	1	100	1	100	0	100
180	0	100	0	100	0	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



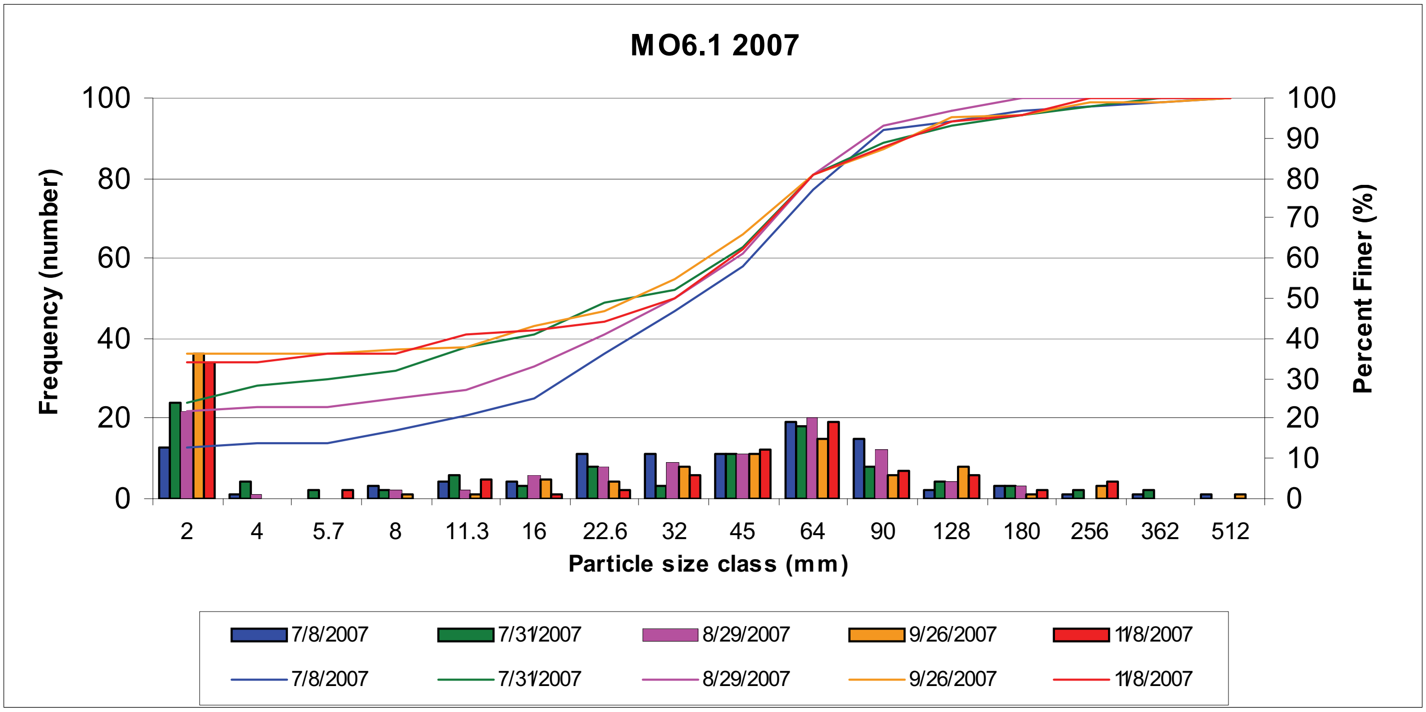
MO4	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer
2	8	8	7	7	6	6	6	6	13	13
4	1	9	1	8	1	7	0	6	1	14
5.7	1	10	1	9	0	7	1	7	0	14
8	1	11	2	11	0	7	6	13	3	17
11.3	3	14	2	13	3	10	5	18	6	23
16	11	25	9	22	9	19	10	28	3	26
22.6	4	29	8	30	4	23	5	33	6	32
32	18	47	16	46	14	37	13	46	10	42
45	14	61	19	65	24	61	20	66	19	61
64	19	80	16	81	23	84	20	86	18	79
90	17	97	14	95	9	93	12	98	18	97
128	2	99	5	100	7	100	2	100	3	100
180	1	100	0	100	0	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



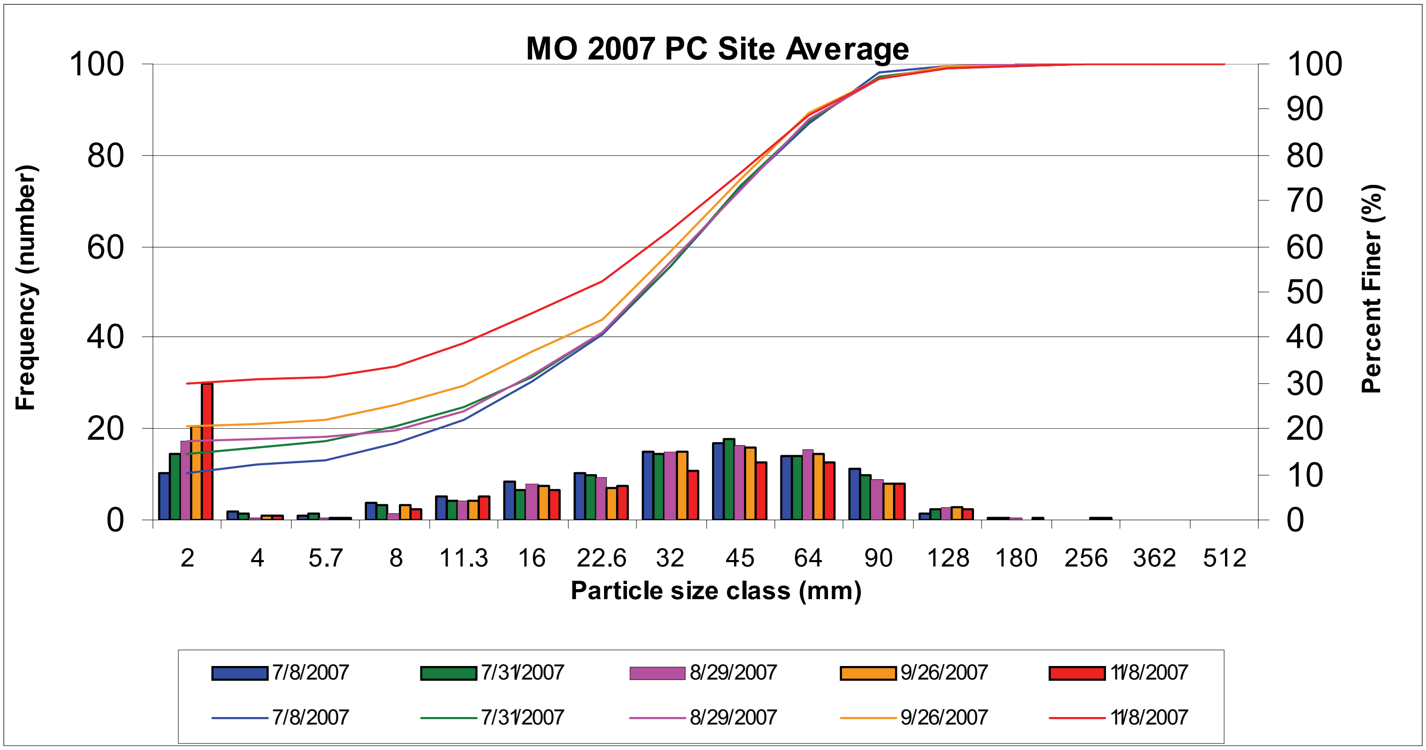
MO5	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7	7	12	12	15	15	19	19	25	25
4	3	10	4	16	1	16	0	19	3	28
5.7	1	11	3	19	3	19	1	20	1	29
8	10	21	6	25	4	23	6	26	2	31
11.3	4	25	6	31	8	31	11	37	8	39
16	18	43	11	42	7	38	13	50	10	49
22.6	15	58	13	55	14	52	9	59	17	66
32	15	73	22	77	14	66	15	74	12	78
45	17	90	9	86	19	85	12	86	9	87
64	7	97	10	96	6	91	6	92	4	91
90	3	100	4	100	5	96	5	97	5	96
128	0	100	0	100	3	99	3	100	4	100
180	0	100	0	100	1	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



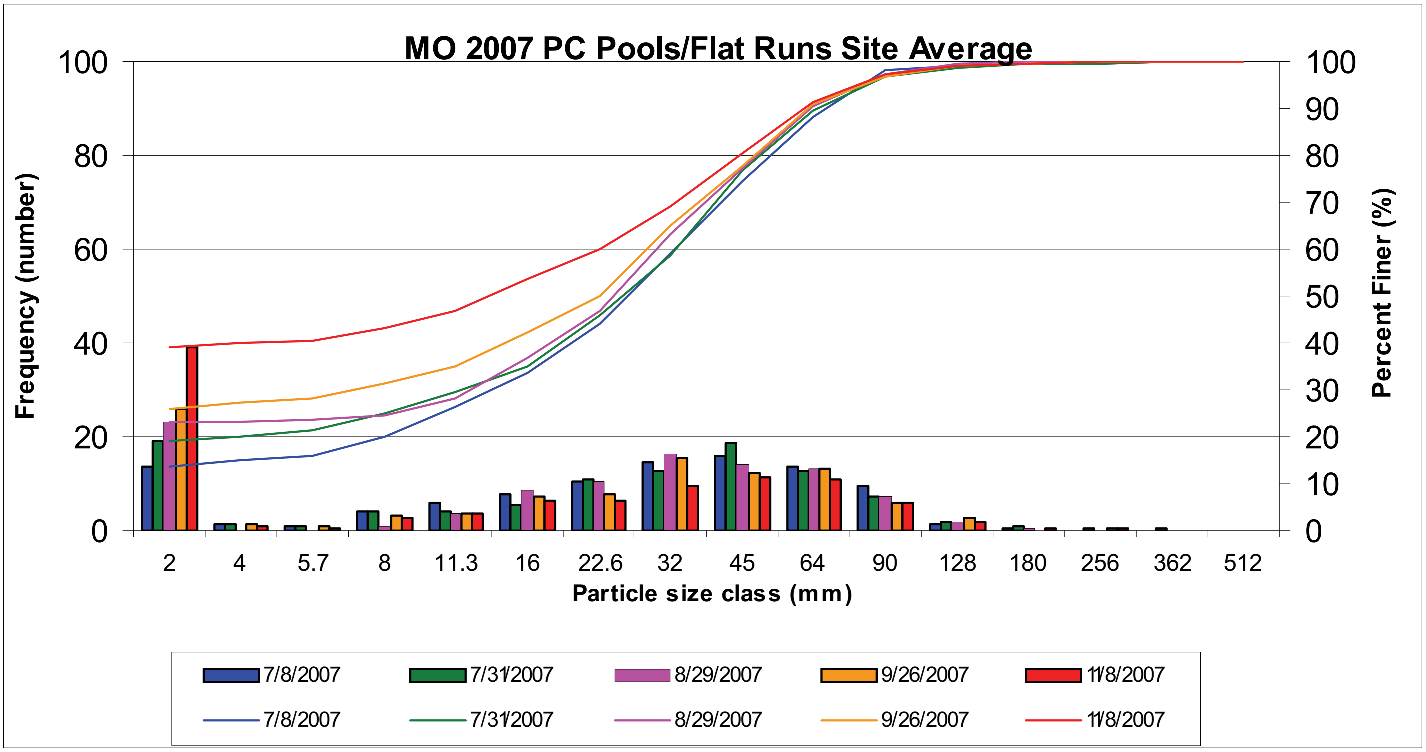
MO6	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	38	38	50	50	58	58	48	48	66	66
4	1	39	0	50	0	58	1	49	0	66
5.7	0	39	0	50	0	58	1	50	0	66
8	2	41	3	53	0	58	3	53	1	67
11.3	10	51	2	55	2	60	2	55	3	70
16	13	64	5	60	6	66	7	62	9	79
22.6	13	77	6	66	8	74	8	70	4	83
32	10	87	14	80	10	84	13	83	6	89
45	7	94	14	94	9	93	7	90	5	94
64	6	100	4	98	6	99	3	93	4	98
90	0	100	1	99	1	100	5	98	2	100
128	0	100	1	100	0	100	2	100	0	100
180	0	100	0	100	0	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



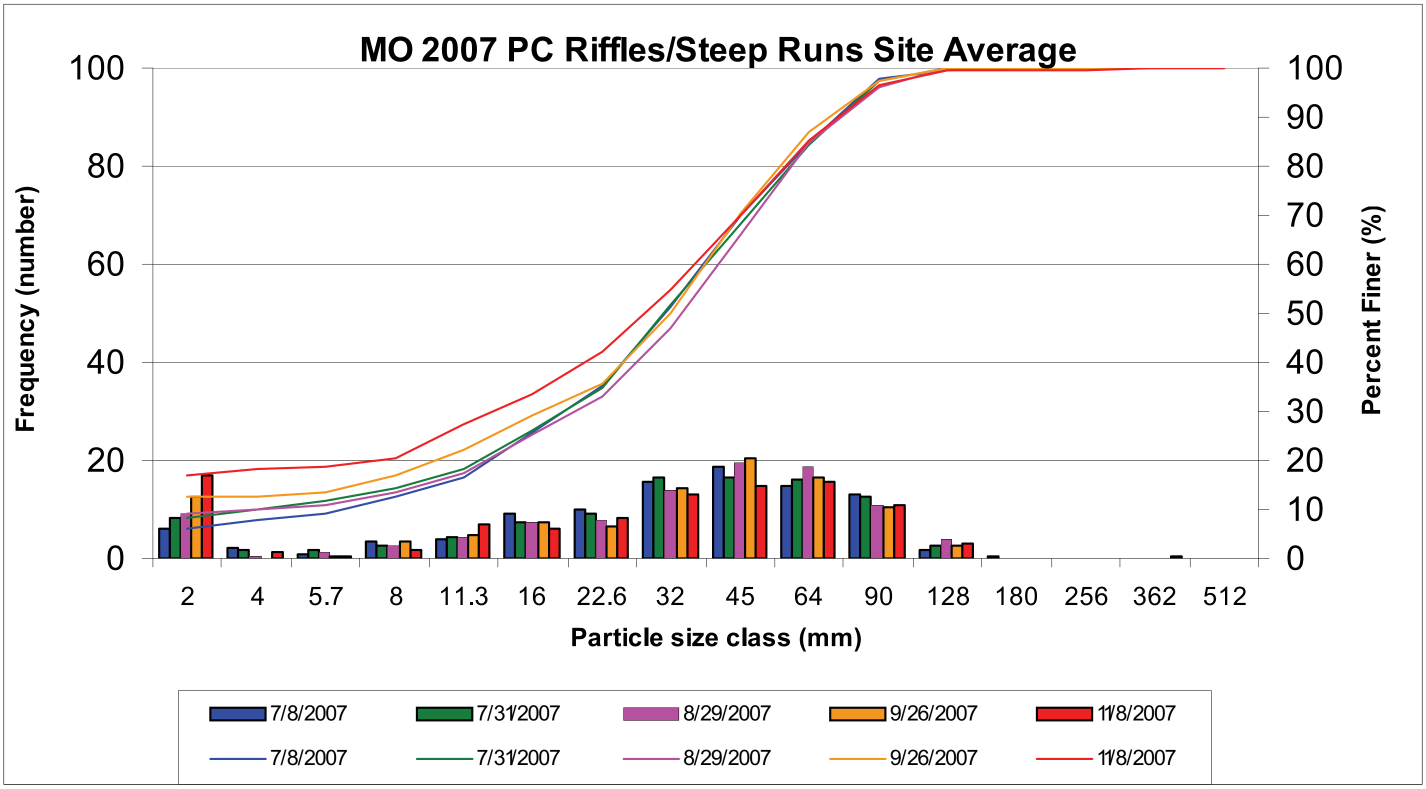
MO6.1	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	13	13	24	24	22	22	36	36	34	34
4	1	14	4	28	1	23	0	36	0	34
5.7	0	14	2	30	0	23	0	36	2	36
8	3	17	2	32	2	25	1	37	0	36
11.3	4	21	6	38	2	27	1	38	5	41
16	4	25	3	41	6	33	5	43	1	42
22.6	11	36	8	49	8	41	4	47	2	44
32	11	47	3	52	9	50	8	55	6	50
45	11	58	11	63	11	61	11	66	12	62
64	19	77	18	81	20	81	15	81	19	81
90	15	92	8	89	12	93	6	87	7	88
128	2	94	4	93	4	97	8	95	6	94
180	3	97	3	96	3	100	1	96	2	96
256	1	98	2	98	0	100	3	99	4	100
362	1	99	2	100	0	100	0	99	0	100
512	1	100	0	100	0	100	1	100	0	100



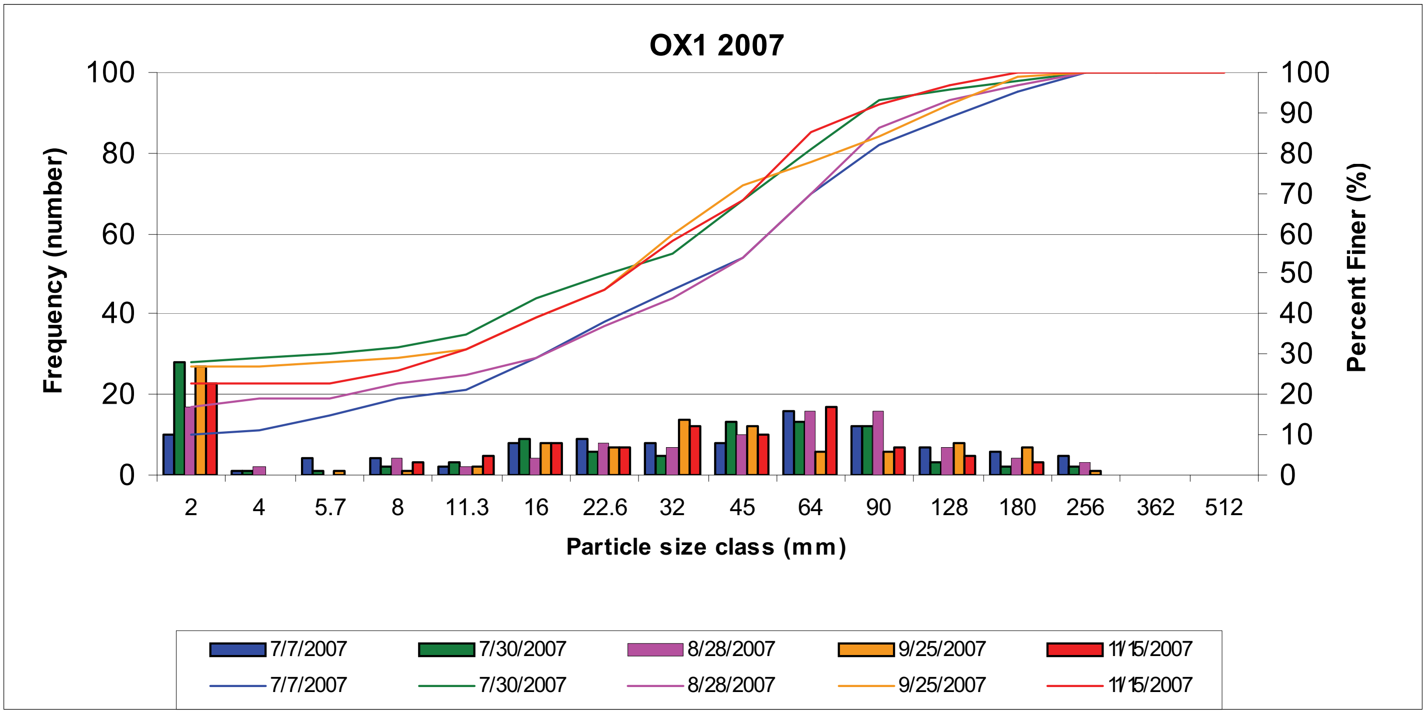
Average MO	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	10.33	10.33	14.58	14.58	17.33	17.33	20.50	20.50	29.92	29.92
4	1.75	12.08	1.33	15.92	0.33	17.67	0.75	21.25	0.92	30.83
5.7	1.00	13.08	1.25	17.17	0.58	18.25	0.67	21.92	0.50	31.33
8	3.83	16.92	3.42	20.58	1.58	19.83	3.33	25.25	2.25	33.58
11.3	5.17	22.08	4.25	24.83	4.00	23.83	4.25	29.50	5.17	38.75
16	8.33	30.42	6.42	31.25	8.08	31.92	7.33	36.83	6.42	45.17
22.6	10.17	40.58	10.00	41.25	9.25	41.17	7.08	43.92	7.25	52.42
32	15.17	55.75	14.33	55.58	15.17	56.33	14.83	58.75	10.92	63.33
45	17.00	72.75	17.75	73.33	16.25	72.58	15.83	74.58	12.67	76.00
64	14.08	86.83	14.17	87.50	15.50	88.08	14.50	89.08	12.83	88.83
90	11.08	97.92	9.58	97.08	8.75	96.83	7.83	96.92	8.00	96.83
128	1.42	99.33	2.17	99.25	2.75	99.58	2.67	99.58	2.33	99.17
180	0.42	99.75	0.42	99.67	0.42	100.00	0.08	99.67	0.33	99.50
256	0.08	99.83	0.17	99.83	0.00	100.00	0.25	99.92	0.33	99.83
362	0.08	99.92	0.17	100.00	0.00	100.00	0.00	99.92	0.17	100.00
512	0.08	100.00	0.00	100.00	0.00	100.00	0.08	100.00	0.00	100.00



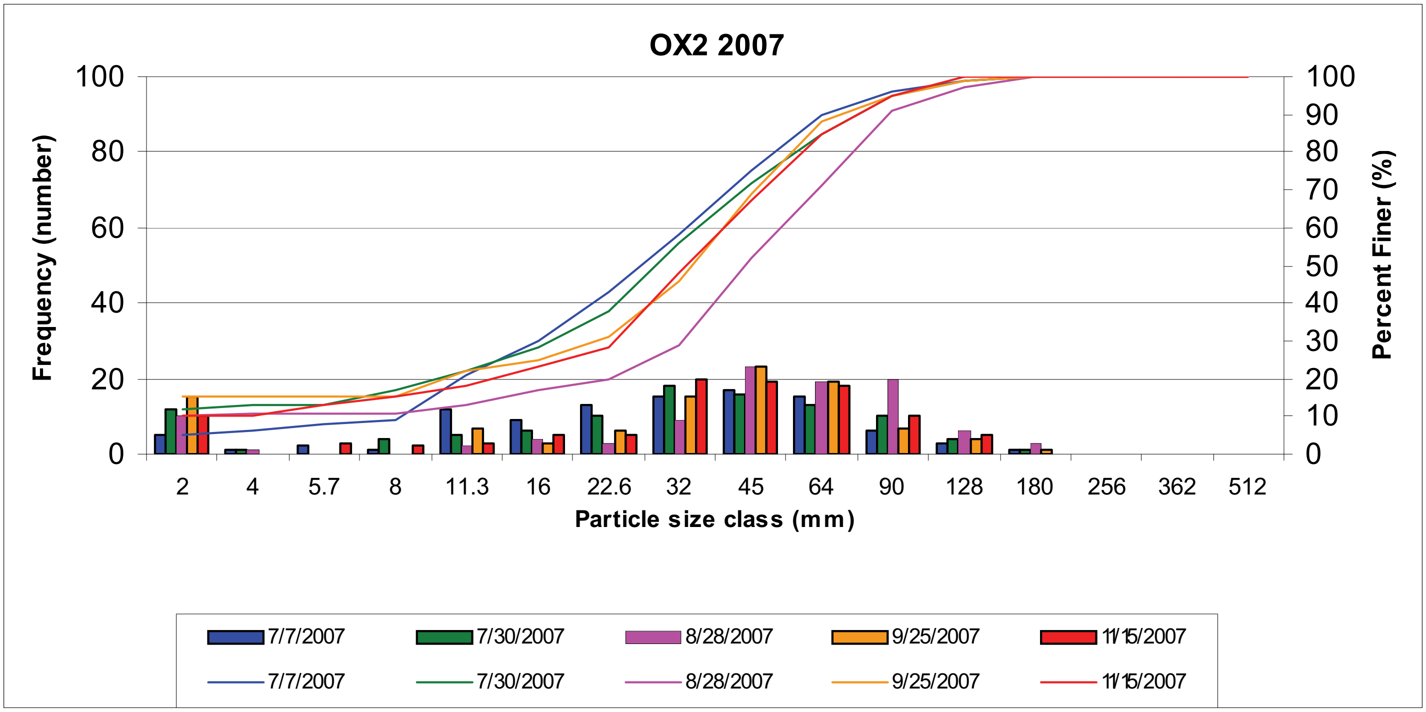
Average Pools/Flat Runs MO	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer
2	13.43	13.43	19.00	19.00	23.14	23.14	26.00	26.00	39.14	39.14
4	1.57	15.00	1.14	20.14	0.14	23.29	1.29	27.29	0.71	39.86
5.7	1.00	16.00	1.00	21.14	0.14	23.43	0.71	28.00	0.57	40.43
8	4.14	20.14	4.00	25.14	1.00	24.43	3.14	31.14	2.57	43.00
11.3	6.00	26.14	4.29	29.43	3.86	28.29	3.71	34.86	3.86	46.86
16	7.71	33.86	5.57	35.00	8.43	36.71	7.43	42.29	6.57	53.43
22.6	10.43	44.29	10.71	45.71	10.29	47.00	7.57	49.86	6.43	59.86
32	14.71	59.00	12.71	58.43	16.14	63.14	15.29	65.14	9.43	69.29
45	15.71	74.71	18.57	77.00	14.00	77.14	12.43	77.57	11.14	80.43
64	13.57	88.29	12.71	89.71	13.14	90.29	13.14	90.71	10.86	91.29
90	9.71	98.00	7.29	97.00	7.14	97.43	6.00	96.71	5.86	97.14
128	1.14	99.14	1.71	98.71	2.00	99.43	2.57	99.29	1.86	99.00
180	0.43	99.57	0.71	99.43	0.57	100.00	0.14	99.43	0.43	99.43
256	0.14	99.71	0.29	99.71	0.00	100.00	0.43	99.86	0.57	100.00
362	0.14	99.86	0.29	100.00	0.00	100.00	0.00	99.86	0.00	100.00
512	0.14	100.00	0.00	100.00	0.00	100.00	0.14	100.00	0.00	100.00



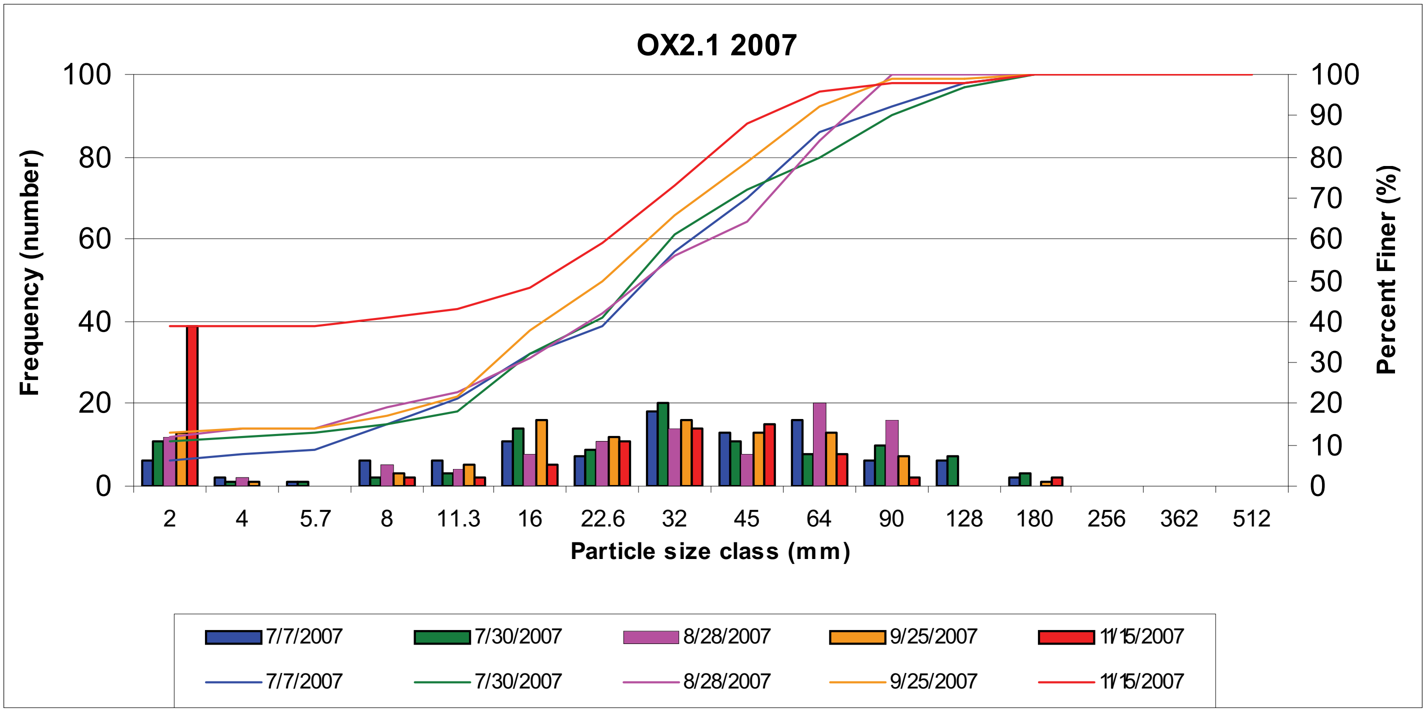
Average Riffles/ Steep Runs MO	7/8/2007	7/8/2007	7/31/2007	7/31/2007	8/29/2007	8/29/2007	9/26/2007	9/26/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	6.00	6.00	8.40	8.40	9.20	9.20	12.80	12.80	17.00	17.00
4	2.00	8.00	1.60	10.00	0.60	9.80	0.00	12.80	1.20	18.20
5.7	1.00	9.00	1.60	11.60	1.20	11.00	0.60	13.40	0.40	18.60
8	3.40	12.40	2.60	14.20	2.40	13.40	3.60	17.00	1.80	20.40
11.3	4.00	16.40	4.20	18.40	4.20	17.60	5.00	22.00	7.00	27.40
16	9.20	25.60	7.60	26.00	7.60	25.20	7.20	29.20	6.20	33.60
22.6	9.80	35.40	9.00	35.00	7.80	33.00	6.40	35.60	8.40	42.00
32	15.80	51.20	16.60	51.60	13.80	46.80	14.20	49.80	13.00	55.00
45	18.80	70.00	16.60	68.20	19.40	66.20	20.60	70.40	14.80	69.80
64	14.80	84.80	16.20	84.40	18.80	85.00	16.40	86.80	15.60	85.40
90	13.00	97.80	12.80	97.20	11.00	96.00	10.40	97.20	11.00	96.40
128	1.80	99.60	2.80	100.00	3.80	99.80	2.80	100.00	3.00	99.40
180	0.40	100.00	0.00	100.00	0.20	100.00	0.00	100.00	0.20	99.60
256	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	99.60
362	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.40	100.00
512	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00



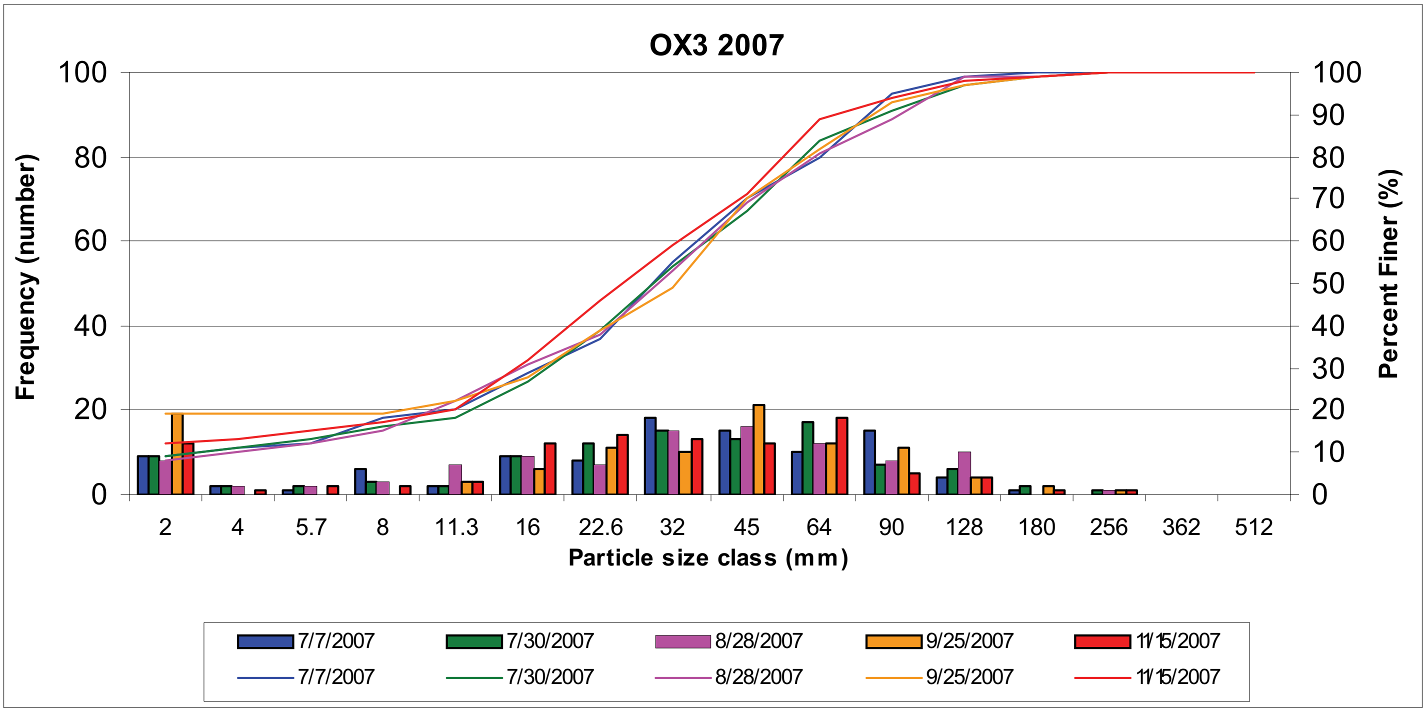
OX1	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	10	10	28	28	17	17	27	27	23	23
4	1	11	1	29	2	19	0	27	0	23
5.7	4	15	1	30	0	19	1	28	0	23
8	4	19	2	32	4	23	1	29	3	26
11.3	2	21	3	35	2	25	2	31	5	31
16	8	29	9	44	4	29	8	39	8	39
22.6	9	38	6	50	8	37	7	46	7	46
32	8	46	5	55	7	44	14	60	12	58
45	8	54	13	68	10	54	12	72	10	68
64	16	70	13	81	16	70	6	78	17	85
90	12	82	12	93	16	86	6	84	7	92
128	7	89	3	96	7	93	8	92	5	97
180	6	95	2	98	4	97	7	99	3	100
256	5	100	2	100	3	100	1	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



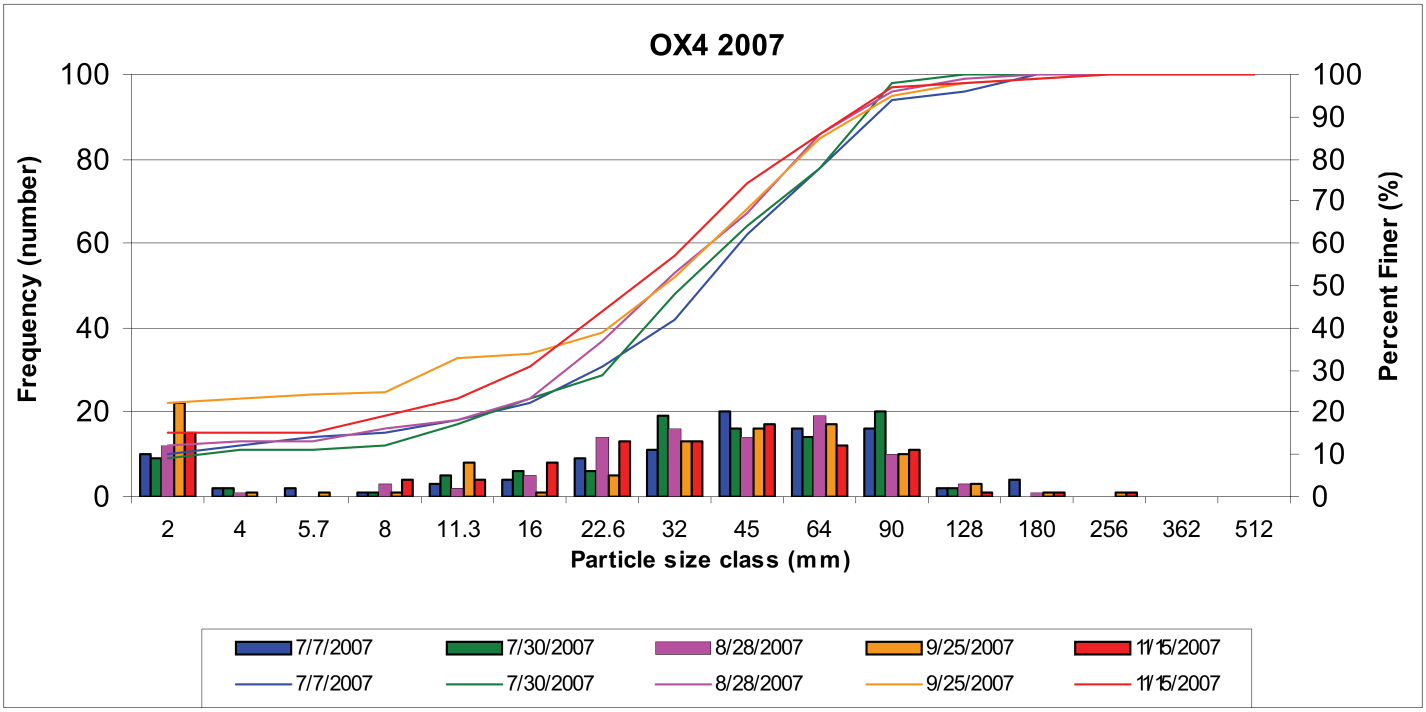
OX2	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	5	5	12	12	10	10	15	15	10	10
4	1	6	1	13	1	11	0	15	0	10
5.7	2	8	0	13	0	11	0	15	3	13
8	1	9	4	17	0	11	0	15	2	15
11.3	12	21	5	22	2	13	7	22	3	18
16	9	30	6	28	4	17	3	25	5	23
22.6	13	43	10	38	3	20	6	31	5	28
32	15	58	18	56	9	29	15	46	20	48
45	17	75	16	72	23	52	23	69	19	67
64	15	90	13	85	19	71	19	88	18	85
90	6	96	10	95	20	91	7	95	10	95
128	3	99	4	99	6	97	4	99	5	100
180	1	100	1	100	3	100	1	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



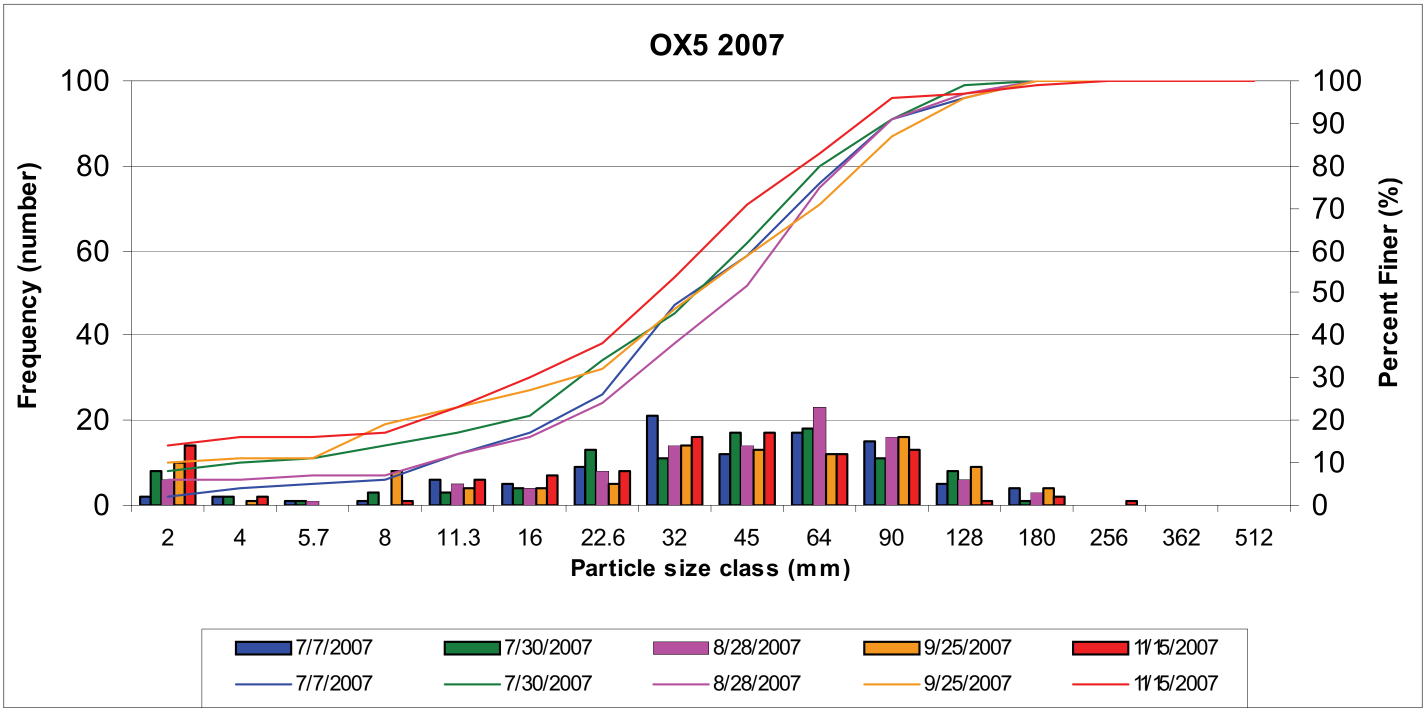
OX2.1	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	6	6	11	11	12	12	13	13	39	39
4	2	8	1	12	2	14	1	14	0	39
5.7	1	9	1	13	0	14	0	14	0	39
8	6	15	2	15	5	19	3	17	2	41
11.3	6	21	3	18	4	23	5	22	2	43
16	11	32	14	32	8	31	16	38	5	48
22.6	7	39	9	41	11	42	12	50	11	59
32	18	57	20	61	14	56	16	66	14	73
45	13	70	11	72	8	64	13	79	15	88
64	16	86	8	80	20	84	13	92	8	96
90	6	92	10	90	16	100	7	99	2	98
128	6	98	7	97	0	100	0	99	0	98
180	2	100	3	100	0	100	1	100	2	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



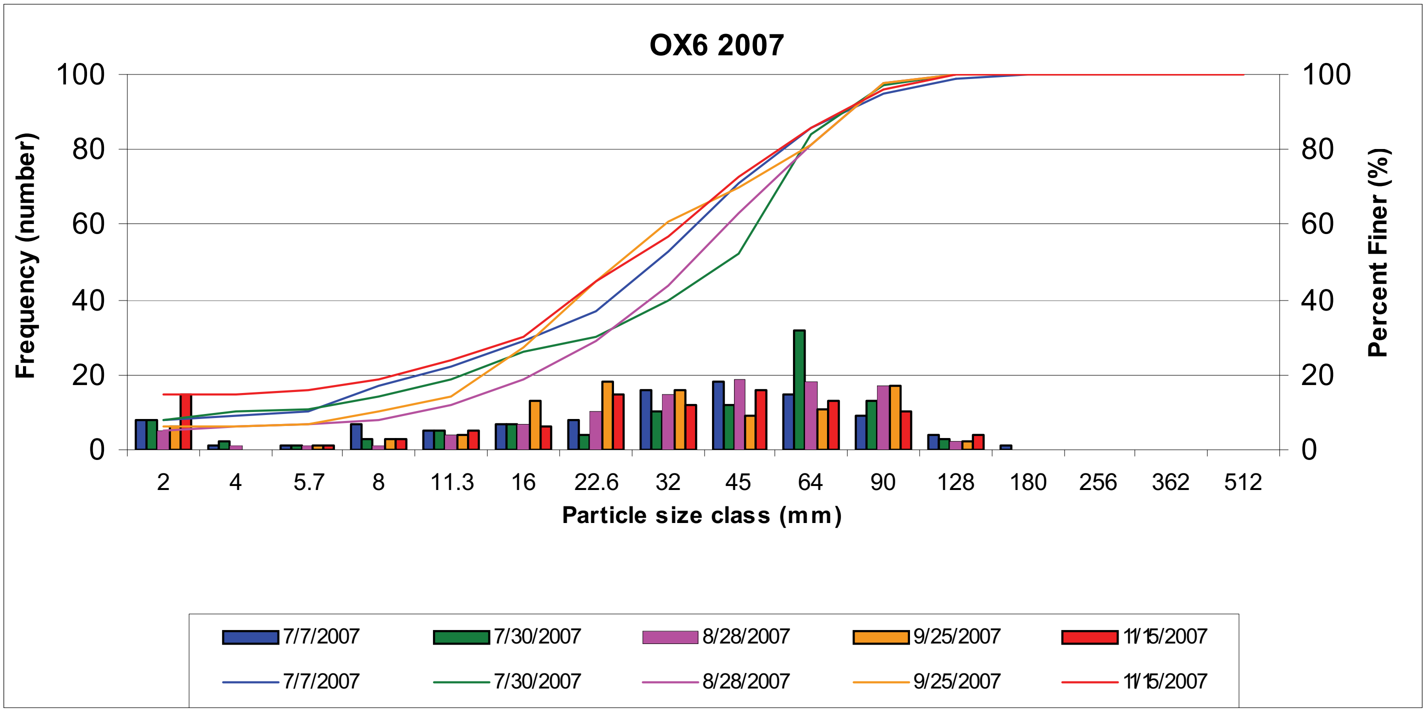
OX3	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	9	9	9	9	8	8	19	19	12	12
4	2	11	2	11	2	10	0	19	1	13
5.7	1	12	2	13	2	12	0	19	2	15
8	6	18	3	16	3	15	0	19	2	17
11.3	2	20	2	18	7	22	3	22	3	20
16	9	29	9	27	9	31	6	28	12	32
22.6	8	37	12	39	7	38	11	39	14	46
32	18	55	15	54	15	53	10	49	13	59
45	15	70	13	67	16	69	21	70	12	71
64	10	80	17	84	12	81	12	82	18	89
90	15	95	7	91	8	89	11	93	5	94
128	4	99	6	97	10	99	4	97	4	98
180	1	100	2	99	0	99	2	99	1	99
256	0	100	1	100	1	100	1	100	1	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



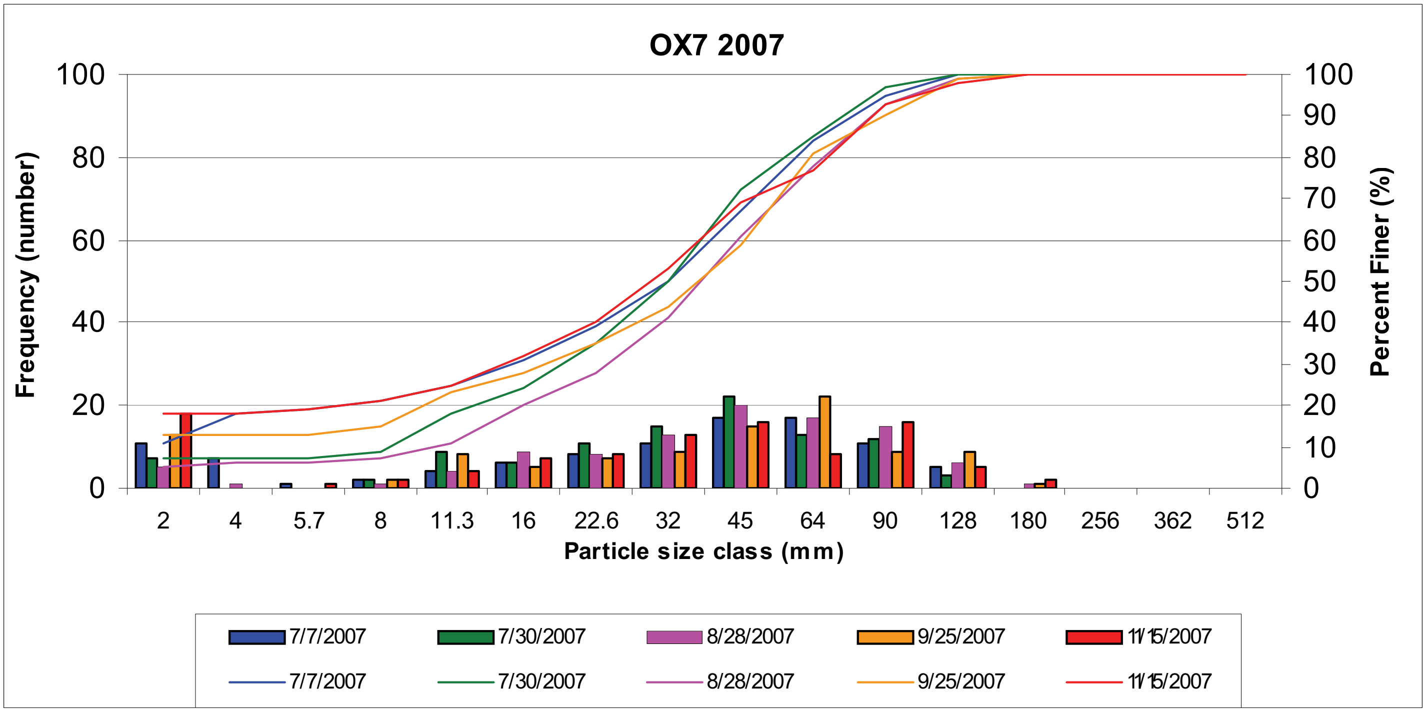
OX4	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	10	10	9	9	12	12	22	22	15	15
4	2	12	2	11	1	13	1	23	0	15
5.7	2	14	0	11	0	13	1	24	0	15
8	1	15	1	12	3	16	1	25	4	19
11.3	3	18	5	17	2	18	8	33	4	23
16	4	22	6	23	5	23	1	34	8	31
22.6	9	31	6	29	14	37	5	39	13	44
32	11	42	19	48	16	53	13	52	13	57
45	20	62	16	64	14	67	16	68	17	74
64	16	78	14	78	19	86	17	85	12	86
90	16	94	20	98	10	96	10	95	11	97
128	2	96	2	100	3	99	3	98	1	98
180	4	100	0	100	1	100	1	99	1	99
256	0	100	0	100	0	100	1	100	1	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



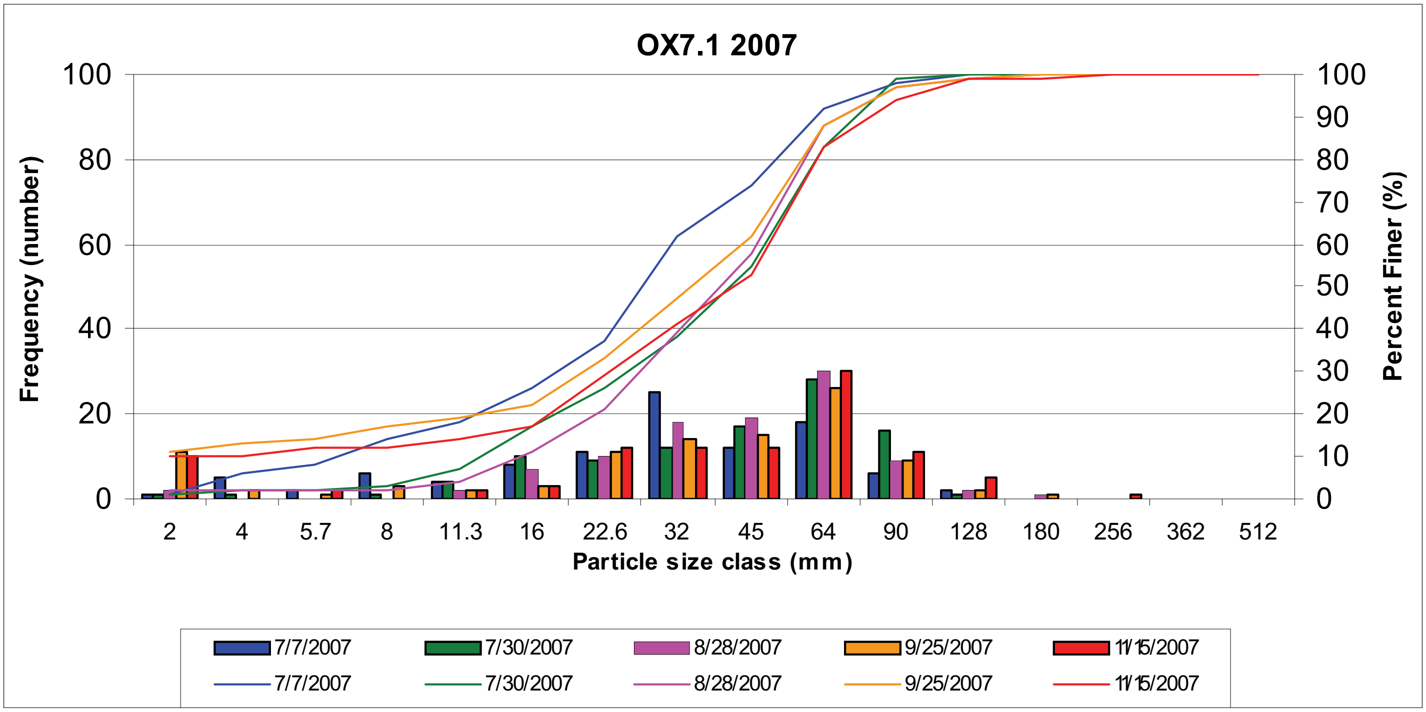
OX5	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	2	2	8	8	6	6	10	10	14	14
4	2	4	2	10	0	6	1	11	2	16
5.7	1	5	1	11	1	7	0	11	0	16
8	1	6	3	14	0	7	8	19	1	17
11.3	6	12	3	17	5	12	4	23	6	23
16	5	17	4	21	4	16	4	27	7	30
22.6	9	26	13	34	8	24	5	32	8	38
32	21	47	11	45	14	38	14	46	16	54
45	12	59	17	62	14	52	13	59	17	71
64	17	76	18	80	23	75	12	71	12	83
90	15	91	11	91	16	91	16	87	13	96
128	5	96	8	99	6	97	9	96	1	97
180	4	100	1	100	3	100	4	100	2	99
256	0	100	0	100	0	100	0	100	1	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



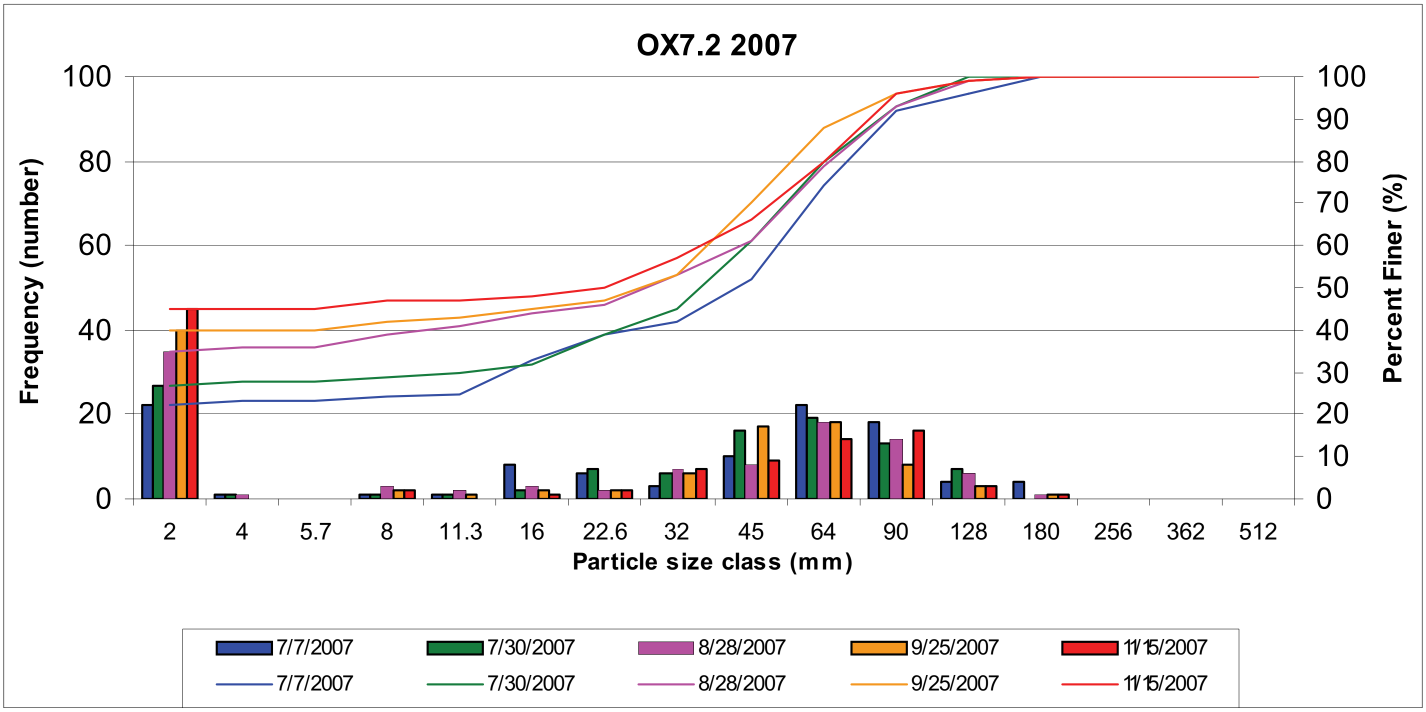
OX6	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	8	8	8	8	5	5	6	6	15	15
4	1	9	2	10	1	6	0	6	0	15
5.7	1	10	1	11	1	7	1	7	1	16
8	7	17	3	14	1	8	3	10	3	19
11.3	5	22	5	19	4	12	4	14	5	24
16	7	29	7	26	7	19	13	27	6	30
22.6	8	37	4	30	10	29	18	45	15	45
32	16	53	10	40	15	44	16	61	12	57
45	18	71	12	52	19	63	9	70	16	73
64	15	86	32	84	18	81	11	81	13	86
90	9	95	13	97	17	98	17	98	10	96
128	4	99	3	100	2	100	2	100	4	100
180	1	100	0	100	0	100	0	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



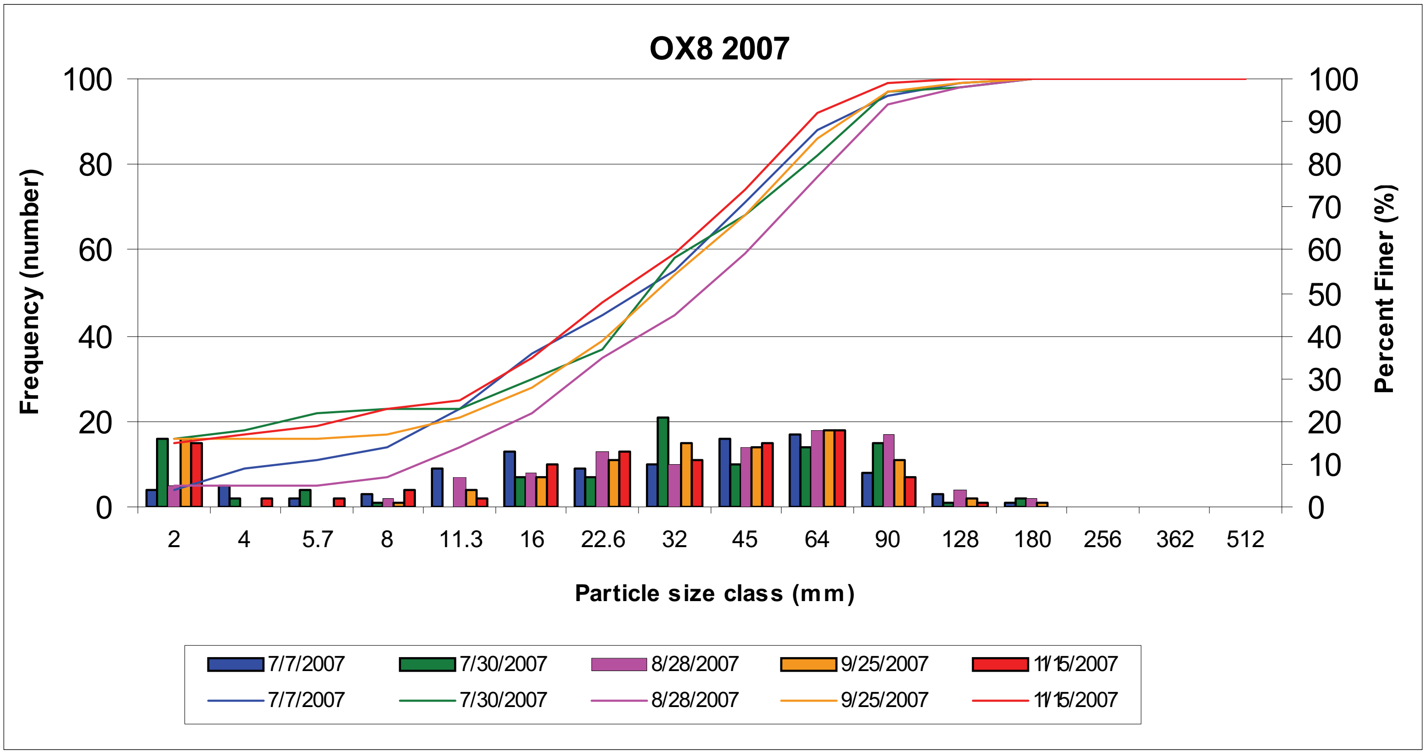
OX7	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	11	11	7	7	5	5	13	13	18	18
4	7	18	0	7	1	6	0	13	0	18
5.7	1	19	0	7	0	6	0	13	1	19
8	2	21	2	9	1	7	2	15	2	21
11.3	4	25	9	18	4	11	8	23	4	25
16	6	31	6	24	9	20	5	28	7	32
22.6	8	39	11	35	8	28	7	35	8	40
32	11	50	15	50	13	41	9	44	13	53
45	17	67	22	72	20	61	15	59	16	69
64	17	84	13	85	17	78	22	81	8	77
90	11	95	12	97	15	93	9	90	16	93
128	5	100	3	100	6	99	9	99	5	98
180	0	100	0	100	1	100	1	100	2	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



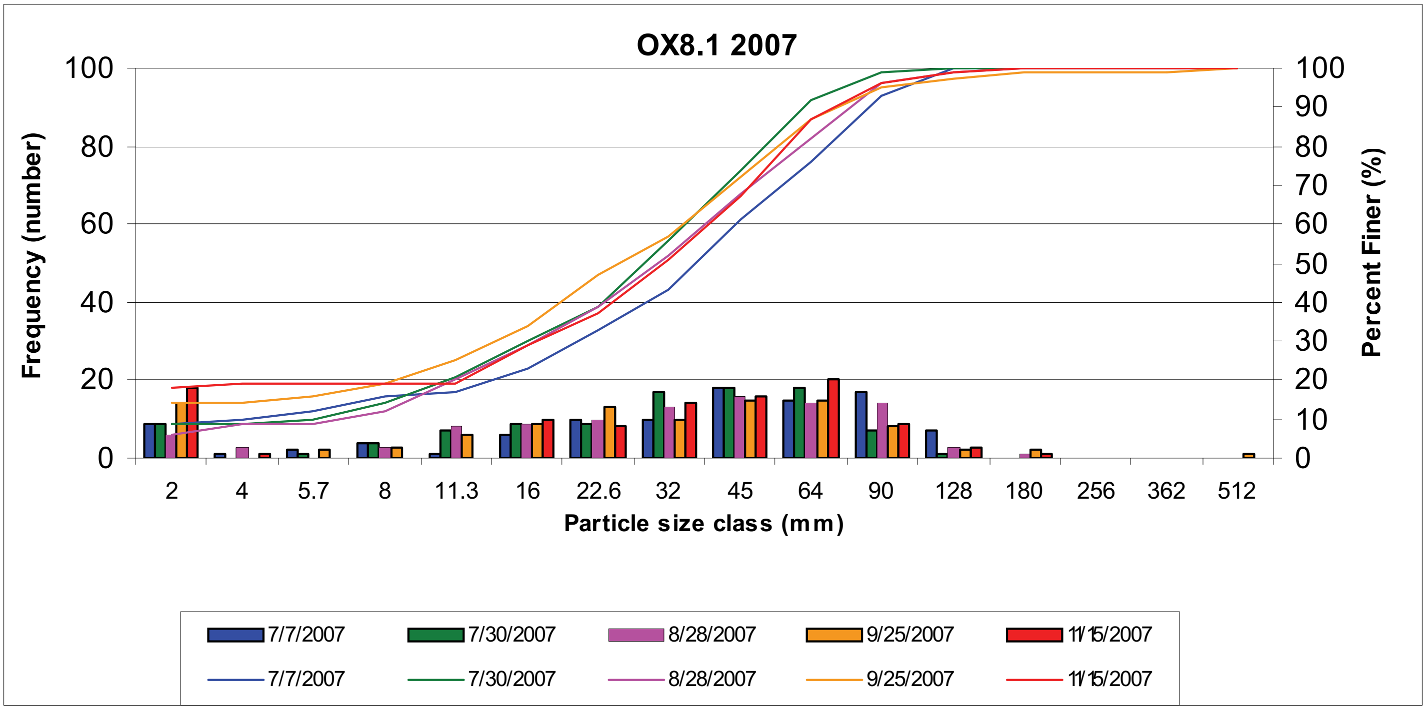
OX7.1	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	1	1	1	1	2	2	11	11	10	10
4	5	6	1	2	0	2	2	13	0	10
5.7	2	8	0	2	0	2	1	14	2	12
8	6	14	1	3	0	2	3	17	0	12
11.3	4	18	4	7	2	4	2	19	2	14
16	8	26	10	17	7	11	3	22	3	17
22.6	11	37	9	26	10	21	11	33	12	29
32	25	62	12	38	18	39	14	47	12	41
45	12	74	17	55	19	58	15	62	12	53
64	18	92	28	83	30	88	26	88	30	83
90	6	98	16	99	9	97	9	97	11	94
128	2	100	1	100	2	99	2	99	5	99
180	0	100	0	100	1	100	1	100	0	99
256	0	100	0	100	0	100	0	100	1	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



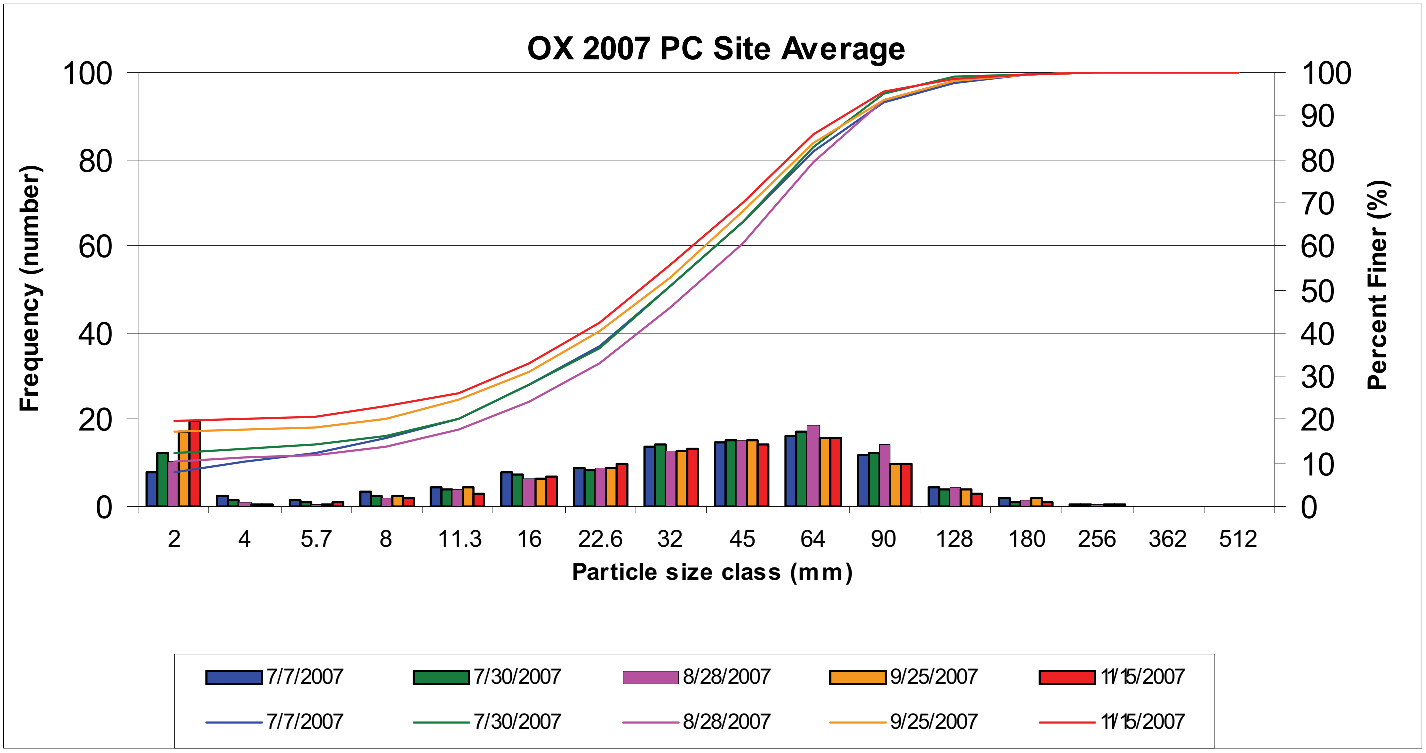
OX7.2	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	22	22	27	27	35	35	40	40	45	45
4	1	23	1	28	1	36	0	40	0	45
5.7	0	23	0	28	0	36	0	40	0	45
8	1	24	1	29	3	39	2	42	2	47
11.3	1	25	1	30	2	41	1	43	0	47
16	8	33	2	32	3	44	2	45	1	48
22.6	6	39	7	39	2	46	2	47	2	50
32	3	42	6	45	7	53	6	53	7	57
45	10	52	16	61	8	61	17	70	9	66
64	22	74	19	80	18	79	18	88	14	80
90	18	92	13	93	14	93	8	96	16	96
128	4	96	7	100	6	99	3	99	3	99
180	4	100	0	100	1	100	1	100	1	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



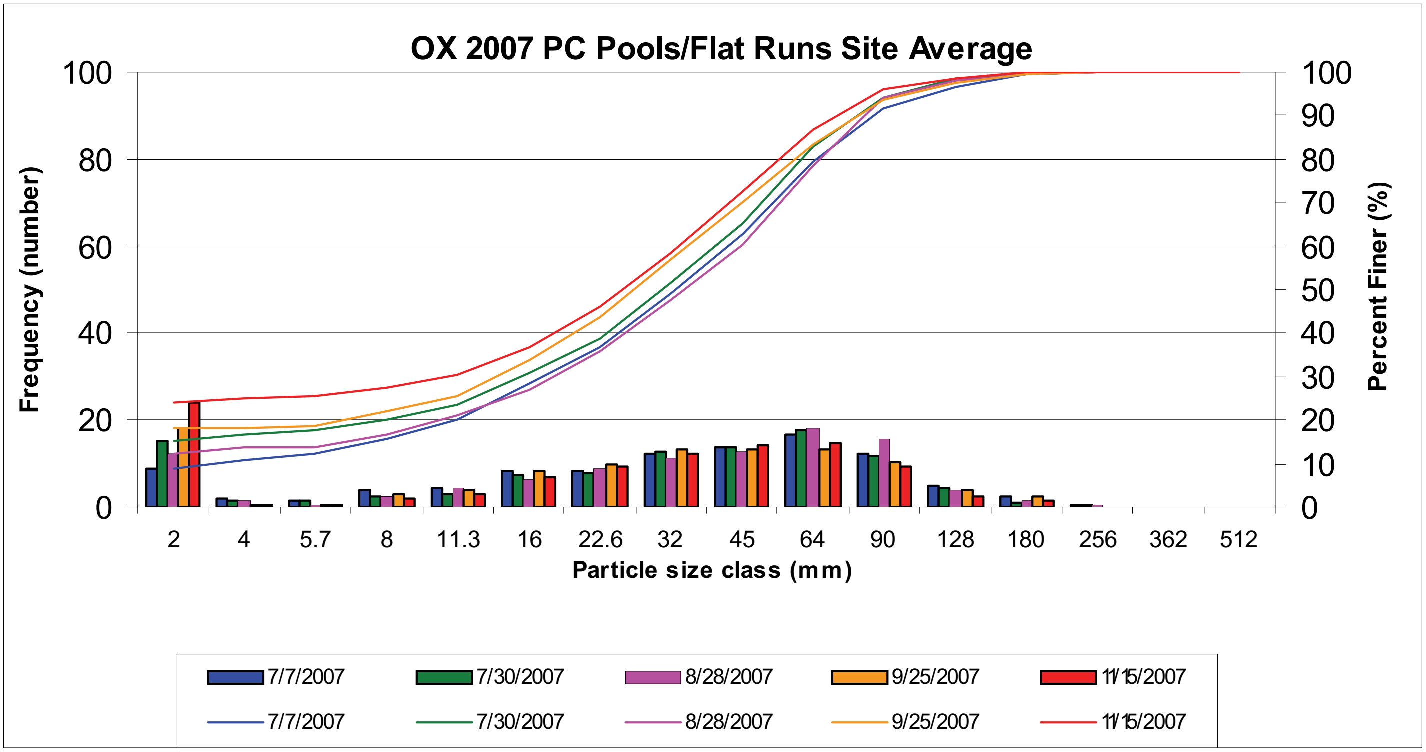
OX8	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	4	4	16	16	5	5	16	16	15	15
4	5	9	2	18	0	5	0	16	2	17
5.7	2	11	4	22	0	5	0	16	2	19
8	3	14	1	23	2	7	1	17	4	23
11.3	9	23	0	23	7	14	4	21	2	25
16	13	36	7	30	8	22	7	28	10	35
22.6	9	45	7	37	13	35	11	39	13	48
32	10	55	21	58	10	45	15	54	11	59
45	16	71	10	68	14	59	14	68	15	74
64	17	88	14	82	18	77	18	86	18	92
90	8	96	15	97	17	94	11	97	7	99
128	3	99	1	98	4	98	2	99	1	100
180	1	100	2	100	2	100	1	100	0	100
256	0	100	0	100	0	100	0	100	0	100
362	0	100	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100	0	100



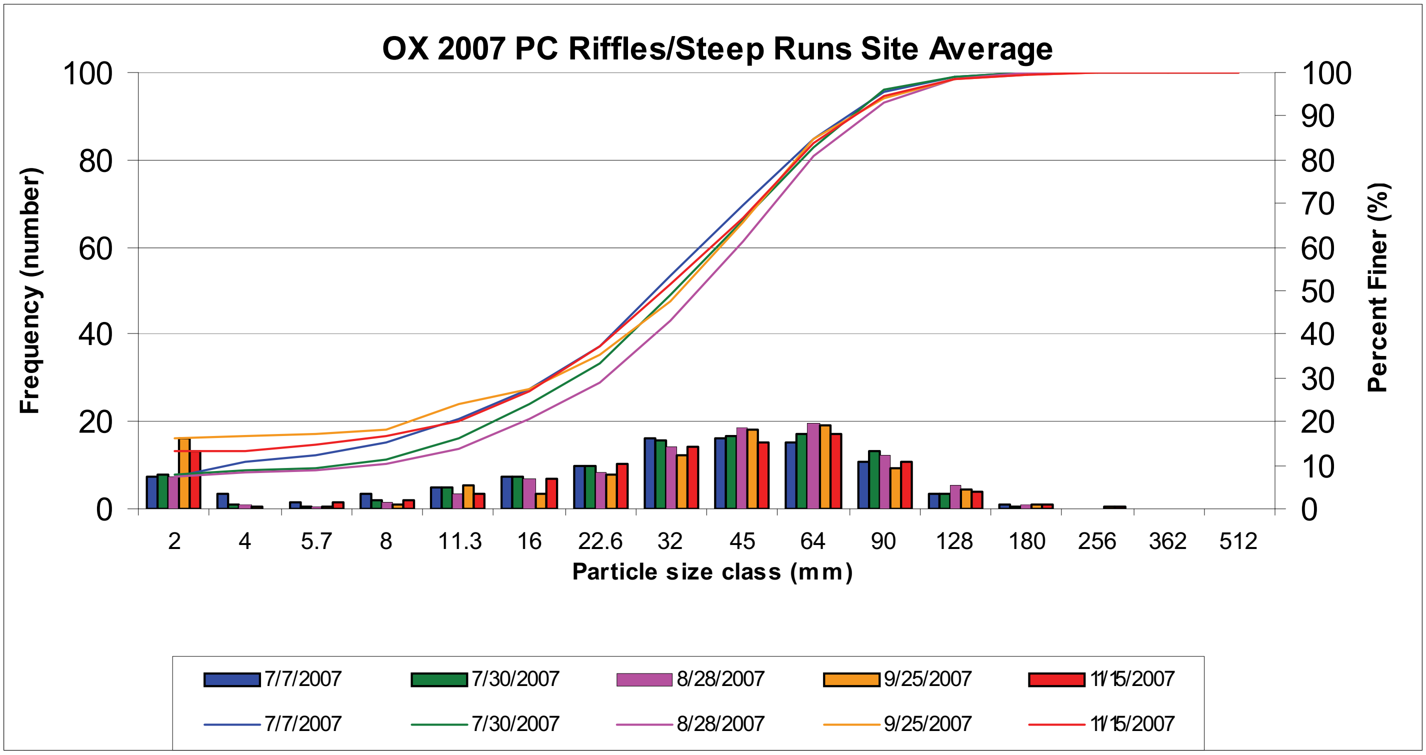
OX8.1	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	9	9	9	9	6	6	14	14	18	18
4	1	10	0	9	3	9	0	14	1	19
5.7	2	12	1	10	0	9	2	16	0	19
8	4	16	4	14	3	12	3	19	0	19
11.3	1	17	7	21	8	20	6	25	0	19
16	6	23	9	30	9	29	9	34	10	29
22.6	10	33	9	39	10	39	13	47	8	37
32	10	43	17	56	13	52	10	57	14	51
45	18	61	18	74	16	68	15	72	16	67
64	15	76	18	92	14	82	15	87	20	87
90	17	93	7	99	14	96	8	95	9	96
128	7	100	1	100	3	99	2	97	3	99
180	0	100	0	100	1	100	2	99	1	100
256	0	100	0	100	0	100	0	99	0	100
362	0	100	0	100	0	100	0	99	0	100
512	0	100	0	100	0	100	1	100	0	100



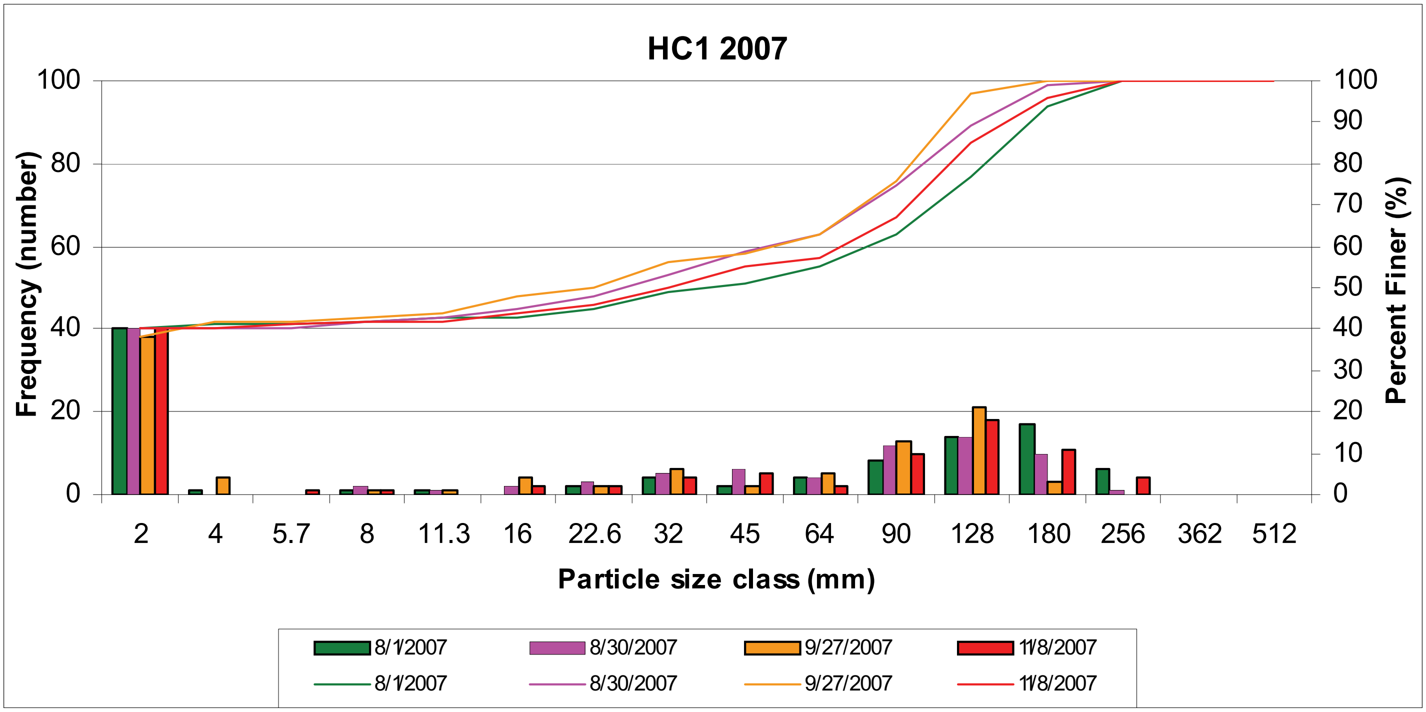
Average OX	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	8.08	8.08	12.08	12.08	10.25	10.25	17.17	17.17	19.50	19.50
4	2.50	10.58	1.25	13.33	1.17	11.42	0.42	17.58	0.50	20.00
5.7	1.58	12.17	0.92	14.25	0.33	11.75	0.50	18.08	0.92	20.92
8	3.50	15.67	2.25	16.50	2.08	13.83	2.25	20.33	2.08	23.00
11.3	4.58	20.25	3.92	20.42	4.08	17.92	4.50	24.83	3.00	26.00
16	7.83	28.08	7.42	27.83	6.42	24.33	6.42	31.25	6.83	32.83
22.6	8.92	37.00	8.58	36.42	8.67	33.00	9.00	40.25	9.67	42.50
32	13.83	50.83	14.08	50.50	12.58	45.58	12.67	52.92	13.08	55.58
45	14.67	65.50	15.08	65.58	15.08	60.67	15.25	68.17	14.50	70.08
64	16.17	81.67	17.25	82.83	18.67	79.33	15.75	83.92	15.67	85.75
90	11.58	93.25	12.17	95.00	14.33	93.67	9.92	93.83	9.75	95.50
128	4.33	97.58	3.83	98.83	4.58	98.25	4.00	97.83	3.08	98.58
180	2.00	99.58	0.92	99.75	1.42	99.67	1.83	99.67	1.08	99.67
256	0.42	100.00	0.25	100.00	0.33	100.00	0.25	99.92	0.33	100.00
362	0.00	100.00	0.00	100.00	0.00	100.00	0.00	99.92	0.00	100.00
512	0.00	100.00	0.00	100.00	0.00	100.00	0.08	100.00	0.00	100.00



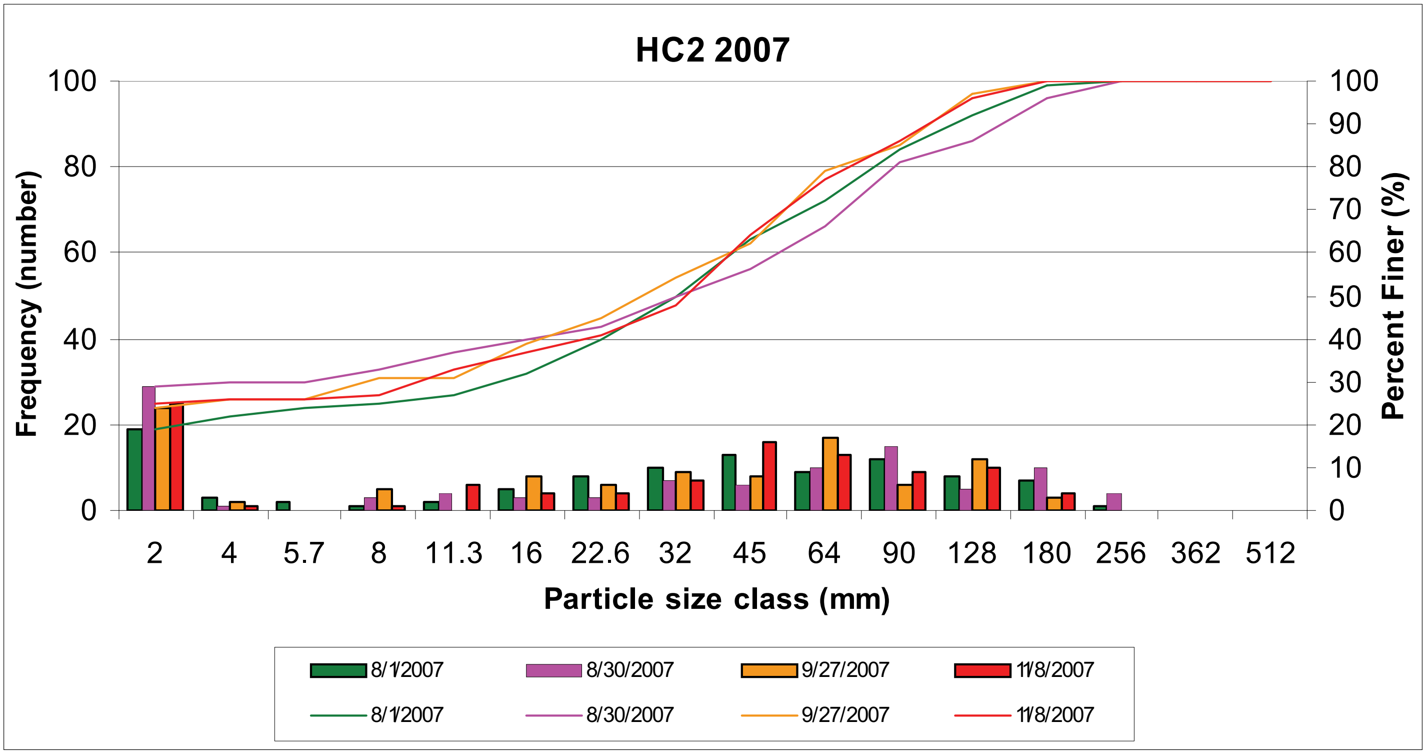
Avg pools flat run OX	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer	Fraction in class	Percent finer
2	8.71	8.71	15.29	15.29	12.29	12.29	18.00	18.00	24.14	24.14
4	1.86	10.57	1.29	16.57	1.29	13.57	0.29	18.29	0.71	24.86
5.7	1.57	12.14	1.29	17.86	0.29	13.86	0.57	18.86	0.43	25.29
8	3.71	15.86	2.29	20.14	2.57	16.43	3.00	21.86	2.14	27.43
11.3	4.29	20.14	3.14	23.29	4.57	21.00	3.71	25.57	2.86	30.29
16	8.29	28.43	7.43	30.71	6.14	27.14	8.43	34.00	6.71	37.00
22.6	8.29	36.71	7.86	38.57	8.86	36.00	9.71	43.71	9.14	46.14
32	12.29	49.00	12.86	51.43	11.43	47.43	13.00	56.71	12.29	58.43
45	13.57	62.57	13.86	65.29	12.71	60.14	13.29	70.00	14.00	72.43
64	16.86	79.43	17.43	82.71	18.14	78.29	13.29	83.29	14.57	87.00
90	12.14	91.57	11.57	94.29	15.71	94.00	10.43	93.71	9.14	96.14
128	5.14	96.71	4.29	98.57	4.00	98.00	3.71	97.43	2.43	98.57
180	2.57	99.29	1.14	99.71	1.57	99.57	2.29	99.71	1.29	99.86
256	0.71	100.00	0.29	100.00	0.43	100.00	0.14	99.86	0.14	100.00
362	0.00	100.00	0.00	100.00	0.00	100.00	0.00	99.86	0.00	100.00
512	0.00	100.00	0.00	100.00	0.00	100.00	0.14	100.00	0.00	100.00



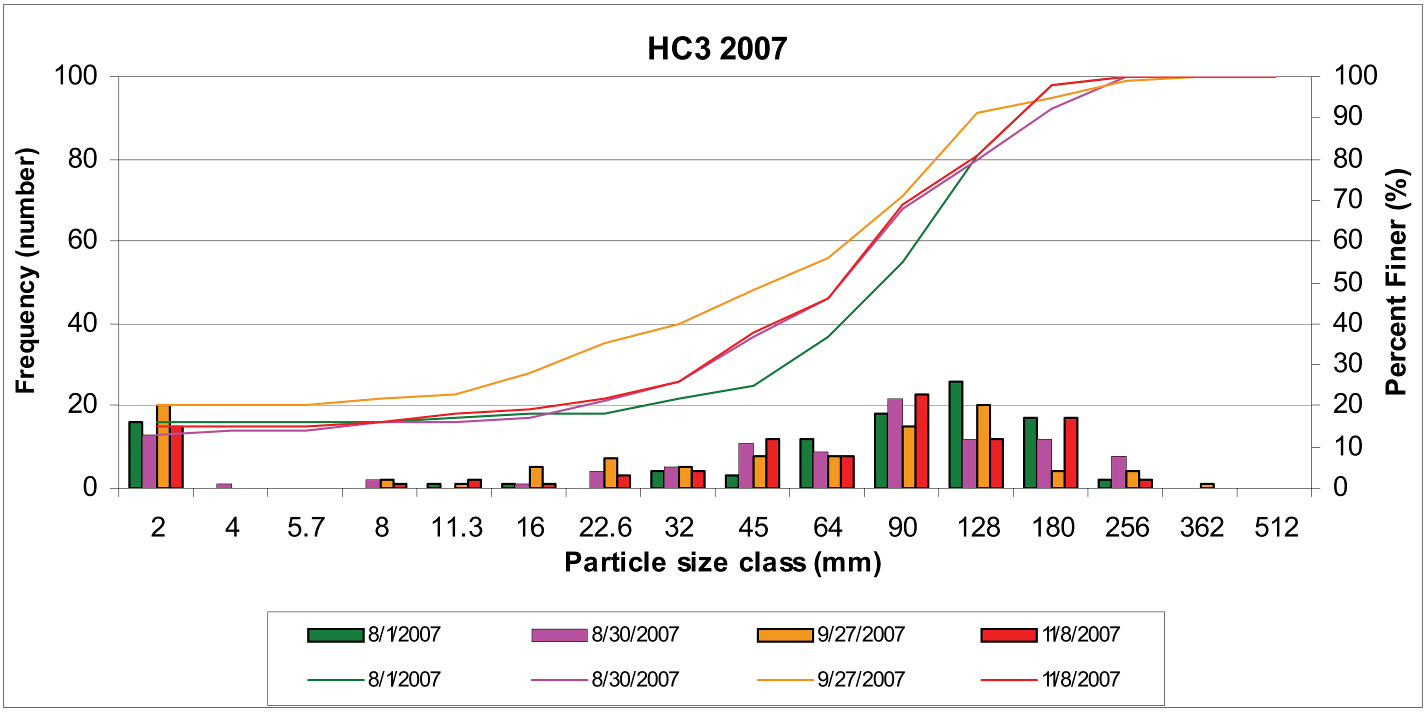
Avg riffle steep run OX	7/7/2007	7/7/2007	7/30/2007	7/30/2007	8/28/2007	8/28/2007	9/25/2007	9/25/2007	11/15/2007	11/15/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	7.20	7.20	7.60	7.60	7.40	7.40	16.00	16.00	13.00	13.00
4	3.40	10.60	1.20	8.80	1.00	8.40	0.60	16.60	0.20	13.20
5.7	1.60	12.20	0.40	9.20	0.40	8.80	0.40	17.00	1.60	14.80
8	3.20	15.40	2.20	11.40	1.40	10.20	1.20	18.20	2.00	16.80
11.3	5.00	20.40	5.00	16.40	3.40	13.60	5.60	23.80	3.20	20.00
16	7.20	27.60	7.40	23.80	6.80	20.40	3.60	27.40	7.00	27.00
22.6	9.80	37.40	9.60	33.40	8.40	28.80	8.00	35.40	10.40	37.40
32	16.00	53.40	15.80	49.20	14.20	43.00	12.20	47.60	14.20	51.60
45	16.20	69.60	16.80	66.00	18.40	61.40	18.00	65.60	15.20	66.80
64	15.20	84.80	17.00	83.00	19.40	80.80	19.20	84.80	17.20	84.00
90	10.80	95.60	13.00	96.00	12.40	93.20	9.20	94.00	10.60	94.60
128	3.20	98.80	3.20	99.20	5.40	98.60	4.40	98.40	4.00	98.60
180	1.20	100.00	0.60	99.80	1.20	99.80	1.20	99.60	0.80	99.40
256	0.00	100.00	0.20	100.00	0.20	100.00	0.40	100.00	0.60	100.00
362	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
512	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00



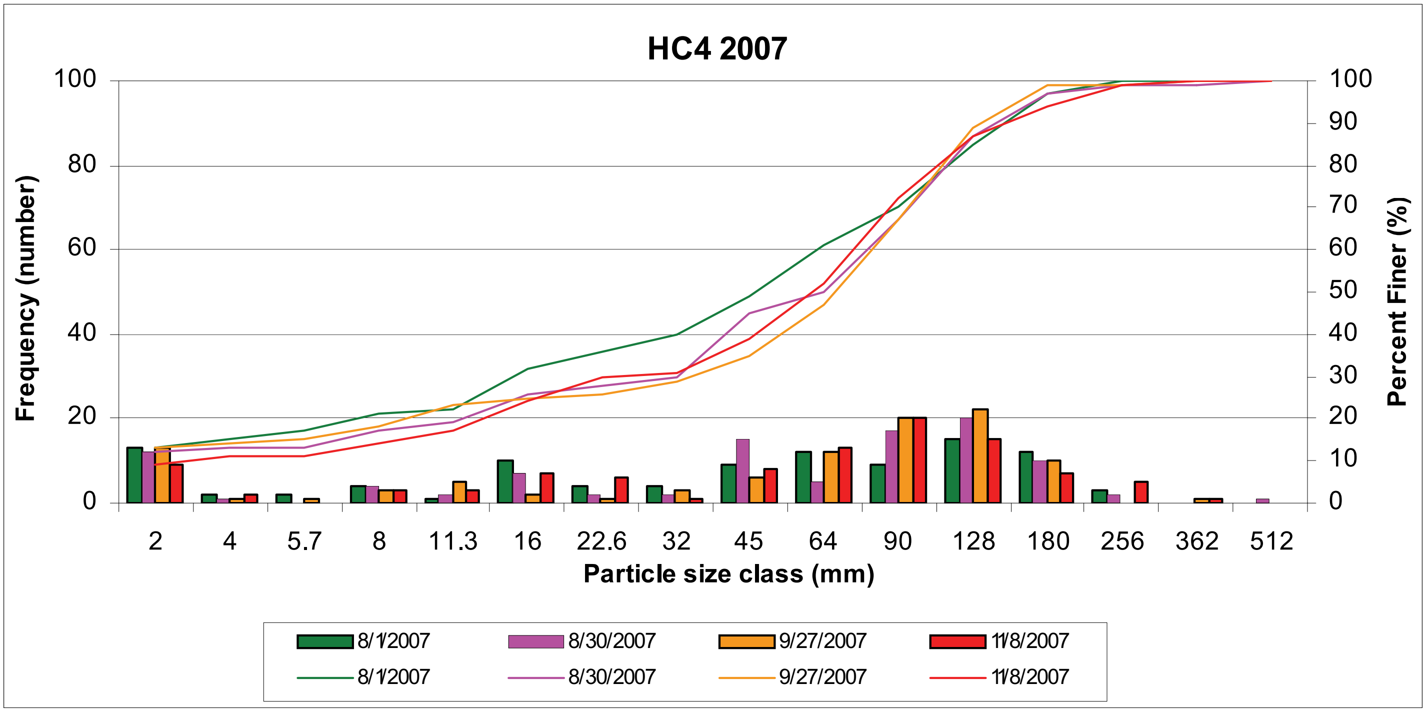
HC1	8/1/2007	8/1/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	40	40	40	40	38	38	40	40
4	1	41	0	40	4	42	0	40
5.7	0	41	0	40	0	42	1	41
8	1	42	2	42	1	43	1	42
11.3	1	43	1	43	1	44	0	42
16	0	43	2	45	4	48	2	44
22.6	2	45	3	48	2	50	2	46
32	4	49	5	53	6	56	4	50
45	2	51	6	59	2	58	5	55
64	4	55	4	63	5	63	2	57
90	8	63	12	75	13	76	10	67
128	14	77	14	89	21	97	18	85
180	17	94	10	99	3	100	11	96
256	6	100	1	100	0	100	4	100
362	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100



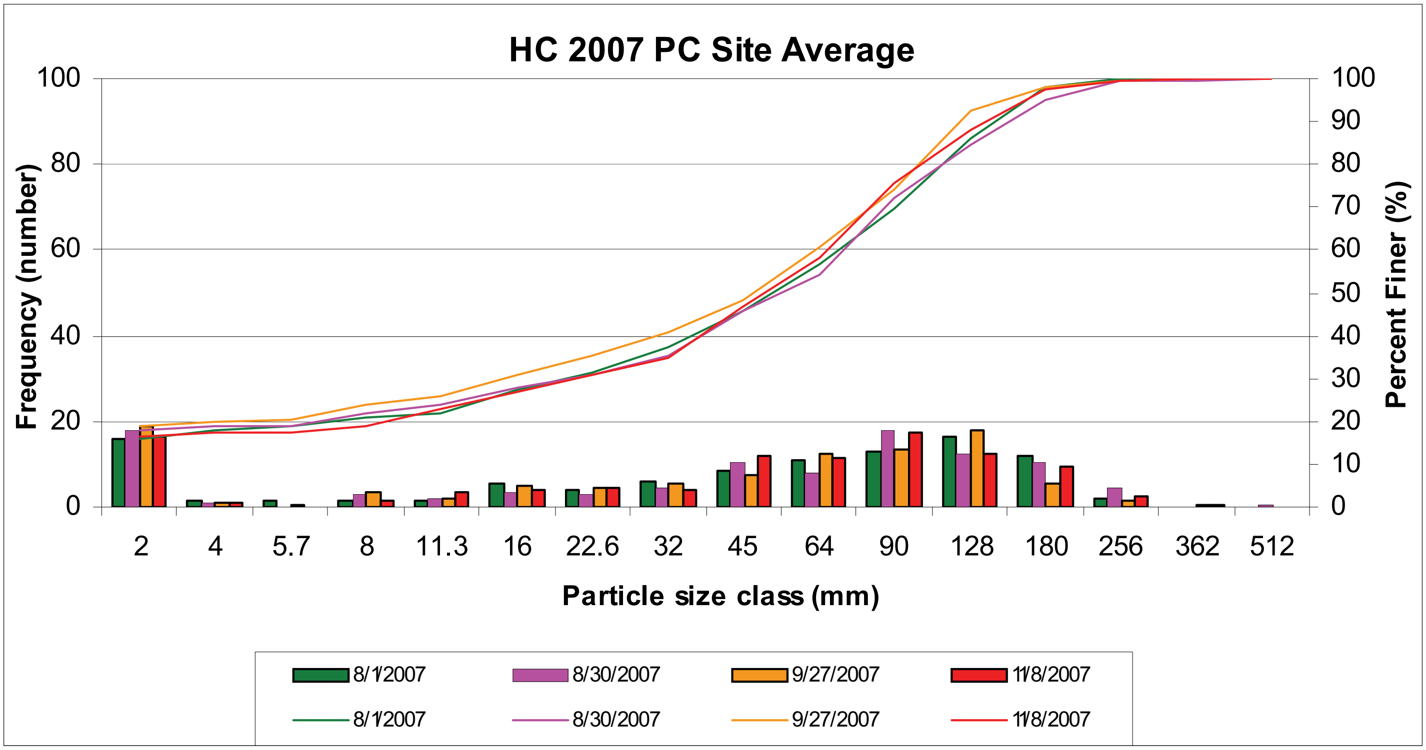
HC2	8/1/2007	8/1/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	19	19	29	29	24	24	25	25
4	3	22	1	30	2	26	1	26
5.7	2	24	0	30	0	26	0	26
8	1	25	3	33	5	31	1	27
11.3	2	27	4	37	0	31	6	33
16	5	32	3	40	8	39	4	37
22.6	8	40	3	43	6	45	4	41
32	10	50	7	50	9	54	7	48
45	13	63	6	56	8	62	16	64
64	9	72	10	66	17	79	13	77
90	12	84	15	81	6	85	9	86
128	8	92	5	86	12	97	10	96
180	7	99	10	96	3	100	4	100
256	1	100	4	100	0	100	0	100
362	0	100	0	100	0	100	0	100
512	0	100	0	100	0	100	0	100



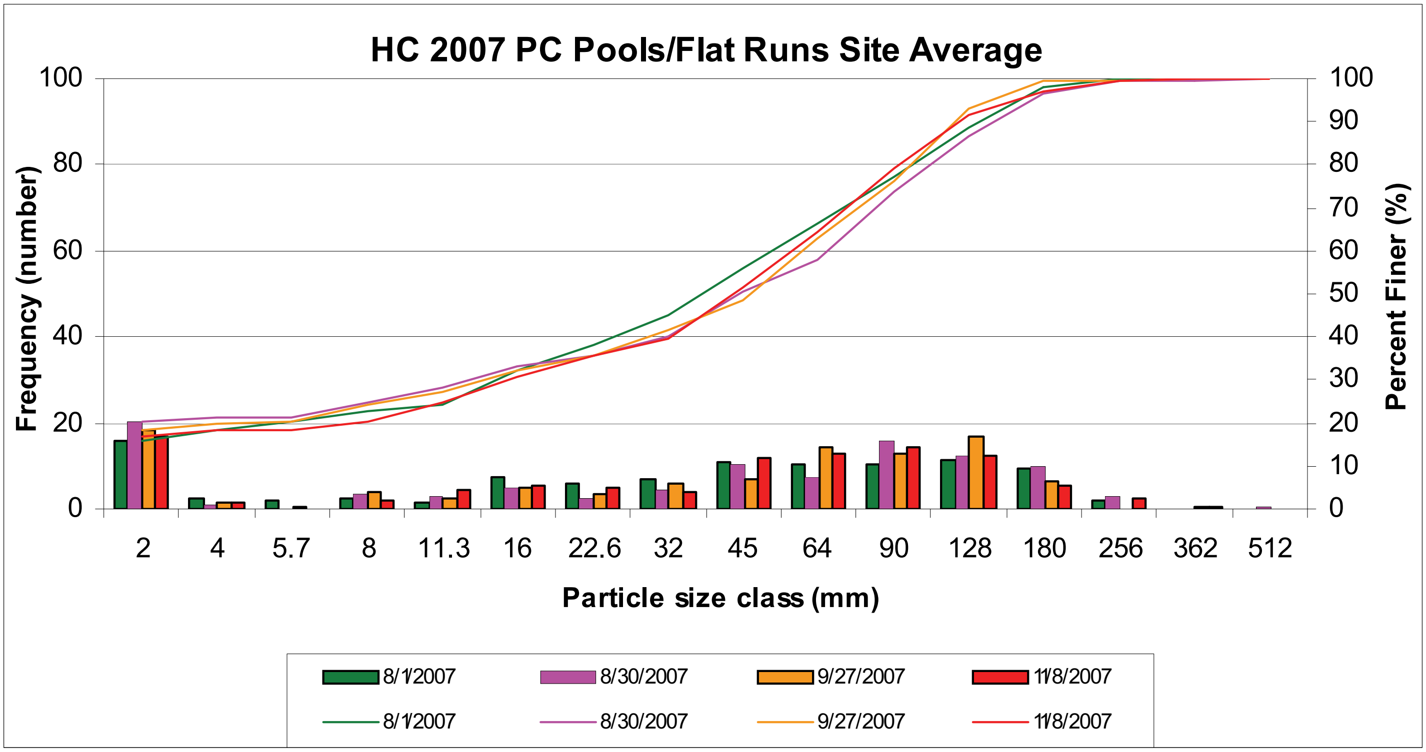
HC3	8/1/2007	8/1/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	16	16	13	13	20	20	15	15
4	0	16	1	14	0	20	0	15
5.7	0	16	0	14	0	20	0	15
8	0	16	2	16	2	22	1	16
11.3	1	17	0	16	1	23	2	18
16	1	18	1	17	5	28	1	19
22.6	0	18	4	21	7	35	3	22
32	4	22	5	26	5	40	4	26
45	3	25	11	37	8	48	12	38
64	12	37	9	46	8	56	8	46
90	18	55	22	68	15	71	23	69
128	26	81	12	80	20	91	12	81
180	17	98	12	92	4	95	17	98
256	2	100	8	100	4	99	2	100
362	0	100	0	100	1	100	0	100
512	0	100	0	100	0	100	0	100



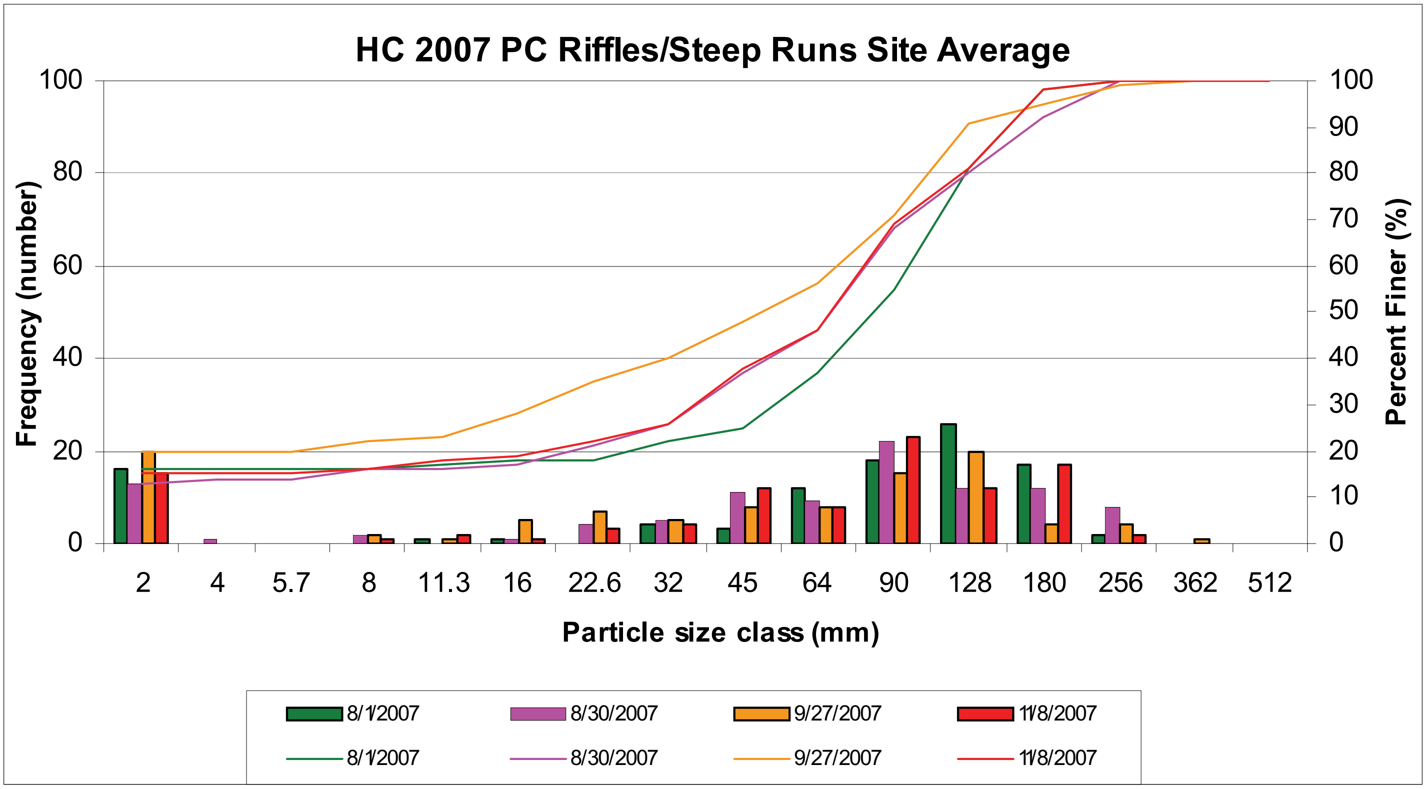
HC4	8/1/2007	8/1/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	13	13	12	12	13	13	9	9
4	2	15	1	13	1	14	2	11
5.7	2	17	0	13	1	15	0	11
8	4	21	4	17	3	18	3	14
11.3	1	22	2	19	5	23	3	17
16	10	32	7	26	2	25	7	24
22.6	4	36	2	28	1	26	6	30
32	4	40	2	30	3	29	1	31
45	9	49	15	45	6	35	8	39
64	12	61	5	50	12	47	13	52
90	9	70	17	67	20	67	20	72
128	15	85	20	87	22	89	15	87
180	12	97	10	97	10	99	7	94
256	3	100	2	99	0	99	5	99
362	0	100	0	99	1	100	1	100
512	0	100	1	100	0	100	0	100



Average HC	8/1/2007	8/1/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	16.00	16.00	18.00	18.00	19.00	19.00	16.33	16.33
4	1.67	17.67	1.00	19.00	1.00	20.00	1.00	17.33
5.7	1.33	19.00	0.00	19.00	0.33	20.33	0.00	17.33
8	1.67	20.67	3.00	22.00	3.33	23.67	1.67	19.00
11.3	1.33	22.00	2.00	24.00	2.00	25.67	3.67	22.67
16	5.33	27.33	3.67	27.67	5.00	30.67	4.00	26.67
22.6	4.00	31.33	3.00	30.67	4.67	35.33	4.33	31.00
32	6.00	37.33	4.67	35.33	5.67	41.00	4.00	35.00
45	8.33	45.67	10.67	46.00	7.33	48.33	12.00	47.00
64	11.00	56.67	8.00	54.00	12.33	60.67	11.33	58.33
90	13.00	69.67	18.00	72.00	13.67	74.33	17.33	75.67
128	16.33	86.00	12.33	84.33	18.00	92.33	12.33	88.00
180	12.00	98.00	10.67	95.00	5.67	98.00	9.33	97.33
256	2.00	100.00	4.67	99.67	1.33	99.33	2.33	99.67
362	0.00	100.00	0.00	99.67	0.67	100.00	0.33	100.00
512	0.00	100.00	0.33	100.00	0.00	100.00	0.00	100.00



Average Pools/Flat Runs HC	8/1/2007	8/1/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	16.00	16.00	20.50	20.50	18.50	18.50	17.00	17.00
4	2.50	18.50	1.00	21.50	1.50	20.00	1.50	18.50
5.7	2.00	20.50	0.00	21.50	0.50	20.50	0.00	18.50
8	2.50	23.00	3.50	25.00	4.00	24.50	2.00	20.50
11.3	1.50	24.50	3.00	28.00	2.50	27.00	4.50	25.00
16	7.50	32.00	5.00	33.00	5.00	32.00	5.50	30.50
22.6	6.00	38.00	2.50	35.50	3.50	35.50	5.00	35.50
32	7.00	45.00	4.50	40.00	6.00	41.50	4.00	39.50
45	11.00	56.00	10.50	50.50	7.00	48.50	12.00	51.50
64	10.50	66.50	7.50	58.00	14.50	63.00	13.00	64.50
90	10.50	77.00	16.00	74.00	13.00	76.00	14.50	79.00
128	11.50	88.50	12.50	86.50	17.00	93.00	12.50	91.50
180	9.50	98.00	10.00	96.50	6.50	99.50	5.50	97.00
256	2.00	100.00	3.00	99.50	0.00	99.50	2.50	99.50
362	0.00	100.00	0.00	99.50	0.50	100.00	0.50	100.00
512	0.00	100.00	0.50	100.00	0.00	100.00	0.00	100.00



Average Riffles/ Steep Runs HC	8/1/2007	8/1/2007	8/30/2007	8/30/2007	9/27/2007	9/27/2007	11/8/2007	11/8/2007
Size of particles (mm)	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**	**Fraction in class**	**Percent finer**
2	16.00	16.00	13.00	13.00	20.00	20.00	15.00	15.00
4	0.00	16.00	1.00	14.00	0.00	20.00	0.00	15.00
5.7	0.00	16.00	0.00	14.00	0.00	20.00	0.00	15.00
8	0.00	16.00	2.00	16.00	2.00	22.00	1.00	16.00
11.3	1.00	17.00	0.00	16.00	1.00	23.00	2.00	18.00
16	1.00	18.00	1.00	17.00	5.00	28.00	1.00	19.00
22.6	0.00	18.00	4.00	21.00	7.00	35.00	3.00	22.00
32	4.00	22.00	5.00	26.00	5.00	40.00	4.00	26.00
45	3.00	25.00	11.00	37.00	8.00	48.00	12.00	38.00
64	12.00	37.00	9.00	46.00	8.00	56.00	8.00	46.00
90	18.00	55.00	22.00	68.00	15.00	71.00	23.00	69.00
128	26.00	81.00	12.00	80.00	20.00	91.00	12.00	81.00
180	17.00	98.00	12.00	92.00	4.00	95.00	17.00	98.00
256	2.00	100.00	8.00	100.00	4.00	99.00	2.00	100.00
362	0.00	100.00	0.00	100.00	1.00	100.00	0.00	100.00
512	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00

APPENDIX 5.1: MACROINVERTEBRATE TAXA AND MATRIX RESULTS

09-13-2007	09-13-2007	09-13-2007	09-13-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-13-2007
6.25	**8.33**	**25.00**	**10.42**	**41.67**	**87.72**	**20.83**	**2.38**	**37.45**
Hess	**Hess**	**Hess**	**D-Frame**	**Hess**	**Hess**	**Hess**	**D-Frame**	**Hess**
09:05	**09:05**	**09:05**	**09:05**	**15:30**	**15:30**	**15:30**	**15:30**	**10:25**
998-1	**998-2**	**998-3**	**998-4**	**998-5**	**998-6**	**998-7**	**998-8**	**998-9**
0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0
35	36	23	33	38	36	47	69	29
0	0	0	0	20	0	14	12	0
0	0	0	0	1	1	3	7	0
1	0	0	0	9	0	0	23	4
0	0	0	0	0	21	17	0	0
3	2	3	0	0	0	0	0	0
0	0	1	0	0	3	2	2	0
0	0	0	0	0	0	0	0	1
0	0	0	0	0	7	9	5	3
0	0	0	0	0	0	0	0	0
0	0	2	0	3	0	0	6	0
2	2	0	4	0	0	0	0	0
3	6	8	13	2	21	26	6	0
1	0	0	2	0	0	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	8	2	0	0	0
0	0	0	0	0	0	0	0	0
21	21	11	54	210	202	162	183	46
0	0	0	0	1	5	3	8	0
103	68	84	47	178	95	184	76	130
1	5	3	4	3	8	4	2	0
0	1	1	4	0	0	0	0	0
1	0	2	0	7	9	3	4	4
0	0	0	0	0	0	0	0	0
0	1	1	0	3	0	1	4	1
0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	0	1	3	2	4	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	1	1	4	0	0
344	286	412	128	4	1	2	2	184
0	0	0	0	3	0	0	1	0
0	2	2	0	0	0	0	0	1
0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0
12	33	28	151	0	0	0	3	32
0	8	9	16	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	1	11	0	0	1	1	0
9	8	7	2	7	107	53	77	24
0	0	0	0	0	0	0	0	0
3	12	3	26	0	0	0	2	3
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	4	0
0	0	0	0	0	1	0	0	0
0	0	0	0	3	3	1	3	0
1	8	7	14	1	0	1	5	4
0	0	0	0	6	6	1	10	0
0	0	0	0	0	0	0	0	0
2	10	2	0	7	5	4	23	32
1	0	0	0	2	2	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	2	0	0	0	0	0
0	0	0	0	0	2	0	1	0
1	2	1	8	1	3	1	1	2
0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

03	04	01	02	03	04	01	02	03	04	01	02	03	04
07	09-13-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007	09-12-2007
00	4.17	28.09	100.00	31.25	13.55	17.21	7.82	18.76	7.29	8.33	10.93	2.08	1.36
ss	D-Frame	Hess	Hess	Hess	D-Frame	Hess	Hess	Hess	D-Frame	Hess	Hess	Hess	D-Frame
40	11:40	16:30	16:30	16:30	16:30	18:40	18:40	18:40	18:40	12:40	12:40	12:40	12:40
15	998-16	998-17	998-18	998-19	998-20	998-21	998-22	998-23	998-24	998-25	998-26	998-27	998-28
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	10	0
01	82	45	44	26	37	18	20	19	25	6	9	0	11
0	0	9	7	8	0	0	0	0	0	16	8	1	19
0	0	2	1	1	1	0	0	0	0	3	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	58	60	34	27	0	0	0	0	0	0	0	0
1	0	0	1	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	5	0	0	0	0	0	0	0	0	0	0	0	0
0	0	6	5	5	5	0	0	0	0	2	0	6	0
0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	4	2	0	0	0	0	0	0	0	0	0
1	0	0	2	0	0	0	0	0	0	0	0	0	3
3	0	7	18	8	10	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	3
0	0	0	1	0	0	0	0	0	0	0	0	0	0
34	99	280	228	243	248	1	0	0	1	23	6	2	19
0	0	1	0	3	2	0	0	0	0	0	0	0	0
34	46	57	54	28	38	489	495	542	503	178	201	182	326
1	1	5	3	4	1	0	0	0	0	1	4	4	5
0	0	1	1	4	4	0	0	0	0	0	0	0	0
1	4	3	1	4	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	1	2	1	0	0	0	1	3	1	1	1
0	0	0	1	0	0	0	0	5	1	0	0	0	0
1	2	1	0	0	0	0	1	0	3	0	0	0	0
0	0	0	0	0	3	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0	1
0	0	0	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	3	0
00	89	0	0	0	2	9	10	8	9	0	0	0	1
0	0	1	0	0	5	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	1	2
18	103	7	0	1	4	0	0	0	0	0	0	0	3
0	0	0	0	0	0	0	0	0	0	1	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	2	0	2	4	0	0	0	0	0	0	0	0
38	36	14	47	73	27	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0	0	0	0	0
4	7	4	0	5	4	0	0	0	0	1	0	0	1
0	0	0	0	0	0	0	0	0	0	4	3	3	15
0	0	1	1	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	1	0	0	3
0	0	0	0	0	0	0	0	0	0	52	11	2	27
0	0	0	0	0	0	0	0	0	0	0	0	1	0
0	1	3	2	0	0	0	0	0	0	0	0	0	0
0	0	0	0	4	1	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	18	22	5	8	94	0	0	0	0	0	0	0	0
0	1	0	0	1	6	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	5	9	6	1	0	43	50	0	18	196	370	298	138
0	1	1	4	0	1	0	0	0	0	0	0	0	0
1	2	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	21	1	2	1	5	0	0	0	2	0	1	0	7
0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	1	0	0	1
0	0	0	0	0	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0	0
2	0	16	1	60	0	1	0	1	0	8	0	0	0

mond Fork Campground	Diamond Fork Campground	Diamond Fork Campground	Diamond Fork Campground	Diamond Fork Guard Station	Diamond Fork Guard S
C	**DFC**	**DFC**	**DFC**	**DFGS**	**DFGS**
	02	**03**	**04**	**01**	**02**
13-2007	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-12-2007**	**09-12-2007**
5	**8.33**	**25.00**	**10.42**	**41.67**	**87.72**
ss	**Hess**	**Hess**	**D-Frame**	**Hess**	**Hess**
05	**09:05**	**09:05**	**09:05**	**15:30**	**15:30**
-1	**998-2**	**998-3**	**998-4**	**998-5**	**998-6**
4.00	6156.00	2460.00	5001.60	1274.40	624.72
4.00	1284.00	340.00	2496.00	201.60	228.00
ulium sp.	Simulium sp.	Simulium sp.	Brachycentrus occidentalis	Optioservus sp.	Optioservus sp.
4.00	3432.00	1648.00	1449.60	504.00	230.28
ronomidae	Chironomidae	Chironomidae	Simulium sp.	Chironomidae	Hydropsyche sp.
8.00	816.00	336.00	1228.80	427.20	121.98
etis tricaudatus	Baetis tricaudatus	Brachycentrus occidentalis	Optioservus sp.	Baetis tricaudatus	Chironomidae
.00	432.00	112.00	518.40	91.20	108.30
24	55.75	66.99	28.98	39.55	36.86
17	69.01	80.65	53.55	73.07	56.39
60	76.02	85.20	63.92	80.23	73.72
00	19.00	22.00	19.00	29.00	25.00
0	8.00	10.00	11.00	9.00	9.00
0	2.00	2.00	1.00	4.00	3.00
0	2.00	3.00	3.00	3.00	3.00
0	4.00	5.00	7.00	2.00	3.00
0	1.00	1.00	1.00	1.00	1.00
0	1.00	1.00	0.00	1.00	1.00
00	17.00	20.00	18.00	27.00	23.00
0	0.00	0.00	1.00	0.00	1.00
7	7.41	4.23	6.33	12.81	10.58
0	1.56	1.79	3.65	1.13	5.66
1	11.89	7.80	39.92	1.88	20.26
68	20.86	13.82	49.90	15.82	36.50
6	4.09	1.79	10.36	41.24	38.14
54	70.76	82.11	35.12	37.85	21.35
7	1.95	0.33	0.00	1.32	0.91
3	7.02	3.74	6.33	7.16	6.57
1	6.43	4.55	28.98	0.00	0.00
93	13.26	13.66	9.02	33.52	17.34
0	0.00	0.00	0.00	3.95	0.18
5	1.56	1.14	0.58	1.32	19.53
0	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00
4	1.17	1.30	2.88	0.38	3.83
24	55.75	66.99	24.57	0.75	0.18

mond Fork Campground	Diamond Fork Campground	Diamond Fork Campground	Diamond Fork Campground	Diamond Fork Guard Station	Diamond Fork Guard S
C	**DFC**	**DFC**	**DFC**	**DFGS**	**DFGS**
	02	**03**	**04**	**01**	**02**
13-2007	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-12-2007**	**09-12-2007**
5	**8.33**	**25.00**	**10.42**	**41.67**	**87.72**
ss	**Hess**	**Hess**	**D-Frame**	**Hess**	**Hess**
05	**09:05**	**09:05**	**09:05**	**15:30**	**15:30**
-1	**998-2**	**998-3**	**998-4**	**998-5**	**998-6**
2	1.75	2.11	3.65	4.71	4.93
0	7.60	5.04	18.23	43.50	38.14
9	3.51	1.79	7.87	0.94	3.83
0	0.00	0.00	0.00	0.00	0.00
0	0.19	0.16	0.00	1.32	0.55
0	3.00	3.00	4.00	3.00	3.00
0	4.00	4.00	3.00	9.00	9.00
0	5.00	7.00	5.00	9.00	9.00
0	4.00	5.00	4.00	3.00	2.00
0	2.00	2.00	3.00	2.00	1.00
0	0.00	0.00	0.00	0.00	0.00
0	1.00	1.00	0.00	3.00	1.00
5	0.73	0.58	0.92	0.78	0.87
3	2.42	1.92	3.06	2.61	2.89
7	1.68	1.33	2.12	1.81	2.00
7	2.06	2.69	2.11	3.92	3.73
4	0.57	0.43	0.72	0.54	0.62
6	0.66	0.53	0.83	0.72	0.79
45	99.42	99.35	98.08	96.61	95.26
9	4.74	4.86	3.79	5.09	4.90
41	81.87	83.74	85.60	58.00	70.62
3	4.63	4.76	3.87	4.62	4.86
31	77.97	80.81	76.01	56.31	70.80
00	46.00	46.00	58.00	61.00	48.00
2	2.42	2.09	3.05	2.10	1.92
3	3.59	3.39	4.53	3.60	3.78
53	95.52	96.75	92.90	89.45	88.50
3	3.53	3.00	3.42	2.17	2.52
2	4.70	4.82	3.86	4.08	3.49
2	2.48	2.23	3.54	3.25	3.45
0	3.00	3.00	5.00	6.00	6.00
00	12.00	13.00	14.00	12.00	12.00
41	81.29	83.74	83.30	55.74	71.90
0	5.00	5.00	7.00	5.00	5.00
3	0.29	0.37	0.29	0.65	0.84
11	10.53	9.09	5.26	6.90	4.00
0	1.00	1.00	1.00	3.00	3.00

mond Fork Guard Station	**Motherlode**	**Motherlode**	**Motherlode**	**Motherlode**	**Oxbow**	**Oxbow**	**Oxbow**	**Oxbow**
GS	**MO**	**MO**	**MO**	**MO**	**OX**	**OX**	**OX**	**OX**
	01	**02**	**03**	**04**	**01**	**02**	**03**	**04**
12-2007	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-200**
8	**37.45**	**12.50**	**16.67**	**5.21**	**12.50**	**12.50**	**25.00**	**4.17**
rame	**Hess**	**Hess**	**Hess**	**D-Frame**	**Hess**	**Hess**	**Hess**	**D-Frame**
30	**10:25**	**10:25**	**10:25**	**10:25**	**11:40**	**11:40**	**11:40**	**11:40**
-8	**998-9**	**998-10**	**998-11**	**998-12**	**998-13**	**998-14**	**998-15**	**998-16**
016.00	1348.35	4136.00	3138.00	10060.80	4232.00	4224.00	2396.00	12648.00
32.00	256.32	824.00	582.00	3072.00	1136.00	472.00	672.00	5664.00
tioservus sp.	Simulium sp.	Simulium sp.	Simulium sp.	Simulium sp.	Simulium sp.	Simulium sp.	Simulium sp.	Brachycer
36.00	491.28	2440.00	2070.00	3628.80	2368.00	3256.00	1200.00	2472.00
dropsyche sp.	Chironomidae	Chironomidae	Chironomidae	Optioservus sp.	Baetis tricaudatus	Baetis tricaudatus	Baetis tricaudatus	Optioserv
34.00	347.10	520.00	264.00	1689.60	816.00	256.00	404.00	2376.00
ronomidae	Optioservus sp.	Baetis tricaudatus	Hydropsyche sp.	Brachycentrus occidentalis	Optioservus sp.	Chironomidae	Chironomidae	Simulium
92.00	122.82	296.00	192.00	1420.80	352.00	240.00	336.00	2136.00
39	36.44	58.99	65.97	36.07	55.95	77.08	50.08	19.54
45	62.18	71.57	74.38	52.86	75.24	83.14	66.94	38.33
31	71.29	78.72	80.50	66.98	83.55	88.83	80.97	55.22
00	17.00	20.00	16.00	21.00	15.00	16.00	20.00	22.00
00	7.00	8.00	7.00	10.00	6.00	7.00	9.00	8.00
0	2.00	1.00	1.00	1.00	2.00	1.00	2.00	1.00
0	2.00	3.00	2.00	5.00	1.00	3.00	2.00	1.00
0	3.00	4.00	4.00	4.00	3.00	3.00	5.00	6.00
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00
00	15.00	18.00	15.00	19.00	14.00	14.00	18.00	20.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
44	6.53	7.16	4.78	6.68	19.47	6.06	17.03	15.56
7	0.79	1.16	1.53	2.86	0.57	0.95	0.67	0.95
42	11.68	11.61	12.24	20.99	6.81	4.17	10.35	28.27
33	19.01	19.92	18.55	30.53	26.84	11.17	28.05	44.78
35	9.11	5.42	3.25	16.79	8.32	4.36	5.68	18.79
97	63.37	72.15	74.95	46.76	61.63	83.33	64.61	26.94
0	6.34	0.19	0.00	0.57	0.00	0.19	0.33	0.95
59	5.74	7.16	4.78	6.68	19.28	6.06	16.86	15.56
5	6.34	5.61	4.97	14.12	3.21	1.52	3.01	19.54
37	25.74	12.57	8.41	10.50	5.29	5.68	14.02	8.73
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05	4.75	5.61	6.12	3.63	3.40	2.46	6.34	7.02
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.20	0.00	0.00	0.19	0.00	0.38	0.00	0.95
9	0.00	0.58	1.15	1.91	0.57	0.19	0.50	0.00
6	36.44	58.99	65.97	36.07	55.95	77.08	50.08	16.89

mond Fork Guard Station	Motherlode	Motherlode	Motherlode	Motherlode	Oxbow	Oxbow	Oxbow	Oxbow
GS	**MO**	**MO**	**MO**	**MO**	**OX**	**OX**	**OX**	**OX**
	01	**02**	**03**	**04**	**01**	**02**	**03**	**04**
12-2007	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-200**
8	**37.45**	**12.50**	**16.67**	**5.21**	**12.50**	**12.50**	**25.00**	**4.17**
rame	**Hess**	**Hess**	**Hess**	**D-Frame**	**Hess**	**Hess**	**Hess**	**D-Frame**
30	**10:25**	**10:25**	**10:25**	**10:25**	**11:40**	**11:40**	**11:40**	**11:40**
-8	**998-9**	**998-10**	**998-11**	**998-12**	**998-13**	**998-14**	**998-15**	**998-16**
6	2.57	2.13	2.68	2.29	3.02	1.52	1.50	6.83
59	10.50	6.58	4.02	20.80	8.70	4.92	6.18	22.39
4	0.59	0.77	2.10	4.77	0.76	0.38	1.17	1.33
0	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00
8	0.20	0.19	0.96	0.38	0.00	0.00	0.17	0.38
0	3.00	3.00	3.00	3.00	3.00	3.00	3.00	5.00
0	4.00	4.00	2.00	3.00	3.00	4.00	5.00	4.00
0	5.00	6.00	5.00	7.00	4.00	5.00	5.00	8.00
0	3.00	4.00	3.00	3.00	3.00	2.00	4.00	3.00
0	1.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00
0	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
0	1.00	1.00	1.00	2.00	0.00	0.00	1.00	1.00
9	0.81	0.65	0.60	0.87	0.63	0.43	0.69	0.95
8	2.70	2.16	1.98	2.88	2.09	1.43	2.30	3.15
7	1.87	1.50	1.37	1.99	1.45	0.99	1.59	2.18
9	2.22	2.28	1.86	2.17	1.68	1.80	2.44	2.22
6	0.66	0.50	0.49	0.65	0.54	0.36	0.53	0.71
3	0.78	0.62	0.55	0.80	0.64	0.40	0.69	0.86
72	98.02	98.45	96.94	98.66	97.92	99.81	99.00	94.31
9	5.18	4.89	4.83	4.58	4.74	4.94	4.84	4.36
44	64.16	85.11	87.57	83.59	92.44	92.99	84.31	81.21
3	4.76	4.84	4.82	4.47	4.90	4.94	4.87	4.40
07	62.38	83.17	85.47	77.29	90.74	92.05	82.47	78.56
00	22.00	33.00	33.00	22.00	34.00	33.00	39.00	45.00
7	1.29	1.65	2.06	1.05	2.27	2.06	1.95	2.05
3	3.64	3.52	3.44	3.81	3.63	3.25	3.69	4.35
58	88.91	96.32	96.18	92.94	96.79	98.11	97.83	88.24
2	2.06	1.80	2.88	2.24	2.87	2.75	2.90	2.00
1	4.43	4.54	4.60	4.08	4.62	4.80	4.61	3.68
0	2.66	2.37	2.11	3.18	2.35	1.78	2.61	3.58
0	3.00	3.00	2.00	4.00	2.00	3.00	2.00	4.00
00	9.00	10.00	9.00	11.00	9.00	10.00	12.00	11.00
62	64.16	84.72	87.38	83.78	91.49	93.18	83.47	82.73
0	3.00	2.00	4.00	4.00	3.00	3.00	5.00	4.00
3	2.72	0.10	0.10	0.22	0.05	0.09	0.13	0.19
5	11.76	10.00	6.25	9.52	13.33	12.50	10.00	9.09
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

wmill Canyon	Sawmill Canyon	Sawmill Canyon	Sulphur Impact	Sulphur Impact	Sulphur Impact	Sulphur Impact	Sixth Water	Sixth Water	Sixth
	SC	**SC**	**SI**	**SI**	**SI**	**SI**	**SX**	**SX**	**SX**
	03	**04**	**01**	**02**	**03**	**04**	**01**	**02**	**03**
12-2007	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12**
.00	**31.25**	**13.55**	**17.21**	**7.82**	**18.76**	**7.29**	**8.33**	**10.93**	**2.08**
ss	**Hess**	**D-Frame**	**Hess**	**Hess**	**Hess**	**D-Frame**	**Hess**	**Hess**	**Hess**
30	**16:30**	**16:30**	**18:40**	**18:40**	**18:40**	**18:40**	**12:40**	**12:40**	**12:40**
-18	**998-19**	**998-20**	**998-21**	**998-22**	**998-23**	**998-24**	**998-25**	**998-26**	**998-2**
.00	1692.80	3926.16	3259.41	7361.28	3064.75	7746.15	6024.00	5663.85	2486
.00	544.00	892.98	104.58	255.60	101.27	342.75	1032.00	283.65	1248
ioservus sp.	Optioservus sp.	Optioservus sp.	Chironomidae	Chironomidae	Chironomidae	Chironomidae	Oligochaeta	Oligochaeta	Oligo
.00	777.60	1830.24	2841.09	6326.10	2888.86	6896.13	2352.00	3385.50	1430
aleptophlebia sp.	Hydropsyche sp.	Physa sp.	Oligochaeta	Oligochaeta	Baetis tricaudatus	Baetis tricaudatus	Chironomidae	Chironomidae	Chiro
00	233.60	693.72	249.83	639.00	101.27	342.75	2136.00	1839.15	8736
ronomidae	Nematoda	Chironomidae	Baetis tricaudatus	Baetis tricaudatus	Simulium sp.	Oligochaeta	Oligophlebodes sp.	Oligophlebodes sp.	Baeti
00	192.00	280.44	104.58	255.60	42.64	246.78	624.00	100.65	480.0
42	45.94	46.62	87.17	85.94	94.26	89.03	39.04	59.77	57.53
37	59.74	64.29	94.83	94.62	97.57	93.45	74.50	92.25	92.66
13	71.08	71.43	98.04	98.09	98.96	96.64	84.86	94.02	94.59
00	25.00	25.00	6.00	5.00	5.00	11.00	17.00	13.00	17.00
00	13.00	11.00	1.00	1.00	1.00	1.00	9.00	4.00	9.00
0	5.00	3.00	1.00	1.00	1.00	1.00	3.00	2.00	2.00
0	3.00	2.00	0.00	0.00	0.00	0.00	1.00	0.00	2.00
0	5.00	6.00	0.00	0.00	0.00	0.00	5.00	2.00	5.00
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
00	23.00	24.00	4.00	3.00	4.00	9.00	15.00	11.00	15.00
0	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
51	13.23	12.22	3.21	3.47	3.30	4.42	4.98	2.75	2.12
3	2.84	2.82	0.00	0.00	0.00	0.00	0.40	0.00	1.35
16	16.07	7.71	0.00	0.00	0.00	0.00	11.75	2.26	1.54
65	32.14	22.74	3.21	3.47	3.30	4.42	17.13	5.01	5.02
62	46.50	46.99	0.18	0.00	0.00	0.18	4.58	0.97	0.39
15	7.94	10.15	88.77	87.85	96.52	91.68	36.25	33.44	36.87
0	0.19	0.00	7.66	8.68	0.00	3.19	39.04	59.77	57.53
6	4.91	6.95	3.21	3.47	3.30	4.42	1.20	1.45	1.93
0	0.19	0.75	0.00	0.00	0.00	0.00	0.80	0.48	0.77
76	5.29	7.14	87.17	85.94	94.26	89.03	35.46	32.47	35.14
9	1.70	0.19	0.00	0.00	0.00	0.00	3.78	1.29	0.19
6	13.80	5.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1.51	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.38	1.60	1.74	1.39	1.59	0.00	0.00	0.00

wmill Canyon	Sawmill Canyon	Sawmill Canyon	Sulphur Impact	Sulphur Impact	Sulphur Impact	Sulphur Impact	Sixth Water	Sixth Water	Sixth
	SC	**SC**	**SI**	**SI**	**SI**	**SI**	**SX**	**SX**	**SX**
	03	**04**	**01**	**02**	**03**	**04**	**01**	**02**	**03**
12-2007	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12-2007**	**09-12**
.00	**31.25**	**13.55**	**17.21**	**7.82**	**18.76**	**7.29**	**8.33**	**10.93**	**2.08**
ss	**Hess**	**D-Frame**	**Hess**	**Hess**	**Hess**	**D-Frame**	**Hess**	**Hess**	**Hess**
30	**16:30**	**16:30**	**18:40**	**18:40**	**18:40**	**18:40**	**12:40**	**12:40**	**12:40**
-18	**998-19**	**998-20**	**998-21**	**998-22**	**998-23**	**998-24**	**998-25**	**998-26**	**998-2**
3	14.18	2.63	0.18	0.17	1.04	1.42	2.79	0.97	0.77
00	50.47	65.98	0.18	0.00	0.00	0.18	18.73	4.04	2.12
9	2.46	3.57	0.00	0.00	0.00	0.00	1.00	0.48	0.77
0	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.38	0.19	0.00	0.00	0.00	0.18	0.60	0.16	0.19
0	3.00	4.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00
0	7.00	7.00	3.00	3.00	2.00	3.00	7.00	4.00	5.00
00	6.00	5.00	1.00	1.00	2.00	5.00	2.00	4.00	4.00
0	6.00	4.00	1.00	0.00	0.00	1.00	5.00	3.00	4.00
0	2.00	3.00	0.00	0.00	0.00	0.00	2.00	1.00	2.00
0	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00
3	0.85	0.82	0.22	0.23	0.12	0.23	0.68	0.45	0.46
7	2.81	2.74	0.74	0.78	0.40	0.75	2.27	1.49	1.51
2	1.95	1.90	0.52	0.54	0.28	0.52	1.58	1.03	1.05
3	3.23	2.90	0.62	0.45	0.50	1.12	1.84	1.39	1.58
3	0.60	0.59	0.29	0.34	0.17	0.22	0.56	0.40	0.37
5	0.75	0.74	0.23	0.25	0.11	0.20	0.71	0.54	0.54
41	97.73	97.74	100.00	100.00	100.00	99.12	99.00	99.68	98.46
4	4.68	5.29	6.07	6.09	5.89	5.95	5.95	6.97	6.99
71	83.55	67.11	5.17	5.38	5.74	6.90	22.71	6.79	3.67
7	4.78	4.79	5.00	4.97	4.55	4.85	2.39	2.83	2.95
08	75.99	68.23	4.99	5.38	5.57	6.90	21.12	6.62	3.67
00	60.00	61.00	11.00	13.00	10.00	18.00	43.00	33.00	53.00
7	2.40	2.44	1.83	2.60	2.00	1.64	2.53	2.54	3.12
4	3.60	3.38	4.29	4.35	4.03	4.41	6.29	5.93	5.26
37	76.56	71.80	92.16	91.15	98.96	95.22	56.77	39.10	38.61
5	2.20	2.20	3.00	3.00	3.00	1.64	3.24	2.85	3.24
7	3.21	3.41	5.00	5.00	5.00	5.00	5.60	5.13	5.04
3	3.56	3.49	0.90	0.90	0.74	1.01	2.59	1.56	1.78
0	6.00	7.00	1.00	0.00	0.00	1.00	3.00	2.00	3.00
00	14.00	14.00	3.00	2.00	2.00	3.00	10.00	6.00	11.00
11	73.16	82.14	4.99	5.21	4.70	6.19	21.71	6.62	6.18
0	7.00	6.00	0.00	0.00	0.00	0.00	6.00	3.00	7.00
5	0.54	2.48	1.32	0.68	0.00	0.23	3.29	6.55	1.22
1	8.00	8.00	16.67	20.00	0.00	9.09	5.88	7.69	5.88
0	2.00	2.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00

Stream	Diamond Fork Campground	Diamond Fork Guard Station	Motherlode	Oxbow	Sawmill Canyon	Sulphur Impact	Sixth Water
Site	**DFC**	**DFGS**	**MO**	**OX**	**SC**	**SI**	**SX**
Rep	**01-04 Pooled**	**01-04 Pooled**	**01-04 Pooled**	**01-04 Pooled**	**01-04 Pooled**	**01-04 Pooled**	**01-04 Pooled**
Date	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-13-2007**	**09-12-2007**	**09-12-0207**	**09-12-2007**
Subsampled	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
sts Sample ID	**998-29**	**998-30**	**998-31**	**998-32**	**998-33**	**998-34**	**998-35**
	0	1	0	0	0	0	0
	0	0	0	0	0	0	10
s	127	190	126	317	152	82	26
	0	46	0	0	24	0	44
	0	12	0	0	5	0	3
	1	32	4	0	0	0	0
sp.	0	38	0	0	179	0	0
	8	0	0	2	2	0	0
	1	7	1	0	0	0	0
osa	0	0	2	7	0	0	0
	0	21	5	0	21	0	8
ifica	0	0	0	0	1	0	0
	2	9	3	0	6	0	0
	8	0	3	3	2	0	3
	30	55	19	7	43	0	0
ornica	3	0	0	0	0	0	0
	0	1	0	0	0	0	0
	0	0	0	0	0	0	1
	0	0	1	0	0	0	0
da	0	10	0	0	0	0	3
	0	0	0	0	1	0	0
	107	757	179	200	999	2	50
	0	17	0	0	6	0	0
	302	533	294	188	177	2,029	887
	13	17	1	5	13	0	14
	6	0	0	0	10	0	0
sp.	3	23	7	5	8	1	0
	0	0	0	0	0	0	1
ela sp.	2	8	2	0	4	1	6
	0	0	0	0	1	6	0
.	0	1	2	5	1	4	0
	0	10	0	0	3	0	0
	0	0	0	0	0	0	2
	0	0	0	0	0	0	1
oscopus sp.	0	6	0	0	0	0	3
	1,170	9	1,023	1,092	2	36	1
	0	4	0	0	6	0	2
	4	0	1	0	0	0	0
dis	1	0	0	1	0	0	0
	0	1	0	0	0	0	0
nericanus	0	0	0	0	1	0	3
cidentalis	224	3	161	146	12	0	3
	33	0	1	0	0	0	1
	0	0	0	1	0	0	0
	12	2	3	1	8	0	0
	26	244	104	105	161	0	0

Stream	Diamond Fork Campground	Diamond Fork Guard Station	Motherlode	Oxbow	Sawmill Canyon	Sulphur Impact	Sixth Water
Site	DFC	DFGS	MO	OX	SC	SI	SX
Rep	01-04 Pooled	01-04 Pooled	01-04 Pooled	01-04 Pooled	01-04 Pooled	01-04 Pooled	01-04 Pooled
Date	09-13-2007	09-13-2007	09-13-2007	09-13-2007	09-12-2007	09-12-0207	09-12-2007
Subsampled	100.00	100.00	100.00	100.00	100.00	100.00	100.00
sts Sample ID	998-29	998-30	998-31	998-32	998-33	998-34	998-35
p.	0	0	0	0	0	0	92
nea gr.	0	0	0	0	0	0	1
radensis gr.	1	4	0	1	5	0	0
	0	1	0	0	5	0	1
	0	10	0	0	0	0	0
	30	7	29	23	129	0	0
	0	23	0	1	7	0	0
	0	0	0	1	0	0	0
	14	39	36	8	16	111	1,002
	1	4	3	2	6	0	0
	0	1	7	3	0	0	0
	2	0	0	1	0	1	0
	0	3	0	0	0	0	0
	12	6	17	36	9	2	8
	0	1	0	1	0	0	0
	0	0	0	0	0	0	2
	0	0	0	0	1	0	0
	0	0	0	0	0	0	1
	6	12	11	7	77	2	8
	0	3	0	0	0	0	10
	0	1	0	0	0	0	3
TOTAL	2,193	2,174	2,069	2,183	2,119	2,277	2,231

ures							
ce	2193.00	2174.00	2069.00	2183.00	2119.00	2277.00	2
	521.00	679.00	456.00	605.00	643.00	82.00	2
ures							
	Simulium sp.	Optioservus sp.	Simulium sp.	Simulium sp.	Optioservus sp.	Chironomidae	C
ce	1170.00	757.00	1023.00	1092.00	999.00	2029.00	1
n	Chironomidae	Chironomidae	Chironomidae	Baetis tricaudatus	Paraleptophlebia sp.	Oligochaeta	C
dance	302.00	533.00	294.00	317.00	179.00	111.00	8
n	Brachycentrus occidentalis	Hydropsyche sp.	Optioservus sp.	Optioservus sp.	Chironomidae	Baetis tricaudatus	C
dance	224.00	244.00	179.00	200.00	177.00	82.00	9
	53.35	34.82	49.44	50.02	47.14	89.11	4
.	67.12	59.34	63.65	64.54	55.59	93.98	8
.	77.34	70.56	72.31	73.71	63.95	97.58	8
s							
	29.00	42.00	28.00	29.00	39.00	12.00	3
	15.00	19.00	13.00	13.00	19.00	1.00	1
hness	3.00	6.00	2.00	2.00	5.00	1.00	4
s	5.00	5.00	6.00	3.00	5.00	0.00	3
ss	7.00	8.00	5.00	8.00	9.00	0.00	9
hness	1.00	1.00	1.00	1.00	1.00	1.00	1
ss	1.00	1.00	1.00	1.00	1.00	1.00	1
g. Richness	27.00	40.00	26.00	27.00	37.00	10.00	3
ess	1.00	2.00	0.00	1.00	2.00	0.00	2
osition							
	6.20	14.67	6.28	14.61	17.08	3.60	3
	2.01	4.28	1.59	0.78	3.45	0.00	0
	15.55	12.28	14.16	12.32	9.82	0.00	5
	23.76	31.23	22.04	27.71	30.34	3.60	1
	4.88	36.06	8.65	9.16	47.48	0.09	2
	68.40	28.10	64.28	59.32	10.62	91.22	4
	0.64	1.79	1.74	0.37	0.76	4.87	4
	5.79	8.74	6.09	14.52	7.17	3.60	1
	10.21	0.18	7.78	6.69	0.61	0.00	1
	13.77	24.52	14.21	8.61	8.35	89.11	3
	0.00	2.67	0.00	0.00	1.37	0.00	2
	1.23	11.22	5.03	4.86	7.60	0.00	0
	0.00	0.00	0.00	0.00	0.00	0.00	0
	0.00	0.00	0.10	0.32	0.05	0.00	0
	1.50	2.53	0.92	0.32	2.03	0.00	0
	53.35	0.41	49.44	50.02	0.09	1.58	0
Composition							
	64.80	12.88	62.25	61.61	8.64	1.58	0
	20.84	41.17	22.28	23.77	25.96	97.58	8
	2.10	3.96	2.42	3.16	6.32	0.70	1
	8.66	38.32	10.49	10.40	55.83	0.09	8
	3.51	2.81	2.08	0.92	2.93	0.00	1
es	0.00	0.00	0.05	0.00	0.14	0.00	0
	0.09	0.87	0.43	0.14	0.19	0.04	0
	4.00	5.00	3.00	5.00	5.00	1.00	3
	5.00	11.00	5.00	5.00	9.00	3.00	1
	11.00	15.00	10.00	11.00	13.00	6.00	1
	5.00	5.00	5.00	5.00	6.00	1.00	5
	3.00	3.00	2.00	2.00	3.00	0.00	4
ichness	0.00	0.00	1.00	0.00	2.00	0.00	0
	1.00	3.00	2.00	1.00	1.00	1.00	1
s Measures							
' (log 10)	0.75	0.93	0.78	0.74	0.89	0.21	0
' (log 2)	2.49	3.08	2.58	2.47	2.95	0.71	2
' (log e)	1.72	2.14	1.79	1.71	2.04	0.49	1
s	3.64	5.34	3.54	3.64	4.96	1.42	4
	0.51	0.57	0.54	0.51	0.56	0.20	0
eneity	0.68	0.80	0.72	0.71	0.75	0.20	0
ue	99.09	96.46	98.02	97.80	97.73	99.78	9
lex	4.61	4.94	4.87	4.73	4.80	6.00	6
ue	82.67	64.31	80.23	87.63	73.38	5.80	1
dex	4.54	4.70	4.72	4.79	4.77	4.83	2
lue	78.39	63.06	77.19	85.85	74.99	5.71	1
c Index	64.00	82.00	39.00	51.00	99.00	18.00	8
	2.21	1.95	1.39	1.76	2.54	1.50	2
erage	3.68	3.83	3.60	3.70	3.44	4.28	5
lue	95.99	88.50	93.62	95.33	77.06	94.38	5
- average	3.00	2.19	2.32	2.45	2.54	1.50	2
erage	4.57	3.84	4.41	4.45	3.45	5.00	5

DFGS	**MO**	**OX**	**SC**	**SX**	**SI**	**DFC**	**DFC**	**DFC**	**DFGS**	**DFGS**	**DFGS**	**MO**	**MO**	**MO**	**OX**	**OX**
04	**04**	**04**	**04**	**04**	**04**	**01**	**02**	**03**	**01**	**02**	**03**	**01**	**02**	**03**	**01**	**02**
04-09-2007	**04-10-2007**	**04-10-2007**	**04-09-2007**	**04-10-2007**	**04-09-2007**	**04-10-2007**	**04-10-2007**	**04-10-2007**	**04-09-2007**	**04-09-2007**	**04-09-2007**	**04-10-2007**	**04-10-2007**	**04-10-2007**	**04-10-2007**	**04-10-2007**
15.63	**14.58**	**20.83**	**5.21**	**12.50**	**6.25**	**29.15**	**62.50**	**68.97**	**18.76**	**12.50**	**25.00**	**54.05**	**62.50**	**81.30**	**93.46**	**52.08**
D-frame	**D-frame**	**D-frame**	**D-frame**	**D-frame**	**D-frame**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**
15:15	**14:00**	**15:15**	**17:00**	**11:00**	**18:00**	**13:15**	**13:15**	**13:15**	**15:15**	**15:15**	**15:15**	**14:00**	**14:00**	**14:00**	**15:15**	**15:15**
997-2	**997-3**	**997-4**	**997-5**	**997-6**	**997-7**	**997-8**	**997-9**	**997-10**	**997-11**	**997-12**	**997-13**	**997-14**	**997-15**	**997-16**	**997-17**	**997-18**
19	47	25	106	43	2	176	207	119	17	14	12	17	54	10	68	63
0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
2	1	1	2	2	0	0	0	0	1	3	1	0	1	0	1	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	61	10	3	156	0	40	11	56	17	14	17	64	86	117	21	26
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	4	1	0	2	0	0	0	0	0	2	1	0	0	0
26	1	0	0	0	0	0	0	0	5	15	8	0	0	3	0	1
0	3	0	0	0	0	15	9	6	0	0	0	6	7	17	10	5
0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	3	0	0	0	0	0	0	0	0	0	0	0	5	4	3
0	1	2	0	0	0	1	3	11	0	0	0	7	2	11	8	8
0	4	13	0	8	0	3	2	3	0	0	0	6	8	8	3	5
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	1	0	0	0	0	0	4	1	2	0	0	0	0	0
0	34	62	0	4	0	11	26	25	0	0	0	56	26	81	53	86
0	0	1	0	0	0	0	0	18	0	0	0	2	0	0	0	3
0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
135	89	89	75	35	1	23	23	14	43	73	43	55	64	74	35	100
12	0	0	0	0	0	0	0	0	3	0	5	0	0	0	0	0
137	38	24	237	85	343	70	105	39	318	300	355	125	162	36	179	105
2	4	8	0	4	0	23	11	47	1	1	1	29	22	7	6	6
0	8	0	0	0	1	0	2	3	0	0	0	1	0	0	1	0
11	23	5	6	3	3	1	1	5	7	8	9	12	9	17	4	8
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0
0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	1	0
1	0	1	0	0	0	0	0	0	2	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	1	2	0	1	5	15	8	3	3	1	2	0
3	0	0	0	2	0	0	0	0	0	2	1	0	0	0	0	0
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1	0	29	0	205	67	24	5	2	4	3	0	1	0	0	0
38	0	0	10	2	1	0	0	0	1	2	4	0	0	0	0	0
0	1	0	0	0	0	2	0	0	0	0	0	1	0	1	0	0
0	1	2	0	0	0	0	0	1	0	0	0	0	0	0	0	4
3	0	0	0	7	0	0	0	0	0	5	0	0	0	0	0	0
0	138	201	0	1	0	19	10	18	0	0	0	38	17	26	56	26
0	2	1	0	9	0	5	19	56	1	0	0	1	0	3	12	18
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
2	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	5	0	5	3	0	10	5	12	6	31	14	43	17	24	13	16
0	12	10	0	1	0	0	1	0	0	0	0	3	3	3	1	1
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	95	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	4	0	0	1	0	3	1	4	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0
6	0	7	0	0	2	0	0	0	8	0	2	0	0	0	0	0
0	0	0	2	2	0	0	0	1	0	0	0	0	0	1	0	0
7	20	19	36	1	4	28	46	36	65	41	26	35	26	15	17	3
0	0	2	0	0	0	1	0	0	0	0	0	0	3	2	3	3
0	0	2	0	0	0	0	0	0	0	0	1	1	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
0	7	4	0	13	0	2	0	3	2	0	0	6	2	1	2	2
0	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0

Sixth Water	Sixth Water	Impact	Impact	Impact
SX	**SX**	**SI**	**SI**	**SI**
02	**03**	**01**	**02**	**03**
04-10-2007	**04-10-2007**	**04-09-2007**	**04-09-2007**	**04-09-2007**
37.45	**18.76**	**14.86**	**6.25**	**6.25**
Hess	**Hess**	**Hess**	**Hess**	**Hess**
11:00	**11:00**	**18:00**	**18:00**	**18:00**
997-24	**997-25**	**997-26**	**997-27**	**997-28**
15	52	7	0	7
0	0	0	0	0
3	0	0	0	0
0	0	0	0	0
112	61	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
24	4	0	0	0
0	0	0	0	0
88	277	453	458	305
11	29	0	0	0
0	0	0	0	0
4	2	0	0	1
0	0	1	0	0
0	1	0	0	0
1	0	1	1	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
4	4	1	0	1
0	1	0	0	0
0	0	0	0	0
0	0	57	137	196
0	0	0	0	0
0	0	0	0	0
2	1	0	0	0
2	3	0	0	0
0	0	0	0	0
12	4	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
23	22	0	0	0
0	0	0	0	0
0	0	0	0	0
136	41	0	0	0
3	4	0	0	0
1	1	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	0
0	0	0	0	0
10	10	18	19	21
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
7	9	0	0	0
1	3	0	0	0
0	0	0	0	0

	14.58	**20.83**	**5.21**	**12.50**	**6.25**	**29.15**	**62.50**	**68.97**	**18.76**	**12.50**	**25.00**
	D-frame	**D-frame**	**D-frame**	**D-frame**	**D-frame**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**
	14:00	**15:15**	**17:00**	**11:00**	**18:00**	**13:15**	**13:15**	**13:15**	**15:15**	**15:15**	**15:15**
	997-3	**997-4**	**997-5**	**997-6**	**997-7**	**997-8**	**997-9**	**997-10**	**997-11**	**997-12**	**997-13**
	3608.36	2419.20	10214.40	4288.00	9024.00	1780.17	854.40	740.95	2952.82	4328.00	2116.00
	2133.46	1598.40	2361.60	2976.00	32.00	970.69	472.00	472.70	293.15	680.00	236.00
e	Brachycentrus occidentalis	Brachycentrus occidentalis	Chironomidae	Ephemerella inermis/infrequens	Chironomidae	Baetis tricaudatus	Baetis tricaudatus	Baetis tricaudatus	Chironomidae	Chironomidae	Chironomidae
	946.68	964.80	4550.40	1248.00	5488.00	603.68	331.20	172.55	1694.94	2400.00	1420.00
sp.	Optioservus sp.	Optioservus sp.	Baetis tricaudatus	Oligophlebodes sp.	Simulium sp.	Chironomidae	Chironomidae	Glossosoma sp.	Oligochaeta	Optioservus sp.	Optioservus sp.
	610.54	427.20	2035.20	760.00	3280.00	240.10	168.00	81.20	346.45	584.00	172.00
e sp.	Ephemerella inermis/infrequens	Pteronarcella sp.	Optioservus sp.	Chironomidae	Oligochaeta	Simulium sp.	Oligochaeta	Ephemerella inermis/infrequens	Optioservus sp.	Oligochaeta	Oligochaeta
	418.46	297.60	1440.00	680.00	64.00	229.81	73.60	81.20	229.19	328.00	104.00
	26.24	39.88	44.55	29.10	60.82	33.91	38.76	23.29	57.40	55.45	67.11
	43.16	57.54	64.47	46.83	97.16	47.40	58.43	34.25	69.13	68.95	75.24
	54.75	69.84	78.57	62.69	97.87	60.31	67.04	45.21	76.90	76.52	80.15
	24.00	27.00	20.00	30.00	11.00	22.00	22.00	24.00	25.00	21.00	23.00
	14.00	14.00	8.00	16.00	1.00	11.00	12.00	12.00	9.00	9.00	8.00
	5.00	3.00	4.00	5.00	1.00	5.00	3.00	3.00	4.00	4.00	4.00
	3.00	6.00	2.00	2.00	0.00	3.00	3.00	4.00	1.00	1.00	2.00
	6.00	5.00	2.00	9.00	0.00	3.00	6.00	5.00	4.00	4.00	2.00
	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	22.00	25.00	18.00	28.00	9.00	20.00	20.00	22.00	23.00	19.00	21.00
	0.00	0.00	0.00	2.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00
	21.48	7.14	21.62	38.25	0.35	45.09	42.51	35.42	7.22	8.50	7.18
	7.41	16.27	0.38	2.24	0.00	2.89	5.81	11.15	0.72	0.18	0.57
	30.23	42.66	1.13	28.92	0.00	6.55	6.93	17.22	1.99	7.02	3.40
	59.13	66.07	23.12	69.40	0.35	54.53	55.24	63.80	9.93	15.71	11.15
	16.92	17.86	14.29	6.72	0.18	4.43	4.31	2.74	8.30	13.49	9.07
	14.26	7.54	53.20	17.91	98.40	31.79	27.15	19.77	61.01	61.55	72.40
	3.80	3.77	6.77	0.19	0.71	5.39	8.61	7.05	11.73	7.58	4.91
	8.94	4.96	19.92	8.02	0.35	33.91	38.76	23.29	3.07	2.59	2.27
	26.24	39.88	0.00	6.34	0.00	3.66	1.87	3.52	0.00	0.92	0.00
	7.22	4.76	44.55	15.86	60.82	13.49	19.66	7.63	57.40	55.45	67.11
	11.79	2.18	0.94	29.48	0.00	7.71	2.06	10.96	3.25	3.14	3.40
	1.14	0.40	0.94	0.56	0.00	1.93	0.94	2.54	1.08	5.73	2.65
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6.46	12.50	0.00	0.75	0.00	2.12	4.87	8.41	0.00	0.00	0.00
	0.19	0.00	5.64	0.00	36.35	12.91	4.49	0.98	0.36	0.74	0.57
	27.57	41.67	6.95	2.43	36.70	18.50	7.30	7.24	2.89	7.39	3.59
	20.91	15.28	72.56	25.75	61.88	57.61	69.10	47.16	73.83	68.95	77.13
	12.93	7.54	3.01	9.70	0.89	5.59	6.55	10.96	11.01	6.28	6.24
	18.25	18.65	14.66	26.87	0.18	8.48	9.74	15.07	8.30	14.05	8.32
	20.34	16.47	2.63	35.26	0.18	9.83	7.12	19.37	3.97	3.33	4.35
	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.40	0.00	0.00	0.18	0.00	0.19	0.20	0.00	0.00	0.38
	4.00	3.00	4.00	4.00	2.00	3.00	3.00	5.00	3.00	3.00	3.00
	5.00	5.00	6.00	8.00	3.00	5.00	4.00	4.00	6.00	6.00	7.00
	7.00	9.00	3.00	8.00	3.00	8.00	7.00	7.00	9.00	6.00	6.00
	5.00	5.00	3.00	5.00	1.00	4.00	4.00	4.00	4.00	2.00	2.00
	3.00	4.00	3.00	5.00	1.00	2.00	3.00	3.00	3.00	4.00	3.00
	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	2.00
	1.02	0.91	0.75	1.00	0.36	0.97	0.90	1.10	0.72	0.73	0.63
	3.38	3.02	2.51	3.34	1.20	3.22	2.99	3.66	2.40	2.44	2.10
	2.35	2.09	1.74	2.31	0.83	2.23	2.07	2.54	1.66	1.69	1.46
	2.81	3.34	2.06	3.47	1.10	2.81	3.11	3.48	3.00	2.39	2.87
	0.74	0.64	0.58	0.68	0.35	0.72	0.67	0.80	0.52	0.55	0.46
	0.87	0.79	0.73	0.84	0.50	0.83	0.79	0.89	0.64	0.66	0.54
	94.30	97.42	98.87	96.46	99.11	98.84	99.63	98.04	97.29	95.56	96.41
	3.50	3.44	5.37	2.59	5.63	4.20	4.53	3.47	5.71	5.51	5.58
	82.89	86.71	46.05	78.73	37.23	79.19	71.35	83.37	25.27	29.57	21.55
	3.81	3.65	4.84	2.83	5.00	4.45	4.50	3.81	4.41	4.63	4.35
	69.39	70.04	43.42	76.49	37.23	73.60	61.05	70.06	18.77	30.50	21.74
	69.00	58.00	32.00	88.00	20.00	48.00	69.00	66.00	63.00	54.00	57.00
	2.88	2.15	1.60	2.93	1.82	2.18	3.14	2.75	2.52	2.57	2.48
	4.74	4.96	4.00	5.08	3.03	4.55	4.82	5.13	3.75	3.78	3.72
	84.60	86.51	86.47	91.42	97.87	88.82	85.21	78.47	74.73	82.99	86.39
	3.13	2.56	2.75	3.47	1.82	2.64	3.36	2.38	2.28	2.86	2.48
	3.73	3.22	4.67	6.09	4.99	4.84	4.88	4.88	4.80	4.51	4.76
	4.00	7.00	4.00	6.00	4.00	2.00	3.00	6.00	4.00	2.00	4.00
	14.00	15.00	11.00	16.00	3.00	12.00	12.00	13.00	11.00	9.00	9.00
	62.93	81.55	41.92	47.39	36.88	68.40	63.30	63.60	14.80	24.58	16.07
	9.00	10.00	6.00	12.00	0.00	6.00	8.00	7.00	7.00	6.00	6.00
	0.59	0.89	0.38	0.05	0.04	1.59	5.40	4.96	2.26	0.99	1.27
	4.17	7.41	10.00	6.67	9.09	4.55	4.55	4.17	4.00	4.76	4.35
	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	2.00

	52.08	**81.30**	**12.50**	**37.45**	**20.33**	**18.76**	**37.45**	**18.76**	**14.86**	**6.25**	**6.25**
	Hess	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**	**Hess**
	15:15	**15:15**	**17:00**	**17:00**	**17:00**	**11:00**	**11:00**	**11:00**	**18:00**	**18:00**	**18:00**
	997-18	**997-19**	**997-20**	**997-21**	**997-22**	**997-23**	**997-24**	**997-25**	**997-26**	**997-27**	**997-28**
	973.44	627.30	4256.00	1431.12	2573.16	2771.60	1388.40	2899.52	3627.47	9872.00	8560.00
	512.64	287.82	792.00	165.54	364.08	1353.82	830.37	1007.37	47.11	0.00	112.00
ae	Chironomidae	Chironomidae	Chironomidae	Chironomidae	Chironomidae	Chironomidae	Oligophlebodes sp.	Chironomidae	Chironomidae	Chironomidae	Chironomidae
	201.60	173.43	2016.00	931.83	1156.20	959.40	363.12	1476.41	3048.69	7328.00	4880.00
udatus	Optioservus sp.	Optioservus sp.	Optioservus sp.	Oligochaeta	Optioservus sp.	Ephemerella inermis/infrequens	Ephemerella inermis/infrequens	Ephemerella inermis/infrequens	Simulium sp.	Simulium sp.	Simulium sp.
	192.00	110.70	640.00	184.23	649.44	485.03	299.04	325.13	383.61	2192.00	3136.00
rus occidentalis	Pteronarcella sp.	Brachycentrus occidentalis	Baetis tricaudatus	Baetis tricaudatus	Oligochaeta	Oligophlebodes sp.	Chironomidae	Baetis tricaudatus	Oligochaeta	Oligochaeta	Oligochaeta
	165.12	102.09	608.00	130.83	216.48	373.10	234.96	277.16	121.14	304.00	336.00
	20.71	27.65	47.37	65.11	44.93	34.62	26.15	50.92	84.04	74.23	57.01
	40.43	45.29	62.41	77.99	70.17	52.12	47.69	62.13	94.62	96.43	93.64
	57.40	61.57	76.69	87.13	78.59	65.58	64.62	71.69	97.96	99.51	97.57
	24.00	27.00	18.00	18.00	21.00	25.00	25.00	20.00	8.00	5.00	7.00
	16.00	15.00	6.00	8.00	7.00	14.00	12.00	9.00	1.00	0.00	1.00
	5.00	4.00	3.00	4.00	3.00	4.00	4.00	2.00	1.00	0.00	1.00
	5.00	5.00	1.00	2.00	2.00	1.00	1.00	0.00	0.00	0.00	0.00
	6.00	6.00	2.00	2.00	2.00	9.00	7.00	7.00	0.00	0.00	0.00
	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	22.00	25.00	16.00	16.00	19.00	23.00	23.00	18.00	6.00	3.00	5.00
	1.00	0.00	1.00	0.00	0.00	2.00	2.00	2.00	0.00	0.00	0.00
	18.93	13.33	15.98	10.26	8.22	27.50	25.19	20.77	1.30	0.00	1.31
	20.71	6.27	0.75	0.56	2.49	1.54	0.19	0.00	0.00	0.00	0.00
	13.02	26.27	1.88	0.75	3.44	19.81	34.42	13.97	0.00	0.00	0.00
	52.66	45.88	18.61	11.57	14.15	48.85	59.81	34.74	1.30	0.00	1.31
	19.72	17.65	15.60	5.41	26.00	4.23	4.62	0.74	0.00	0.00	0.00
	23.47	30.98	62.59	69.22	48.37	37.50	20.77	57.72	95.18	96.60	94.02
	0.59	1.37	2.82	12.87	8.41	3.08	1.92	1.84	3.34	3.08	3.93
	12.43	5.88	14.29	9.14	5.74	9.62	2.88	9.56	1.30	0.00	1.31
	5.13	16.27	0.00	0.00	0.00	3.27	4.81	4.60	0.00	0.00	0.00
	20.71	27.65	47.37	65.11	44.93	34.62	16.92	50.92	84.04	74.23	57.01
	5.33	4.71	0.19	0.19	0.19	17.69	22.12	11.21	0.00	0.00	0.00
	3.94	5.10	1.50	0.56	3.06	0.77	0.38	0.18	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.59	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	17.55	5.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	14.66	1.31	0.76	0.00	0.00	0.00	10.58	22.20	36.64
	9.07	21.57	16.35	2.05	4.59	1.54	0.96	0.74	10.58	22.20	36.64
	35.11	35.49	66.92	88.06	62.33	48.65	24.04	67.83	88.68	77.31	62.24
	8.48	7.84	1.50	2.99	6.50	10.38	15.19	6.99	0.74	0.49	1.12
	24.46	24.90	15.04	5.78	25.62	19.23	33.85	9.01	0.00	0.00	0.00
	22.88	10.20	0.19	1.12	0.76	20.00	25.96	15.26	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.19	0.19	0.00	0.18	0.00	0.00	0.00
	3.00	4.00	4.00	3.00	3.00	3.00	3.00	2.00	1.00	1.00	1.00
	5.00	5.00	8.00	5.00	7.00	4.00	5.00	5.00	3.00	2.00	3.00
	8.00	9.00	4.00	5.00	6.00	9.00	10.00	7.00	4.00	2.00	3.00
	4.00	5.00	1.00	3.00	2.00	6.00	5.00	3.00	0.00	0.00	0.00
	4.00	4.00	1.00	2.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
	1.02	1.00	0.71	0.56	0.76	0.93	0.96	0.78	0.26	0.30	0.40
	3.37	3.34	2.35	1.86	2.52	3.07	3.18	2.60	0.87	1.00	1.34
	2.34	2.31	1.63	1.29	1.75	2.13	2.21	1.80	0.60	0.69	0.93
	3.34	4.04	2.03	2.34	2.55	3.03	3.32	2.38	0.85	0.43	0.66
	0.74	0.70	0.56	0.45	0.57	0.66	0.69	0.60	0.29	0.43	0.48
	0.87	0.85	0.71	0.55	0.72	0.82	0.84	0.71	0.28	0.40	0.54
	97.44	97.84	99.81	97.76	98.47	98.46	96.92	96.51	99.81	100.00	99.63
	4.16	4.11	5.30	5.91	5.51	3.79	2.89	4.34	5.93	5.83	5.68
	75.94	68.24	46.43	18.47	38.81	55.38	67.69	40.99	12.43	22.69	38.69
	4.13	3.90	4.89	4.81	4.94	2.95	2.38	3.12	4.94	4.98	5.00
	54.24	58.82	47.37	18.28	38.81	54.81	66.73	40.99	12.06	22.37	37.94
	70.00	72.00	41.00	31.00	38.00	88.00	73.00	65.00	10.00	5.00	8.00
	2.92	2.67	2.28	1.72	1.81	3.52	2.92	3.25	1.25	1.00	1.14
	4.37	4.73	3.65	4.06	3.42	5.22	5.73	5.33	3.20	2.99	3.07
	90.34	90.39	94.92	82.09	83.17	87.50	83.08	91.91	95.92	96.43	94.95
	2.83	2.37	3.78	2.28	2.19	3.68	3.00	3.80	1.88	2.00	2.14
	4.40	4.05	4.74	4.86	4.36	5.79	6.49	5.46	5.00	5.00	5.00
	5.00	6.00	5.00	3.00	6.00	3.00	4.00	3.00	0.00	0.00	0.00
	14.00	14.00	10.00	9.00	10.00	15.00	13.00	10.00	2.00	1.00	2.00
	66.47	58.63	47.37	17.54	38.62	36.92	45.00	29.60	11.87	22.20	37.94
	11.00	9.00	4.00	5.00	4.00	10.00	11.00	8.00	0.00	0.00	0.00
	0.32	1.30	0.35	4.93	1.74	0.59	0.74	0.36	0.50	0.19	0.25
	4.17	7.41	5.56	5.56	4.76	4.00	4.00	5.00	12.50	20.00	14.29
	1.00	1.00	3.00	1.00	3.00	1.00	1.00	1.00	0.00	0.00	0.00

	Ephemerella sp.	0	0	0	0	3	0	
	Heptagenia sp.	1	0	0	0	0	0	
	Leptophlebiidae	2	0	3	0	4	0	
	Paraleptophlebia sp.	1	54	4	2	24	0	
	Rhithrogena sp.	33	0	33	28	0	0	
Plecoptera	Chloroperlidae	0	0	1	1	0	0	
	Claassenia sabulosa	0	0	5	14	0	0	
	Isogenoides sp.	18	0	21	19	0	0	
	Isoperla sp.	14	0	26	22	0	0	
	Perlodidae	0	0	0	0	18	0	
	Podmosta sp.	0	20	0	0	4	0	
	Pteronarcella sp.	90	0	197	225	0	0	
	Pteronarcys californica	18	0	2	4	0	0	
	Pteronarcys sp.	0	0	4	3	0	0	
	Triznaka sp.	0	1	0	0	0	0	
Coleoptera	Cleptelmis addenda	0	1	0	1	5	0	
	Optioservus sp.	105	294	282	314	316	1	
	Zaitzevia sp.	0	20	0	0	3	0	
ronomidae	Chironomidae	268	1,110	361	449	1,073	1,559	
Diptera	Antocha sp.	105	5	62	22	0	0	
	Atherix sp.	14	0	9	4	1	1	
	Bezzia/Palpomyia sp.	11	35	61	26	16	4	
	Ceratopogoninae	0	1	0	0	2	1	
	Chelifera/Metachela sp.	3	0	0	0	1	1	
	Dicranota sp.	0	2	1	0	0	2	
	Hemerodromia sp.	1	1	2	3	0	0	
	Hexatoma sp.	0	4	0	1	0	0	
	Limnophila sp.	0	0	0	1	0	0	
	Neoplasta sp.	3	34	7	2	9	3	
	Pericoma/Telmatoscopus sp.	0	6	0	0	1	0	
	Prosimulium sp.	0	1	0	0	7	0	
	Simulium sp.	97	16	2	0	112	595	
	Tipula sp.	1	45	0	0	18	1	
	Wiedemannia sp.	7	0	3	0	0	0	
richoptera	Arctopsyche grandis	1	0	1	8	0	0	
	Brachycentrus americanus	0	8	0	0	0	0	
	Brachycentrus occidentalis	103	0	219	366	0	0	
	Glossosoma sp.	89	1	6	53	0	0	
	Glossosomatidae	0	0	1	0	0	0	
	Helicopsyche sp.	4	3	1	2	3	0	
	Hesperophylax sp.	0	4	0	0	0	0	
	Hydropsyche sp.	31	91	89	53	32	0	
	Lepidostoma sp.	7	0	21	14	0	0	
	Limnephilidae	0	1	0	0	0	0	
	Micrasema sp.	0	0	0	0	0	0	
	Neophylax sp.	0	0	0	0	0	0	
	Neotrichia sp.	0	0	0	0	1	0	
	Oligophlebodes sp.	1	0	0	0	0	0	
	Rhyacophila brunnea gr.	0	0	0	0	0	0	
	Rhyacophila coloradensis gr.	1	11	0	1	2	0	
astropoda	Hydrobiidae	1	0	0	0	0	0	
	Lymnaeidae	0	0	1	0	1	0	
	Physa sp.	0	1	0	4	0	0	
Bivalvia	Pisidium sp.	0	16	0	7	6	2	
	Sphaeriidae	1	0	1	1	2	0	
Annelida	Oligochaeta	137	139	96	46	164	62	
Acari	Atractides sp.	1	0	5	8	1	0	
	Corticacarus	1	1	2	2	0	0	
	Lebertia sp.	0	0	2	0	0	0	
	Protzia sp.	0	2	0	0	0	0	
	Sperchon sp.	14	2	16	10	0	0	
	Testudacarus sp.	1	0	1	0	0	0	
Crustacea	Ostracoda	0	0	0	0	2	0	
rganisms	Nematoda	113	58	103	62	25	7	
	Polycelis sp.	0	0	0	0	0	0	
	TOTAL	**2,091**	**2,135**	**2,109**	**2,048**	**2,123**	**2,255**	**2,**

iamond Fork Campground	**Diamond Fork Guard Station**	**Motherlode**	**Oxbow**	**Sawmill Canyon**	**Sulpher Impact**	**Sixth Wa**
FC	**DFGS**	**MO**	**OX**	**SC**	**SI**	**SX**
ooled	**Pooled**	**Pooled**	**Pooled**	**Pooled**	**Pooled**	**Pooled**
-	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**
97-29	**997-30**	**997-31**	**997-32**	**997-33**	**997-34**	**997-35**
091.00	2135.00	2109.00	2048.00	2123.00	2255.00	2120.00
207.00	341.00	1092.00	1085.00	358.00	16.00	1126.00
aetis tricaudatus	Chironomidae	Chironomidae	Chironomidae	Chironomidae	Chironomidae	Chironom
35.00	1110.00	361.00	449.00	1073.00	1559.00	630.00
hironomidae	Optioservus sp.	Ephemerella inermis/infrequens	Brachycentrus occidentalis	Optioservus sp.	Simulium sp.	Ephemer
68.00	294.00	328.00	366.00	316.00	595.00	420.00
phemerella inermis/infrequens	Oligochaeta	Optioservus sp.	Optioservus sp.	Baetis tricaudatus	Oligochaeta	Oligophle
56.00	139.00	282.00	314.00	261.00	62.00	342.00
0.37	51.99	17.12	21.92	50.54	69.14	29.72
3.19	65.76	32.67	39.79	65.43	95.52	49.53
0.65	72.27	46.04	55.13	77.72	98.27	65.66
8.00	35.00	39.00	37.00	33.00	14.00	38.00
9.00	13.00	20.00	19.00	13.00	1.00	19.00
.00	4.00	6.00	5.00	7.00	1.00	6.00
.00	2.00	7.00	7.00	2.00	0.00	2.00
.00	7.00	7.00	7.00	4.00	0.00	11.00
.00	1.00	1.00	1.00	1.00	1.00	1.00
.00	1.00	1.00	1.00	1.00	1.00	1.00
6.00	33.00	37.00	35.00	31.00	12.00	36.00
.00	1.00	0.00	1.00	1.00	0.00	2.00
9.69	9.41	23.61	14.65	14.04	0.71	27.92
.70	0.98	12.14	14.06	1.04	0.00	0.99
1.33	5.57	16.03	24.27	1.79	0.00	24.20
7.72	15.97	51.78	52.98	16.86	0.71	53.11
.02	14.75	13.37	15.38	15.26	0.04	4.06
4.39	59.02	24.09	24.80	58.41	96.10	33.63
.55	6.51	4.55	2.25	7.72	2.75	1.75
0.37	2.90	6.07	9.08	12.29	0.71	7.55
.93	0.37	10.38	17.87	0.00	0.00	4.76
2.82	51.99	17.12	21.92	50.54	69.14	29.72
.56	3.98	15.65	4.10	0.38	0.00	20.09
.53	4.26	4.27	2.98	1.51	0.00	0.47
.00	0.00	0.00	0.00	0.00	0.00	0.00
.00	0.00	0.24	0.68	0.00	0.00	0.00
.16	0.00	9.63	11.33	0.00	0.00	0.19
.64	0.80	0.09	0.00	5.61	26.39	0.00

iamond Fork Campground	Diamond Fork Guard Station	Motherlode	Oxbow	Sawmill Canyon	Sulpher Impact	Sixth Wa
FC	DFGS	MO	OX	SC	SI	SX
ooled	Pooled	Pooled	Pooled	Pooled	Pooled	Pooled
-	- -	- -	- -	- -	- -	- -
97-29	**997-30**	**997-31**	**997-32**	**997-33**	**997-34**	**997-35**
.47	7.03	12.47	8.50	3.49	0.80	10.52
1.29	14.33	15.46	19.73	15.21	0.04	22.12
3.01	6.93	26.17	15.97	1.18	0.04	24.10
.00	0.00	0.00	0.00	0.05	0.00	0.00
.19	0.09	0.09	0.10	0.05	0.04	0.09
.00	5.00	5.00	5.00	5.00	2.00	6.00
.00	8.00	6.00	6.00	10.00	3.00	9.00
2.00	10.00	15.00	14.00	8.00	6.00	10.00
.00	5.00	7.00	6.00	5.00	1.00	7.00
.00	5.00	5.00	5.00	3.00	1.00	5.00
.00	0.00	0.00	0.00	1.00	0.00	0.00
.00	2.00	1.00	1.00	1.00	1.00	1.00
.08	0.82	1.11	1.05	0.74	0.35	0.97
.58	2.74	3.70	3.50	2.47	1.17	3.23
.48	1.90	2.56	2.42	1.71	0.81	2.24
.84	4.44	4.96	4.72	4.18	1.68	4.83
.68	0.53	0.70	0.67	0.49	0.31	0.62
.86	0.70	0.90	0.87	0.70	0.45	0.83
8.37	96.49	95.54	97.66	98.73	99.65	97.08
.04	5.37	3.89	4.03	5.52	5.77	3.41
8.48	33.44	73.35	72.71	37.40	27.67	60.61
.22	4.43	3.89	3.90	4.87	4.99	2.78
7.38	33.07	56.90	56.45	36.93	27.32	59.67
7.00	77.00	88.00	94.00	64.00	22.00	106.00
.55	2.20	2.26	2.54	1.94	1.57	2.79
.83	3.67	4.46	4.76	3.75	3.05	5.34
3.45	80.37	82.74	88.43	86.67	96.32	88.54
.42	2.57	2.28	2.57	2.64	1.43	3.05
.76	4.54	4.33	4.05	4.66	5.00	5.94
.00	5.00	7.00	9.00	7.00	4.00	8.00
9.00	15.00	20.00	19.00	16.00	3.00	19.00
3.99	25.34	50.50	63.96	36.32	27.14	39.67
3.00	8.00	14.00	14.00	10.00	0.00	14.00
.66	6.80	4.76	2.50	7.92	2.76	1.85
.63	5.71	2.56	5.41	6.06	7.14	5.26
.00	3.00	1.00	2.00	3.00	1.00	2.00