



Wadeable Stream Suitability Assessment for Long-Term Monitoring

Ocmulgee National Monument

Natural Resource Data Series NPS/SECN/NRDS—2019/1221



ON THE COVER

Looking downstream on Walnut Creek in Ocmulgee National Monument. NPS photo / J.M. McDonald.

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Executive Summary

The Southeast Coast Network *Monitoring Wadeable Stream Habitat Conditions in Southeast Coast Network Parks: Protocol Narrative* (McDonald 2018a) was developed to provide insight into the status of, and trends in, stream and near-channel habitat conditions in wadeable streams at national parks, recreation areas, battle fields, and monuments in Alabama, Georgia, and South Carolina (McDonald et al. 2018a). These parks include Chattahoochee River National Recreation Area (CHAT), Kennesaw Mountain National Battlefield Park (KEMO), Congaree National Park (CONG), Horseshoe Bend National Military Park (HOBE), and Ocmulgee National Monument (OCMU).

The number of reaches surveyed at each park is dependent on the size of the park and the number of wadeable streams within park boundaries. Reaches selected for monitoring (1) are representative of the processes influencing the streams in each park; (2) can address current and anticipated management concerns, and (3) offer the most utility for future complementary studies. The habitat assessment methods outlined in the protocol rely on standard data collection methods and standard operating procedures currently in use by the U.S. Geological Survey, U.S. Environmental Protection Agency, and U.S. Forest Service, modified to meet the needs of National Park Service (NPS) managers.

The purpose of this report is to document the stream suitability survey conducted at Ocmulgee National Monument to determine which streams should be chosen for long-term monitoring. Over the course of three days (January 17, 2017; May 22, 2017; and December 6, 2018), twelve stream segments were assessed for suitability for long-term monitoring. Stream segment suitability was based on whether the stream (1) could be safely accessed, (2) was part of a single channel, wadeable stream system, and (3) was not greatly influenced by upstream impoundments. Of the twelve stream segments identified in GIS or in consultation with park staff, three were determined to be suitable for long-term monitoring, one was classified as potentially suitable (listed as “maybe”), three were determined to not be suitable for long-term monitoring, and five did not meet the criteria used to define the stream channel sample frame outlined in the protocol (i.e., perennial, single channel, wadeable stream).

The streams selected will provide comparisons between similar streams and/or be representative of similar streams within the park and/or network. The following report provides an overview of the methods used to assess the suitability of each stream segment and provides a description of the streams assessed.

Introduction

The purpose of this report is to document the stream suitability surveys conducted at Ocmulgee National Monument (OCMU) to determine which stream should be chosen for long-term monitoring (McDonald et al. 2018a). On January 17, 2017, Southeast Coast Network (SECN) staff met with OCMU staff to tour the park and determine whether there were any management concerns related to the wadeable streams in the park. On May 22, 2017, SECN staff conducted stream assessments to select a monitoring reach on Walnut Creek (the only perennial stream recognized by the high resolution National Hydrography Dataset [NHDhd]). On December 6, 2018, SECN staff returned to Ocmulgee National Monument to conduct a second round of stream assessments to document the non-NHDhd drainages in the park and determine their suitability for future monitoring. While conducting stream segment suitability assessments, suitability was based on whether the stream (1) could be safely accessed, (2) was part of a single channel, wadeable stream system, and (3) was not greatly influenced by upstream impoundments. Additionally, because Ocmulgee National Monument is an archaeological site, special care was taken to make sure monitoring activities would not negatively affect the archaeological record or visitor experience.

The NHDhd only identifies one perennial stream (Walnut Creek) in the park (Figure 1). During the initial tour of the park (January 17, 2017), additional streams were identified by park staff that were not part of the NHDhd coverage and were of potential management concern (Oc006–Oc012; Table 1). After evaluating the stream segments in the field, three of the segments (one on Walnut Creek and two on “Temple Mound Creek”) were determined to be suitable for long-term monitoring (Table 2). The upstream stream segment on ‘Temple Mound Creek’ was determined to be potentially suitable because, where the assessment was conducted, the stream was too entrenched to be safely surveyed. If this portion of ‘Temple Mound Creek’ is of management concern, a reach can be safely surveyed just downstream of this highly entrenched portion of the stream.

Following the criteria for segment selection outlined in McDonald et al. (2018a), Oc003 (Walnut Creek [middle 2]) was chosen for monitoring (Table 2). The two suitable stream segments on ‘Temple Mound Creek’ were not chosen for monitoring because of the potential for cultural resource

disturbance by the installation of the survey benchmarks. If park management determines either of these two reaches is of management concern, archaeological assessments may be required prior to adding either reach to the wadeable stream monitoring program.

The following report provides an overview of the methods used to assess the suitability of each stream segment. Appendix A provides a detailed description of each assessed segment and identifies any potential management concerns.

Ocmulgee National Monument

Ocmulgee National Monument (OCMU) is located on the Ocmulgee River just below the fall line (which separates the Piedmont and Coastal Plain physiographic provinces) in Macon, Georgia (Figure 1). The monument preserves burial and temple mounds, constructed by American Indians, on the Oconee River flood plain and provides recreational opportunities with its green spaces and hiking trails. The 702-acre (284-hectare) monument is surrounded by mostly urban and suburban development. Development in eastern Macon has altered sediment delivery and streamflow inside the monument’s boundaries (Middle Georgia Regional Development Center 2003). Portions of the monument’s North Plateau are rapidly eroding and this material is being deposited on the Middle and South Plateaus (KellerLynn 2013). The streams in the park are heavily influenced by the high amount of developed land cover that surrounds the park. Walnut Creek, the park’s largest perennial stream, originates outside of the monument’s boundaries and has several areas of severe bank erosion and sedimentation (Middle Georgia Regional Development Center 2003). Other smaller, intermittent streams at Ocmulgee National Monument have been similarly impacted. Roughly 300 acres (121 hectares) of the park are classified as emergent wetlands. Stream reconnaissance conducted in 2012 noted extensive beaver activity within the monument along Walnut Creek, which has significantly altered stream habitats (M. B. Gregory, SECN program manager, personal observation). Additionally, a railroad runs directly through the park, and all of the smaller streams that flow through the park pass through culverts under the railroad. Although the monument owns approximately one mile (1.6 kilometers) of river frontage along the Ocmulgee River, the construction of Interstate 16 through the monument’s flood plain severed its direct connection with the river.

Methods and Results

Stream segments were chosen for long-term monitoring based on GIS analyses of relevant, reliable, and accurate data layers, their relevance to management concerns, and based on field assessments of their safety and accessibility. Field evaluations are necessary because the resolution of available geospatial data is often too imprecise for a determination of the suitability of any given sample reach. In order to provide the most relevant information for management, stream reaches are either: (1) paired (based on drainage area and stream type) to determine the influence of different upstream watershed characteristics and land use/land cover; or (2) chosen to represent conditions or processes affecting similar-sized streams within the park. A probabilistic approach to reach selection was not used due to the limited number of stream segments within the park.

Stream segments were selected for long-term monitoring in five stages:

1. identification of potential stream segments in GIS;
2. consultation with park staff;
3. field suitability evaluation;
4. basin-scale assessment in GIS; and
5. final decision (with park staff input).

Each of these stages is discussed in detail in McDonald et al. (2018a) and step-by-step instructions are provided in SOP 1.2.14 *Wadeable Stream Reach Selection and Location of Sampling Points—Version 1.0* (McDonald et al. 2018b). A brief description of each stage and the results of the each analysis is provided below.

Identification of Potential Stream Segments

Potential stream segments were identified in a GIS using the National Hydrography Dataset high definition (NHDhd) dataset and the park ownership boundaries. A point coverage was created to represent the potential stream segments within the park. This point coverage was used to discuss potential survey reaches with park staff as well as locate the stream segments in the field. All stream segments were classified as perennial, were within park ownership boundaries, and each segment was at least 400 feet (122 meters) in length. Five stream segments (Oc001–Oc005) were identified from the NHDhd within the boundaries of Ocmulgee National Monument (Table 1; Figure 1).

Consultation with Park Staff

Once the segments were identified in GIS, SECN staff met with OCMU's head biotechnician Allen Huckabee to identify reaches with current or potential management concerns, determine issues that may prevent accessing segments, and determine the long-term applicability of each stream segment. During the meeting, three additional drainages were identified and added to the sample frame due to potential management concern (Oc006–Oc012; Table 1 and Figure 1). After the initial meeting, Allen Huckabee led SECN staff on a tour of the park. Segments Oc001, Oc004, and Oc005 were determined to be unsuitable for monitoring based on the criteria outlined in McDonald et al. (2018a). Oc001 was deemed unsuitable because Walnut Creek is a braided stream in this portion of the park, Oc004 was located within a wetland, and Oc005 was not wadeable. The remaining stream segments were assessed when SECN staff returned to the park in May 2017 and December 2018.

Field Suitability Evaluation

Field surveys were conducted to determine whether each stream segment was suitable for long-term monitoring and to locate a representative reach within the candidate segment suitable for data collection. The width, water depth, bank height, and an interpretation of the geomorphic conditions that characterize the segment were recorded. Additionally, any conditions that made the stream unsuitable for sampling were also recorded. Conditions include (but are not limited to): presence of beaver dams or ponds; lack of a defined channel; or hazardous conditions such as treacherous wading conditions or difficult access to the stream (e.g., high undercut banks).

The field suitability evaluations determined three of the twelve stream segments (Oc003, Oc008, and Oc011) were suitable for long-term monitoring (Table 1). One stream segment (Oc006) was classified as potentially ('maybe') suitable for monitoring. The upstream 'Temple Mound Creek' segment (Oc006) was classified as 'maybe' suitable because the stream is highly entrenched where the assessment was completed and it would be unsafe to survey the stream in this location. If this portion of 'Temple Mound Creek' is determined to be of management concern, a reach can be surveyed downstream of this entrenched section. Two segments (Oc007 and Oc012 [on the same drainage]) were not assessed because the drainage lacked a well-defined channel and is ephemeral.

Basin-Scale Assessment

A basin analysis was conducted to characterize the watershed characteristics (e.g., geomorphic basin characteristics and land cover conditions) of the three stream segments classified as suitable for long-term monitoring (Table 2). This stage of segment selection determines whether basin-scale similarities between segments exist so representative segments can be chosen that provide an understanding of similar streams in the park or network. The measures used to determine the geomorphic characteristics and land cover conditions of each stream segment's watershed are described in McDonald et al. (2018a) and a detailed description of the methods used to calculate these measures can be found in SOP 1.2.15 *Wadeable Stream Basin- and Segment-Scale Data Summary—Version 1.0* (McDonald et al. 2018c).

Final Decision

The basin-scale assessment results were used to assist in the final selection of stream segments. Final stream segment selection was done by SECN personnel who could provide

the best professional judgment required to adequately assess reach utility, safety, and suitability issues. Chosen stream segments struck a balance between being relevant to management goals, complementary to future studies, and representative of conditions within the park.

Of the three suitable stream segments, Walnut Creek (middle 2; Oc003) was chosen for long-term monitoring because it was on the only perennial stream identified in the park by NHDhd and the segment was representative of the single thread portions of Walnut Creek. The segments on 'Temple Mound Creek' (Oc008 and Oc011) were not chosen for monitoring because the Southeast Coast Network only had enough resources to monitor one segment during this survey cycle. Another reason for not including either reach in the initial survey cycle was the potential need for an archaeological survey prior to installing the survey benchmarks. Depending on management concerns, either or both of these segments may be included in future survey cycles.

Table 1. List of all the wadeable stream segments at Ocmulgee NM assessed in 2017–2018 ("pSite" indicates potential sites).

pSite	Suitable	Stream Name	Included in NHDhd	Latitude	Longitude	Stream Order	Drainage Area (km ²)
Oc001	No	Walnut Creek (upstream)	Yes	32.8449	-83.5973	5	239.00
Oc002	No	Walnut Creek (middle 1)	Yes	32.8417	-83.5968	5	239.44
Oc003	Yes	Walnut Creek (middle 2)	Yes	32.8385	-83.5996	5	239.46
Oc004	No	Walnut Creek (wetland)	Yes	32.8364	-83.6010	5	239.46
Oc005	No	Walnut Creek (downstream)	Yes	32.8311	-83.6041	5	239.46
Oc006	Maybe	"Temple Mound Creek" (upstream)	No	32.8454	-83.6068	1	0.35
Oc007	No	Unnamed (Ephemeral)	No	32.8439	-83.6051	0	0.08
Oc008	Yes	"Temple Mound Creek" (middle)	No	32.8411	-83.6087	1	0.56
Oc009	No	"Bamboo Creek"	No	32.8411	-83.6129	1	0.33
Oc010	No	"Bamboo Creek" (downstream)	No	32.8391	-83.6162	2	0.68
Oc011	Yes	"Temple Mound Creek" (downstream)	No	32.8388	-83.6090	1	0.67
Oc012	No	Unnamed (Ephemeral)	No	32.8383	-83.6012	0	0.29

Table 2. Sites that were suitable for monitoring. Final site numbers were determined after consultation with park staff. "pSite" indicates potential sites. "Site Name" indicates a site's identifier if selected for long-term monitoring.

pSite	Site Name	Stream Name	Stream Order	Drainage Area (km ²)	Entire Stream Gradient (%)	Average Basin Slope (°)	Basin Relief (km)	Developed (%)	Forested (%)	Grass/Pasture (%)
Oc003	OCMU001	Walnut Creek	5	239.00	0.0043	4.87	0.200	12	57	23
Oc008	–	"Temple Mound Creek" (middle)	1	0.56	0.0312	4.16	0.047	80	18	2
Oc011	–	"Temple Mound Creek" (downstream)	1	0.67	0.0317	4.23	0.052	66	27	6

Ocumulgee National Monument - Potential Stream Monitoring Sites

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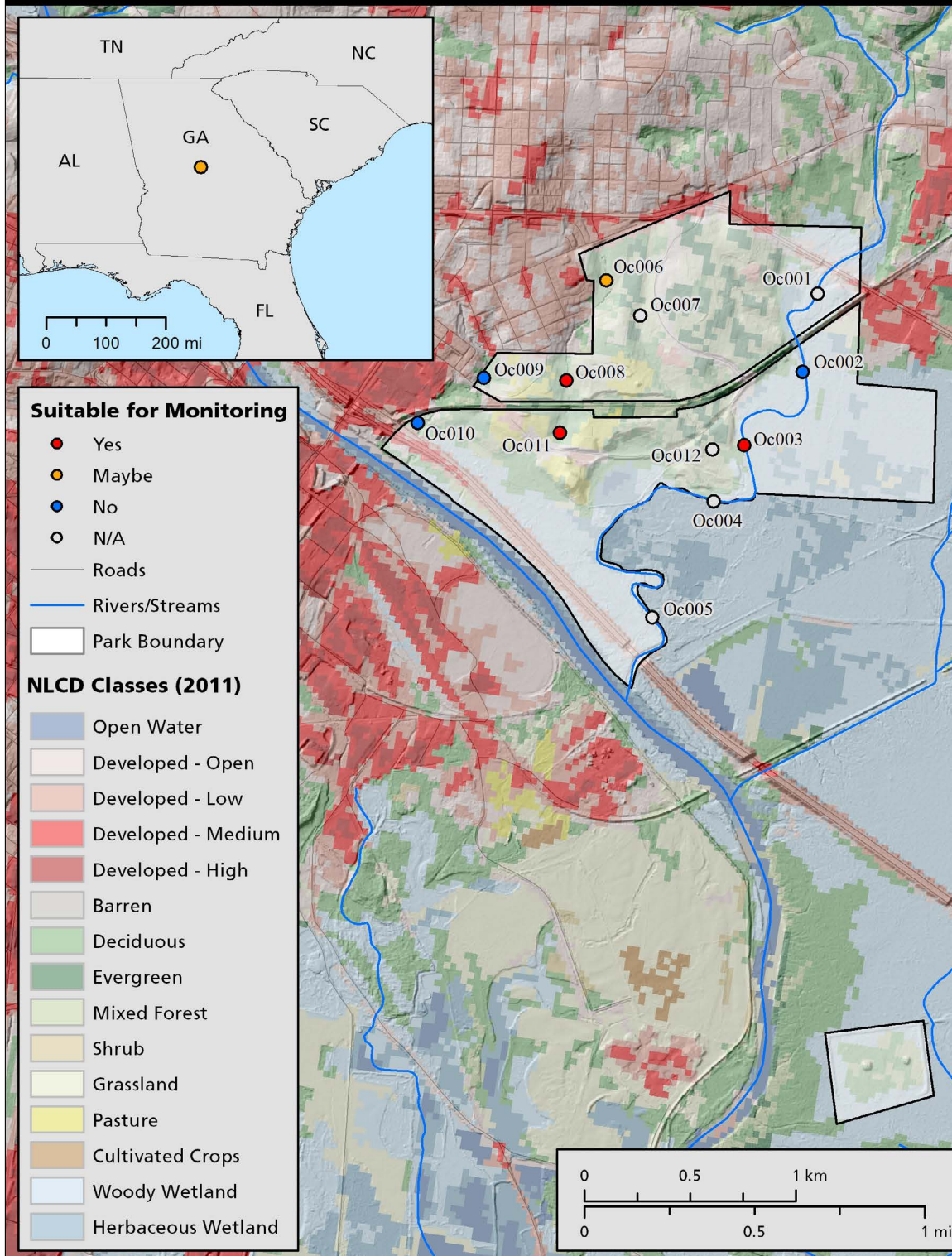


Figure 1. Overview map of the stream segments that were assessed to determine their suitability for long-term monitoring according to the criteria outlined in the SECN wadeable stream monitoring protocol (McDonald et al. 2018a). Segments marked 'N/A' were not assessed (see text for explanation).

Literature Cited

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Appendix A. Stream Segment Assessments



Park Unit: OCMU
Proposed Site Number: Oc002
Stream Name: Walnut Creek (middle 1)
Date: 5.22.2017
Time: 11:00 a.m.
Assessed by: JMM, ENS and CSC
Accessible: Yes
Gate Key Required: No
Wadeable: Yes
Recommend for Monitoring: No

Best Point of Access/Parking: Park on road closest to Walnut Creek (Temple Mound Rd).

Directions from Parking to Site: Carefully walk down slope to Walnut Creek and follow upstream to segment.

Management Issues Noted: Trash in the stream.

Safety Concerns: None.

Site Summary— Walnut Creek (middle 1) is a large sand bedded stream with a high concentration of bar surfaces. Wetted width was estimated to be approximately 15 meters (49.2 feet) and bankfull width around 25 meters (82 feet). Water depth was approximately 0.15 meter (0.49 feet). Bank heights were approximately 1.5 meters (4.9 feet). Initial assessment of the creek classified the entrenchment of the segment as low. Floodplains have developed on both sides of the stream. The banks were fairly well vegetated (approxiamtely 50–90%) with grasses, shrubs, and trees being the dominant cover where present. Large woody debris is present and is mostly serving as bank protection (though most pieces are not buried and will likely be extirpated by the next flood). The stream is multi-thread and complex upstream of the railroad bridge. Immediately downstream, Walnut Creek makes a sharp turn toward the hillslope (leading to Oc003). At the sharp turn, Walnut Creek has a large flood chute that leads to a power line easement to the southeast.

Monitoring Recommendation— This site is not recommended for monitoring because of the quasi-multi-thread nature of the stream and because there is not a long enough length of stream to install a monitoring site (due to presence of the railroad bridge).



Park Unit: OCMU
Proposed Site Number: Oc003
Stream Name: Walnut Creek (middle 2)
Date: 5.22.2017
Time: 12:12 p.m.
Assessed by: JMM, ENS and CSC
Accessible: Yes
Gate Key Required: No
Wadeable: Yes
Recommend for Monitoring: Yes

Best Point of Access/Parking: Park on road at trail head.

Directions from Parking to Site: Carefully navigate the hillslope down to the creek.

Management Issues Noted: Privet and Chinese Tallow are prevalent.

Safety Concerns: None.

Site Summary— Walnut Creek (middle 2) is a medium-sized, sand-bedded stream. Wetted width was estimated to be approximately 6.5 meters (21.3 feet) and bankfull width around 10 meters (32.8 feet). Water depth ranged from 0.2–0.5 meters (0.7–1.6 feet). Bank heights were approximately 1 meter (3.3 feet) where floodplains were present and around 1.5 meters (4.9 feet) where the stream was entrenched. Initial assessment of the creek classified the entrenchment of the segment as low (downstream portions were more entrenched). Floodplains have developed throughout the segment. The banks were fairly well vegetated (approximately 50–90%) with grasses, shrubs, and trees being the dominant cover where present. Large woody debris is present and serving multiple functions such as habitat creation and bank protection. A number of smaller (ephemeral) drainages were observed entering the stream (on river left) throughout the segment. Privet and Chinese Tallow were prevalent along the banks. Side and mid-channel sand bars were observed throughout the segment.

Monitoring Recommendation— This site is recommended for monitoring because it is representative of the single-thread portions of Walnut Creek in the park. Additionally, this segment may be affected by the Privet and Chinese Tallow clearing that is taking place throughout the park. Placement of a monitoring site in one of these areas will help determine the influence these management practices are having on the streams in the park.



Park Unit: OCMU
Proposed Site Number: Oc006
Stream Name: 'Temple Mound Creek' (upstream)
Date: 12.06.2018
Time: 9:56 a.m.
Assessed by: JMM and CSC
Accessible: Yes
Gate Key Required: No
Wadeable: Yes
Recommend for Monitoring: No (Maybe)

Best Point of Access/Parking: Park at temple mound parking.

Directions from Parking to Site: Walk the service road upstream to the site.

Management Issues Noted: Trash in the stream.

Safety Concerns: High steep banks, undercut trees.

Site Summary— 'Temple Mound Creek' (upstream; unnamed first order) is a small sand and clay-bedded stream with high steep banks. Wetted width was estimated to be approximately 1.5 meters (4.9 feet) and channel-full width around 5 meters (16.4 feet). Water depth was estimated to be approximately 0.05 meters (0.2 feet). Bank heights were approximately 2.8 meters (9.2 feet) high. Initial assessment of the creek classified the segment as extremely entrenched. The banks were mostly bare, with mosses and leaves being the dominant cover where present. Many of the trees that lined the banks were deeply undercut. Large woody debris is present and serving multiple functions such as habitat creation and bank protection. Bank slumping is prevalent and there are a lot of slump blocks on the sides of the channel. Downstream the stream is not as entrenched and a monitoring site could be successfully surveyed.

Monitoring Recommendation— This site is not recommended for monitoring due to the dangerous survey conditions. If this portion of 'Temple Mound Creek' is determined to be of management concern, a site could be surveyed in the less entrenched portions of the stream.



Park Unit: OCMU
Proposed Site Number: Oc008
Stream Name: 'Temple Mound Creek' (middle)
Date: 12.06.2018
Time: 9:05 a.m.
Assessed by: JMM and CSC
Accessible: Yes
Gate Key Required: No
Wadeable: Yes
Recommend for Monitoring: Yes

Best Point of Access/Parking: Park at temple mound parking.

Directions from Parking to Site: Walk the service road to the railroad bridge, then walk the trail to within 20 meters (65.6 feet) of the stream.

Management Issues Noted: Trash in the stream and Chinese Tallow.

Safety Concerns: Higher steep banks.

Site Summary— 'Temple Mound Creek' (middle; unnamed first order) is a small sand-bedded stream with a high frequency of large slumps. Wetted width was estimated to be approximately 1 meter (3.3 feet) and bankfull width around 3 meters (9.8 feet). Water depth was approximately 0.09 meters (0.3 feet). Bank heights were approximately 0.4 meters (1.3 feet) where floodplains were present and around 1.5 meters (4.9 feet) where the stream was cutting into the high terrace. Initial assessment of the creek classified the entrenchment of the segment as moderate. Floodplains have developed in a few areas along the segment. The banks were fairly well vegetated (approximately 50–90%) with grasses and shrubs being the dominant cover where present. Large woody debris is present and serving multiple functions such as habitat creation and bank protection. Though the channel bed is very sandy there is a high proportion of gravel in the point and side bars.

Monitoring Recommendation— This site is recommended for monitoring because it is representative of 'Temple Mound Creek' and installation and surveying of the stream will not affect visitor experience. An archaeological survey may be needed prior to installing the survey benchmarks.



Park Unit: OCMU

Proposed Site Number: Oc009

Stream Name: 'Bamboo Creek' (upstream)

Date: 12.06.2018

Time: 9:28 a.m.

Assessed by: JMM and CSC

Accessible: Yes

Gate Key Required: No (railroad gate)

Wadeable: Yes

Recommend for Monitoring: No

Best Point of Access/Parking: Follow walking trail to stream.

Directions from Parking to Site: Could drive to stream if railroad gate keys can be procured.

Management Issues Noted: Trash in the stream, bamboo growing along the stream.

Safety Concerns: High banks.

Site Summary— 'Bamboo Creek' (unnamed first order) is a small sand and gravel bedded stream. Wetted width was approximately 1.65 meters (5.4 feet) and channel-full width was around 6 meters (19.7 feet). Water depth was approximately 0.1 meters (0.3 feet). Bank heights were approximately 1.85 meters (6.1 feet) where the stream was cutting into the high terrace. Initial assessment of the creek classified the entrenchment of the segment as high. No floodplains have developed within the entrenched channel. Slumping has created some lower surfaces inset within the higher terrace surface. The banks were sparsely vegetated (approximately 30–60%) with mosses and leaves being the dominant cover where present. Large woody debris is present and serving multiple functions such as habitat creation and bank protection. A small drainage was observed entering the stream on river left. In addition to some coarser pieces of sediment, there were a lot of bricks in the bed of the stream. Bank slumping and undercutting have progressed to the point where there are quite a few trees close to falling into the stream.

Monitoring Recommendation— This site is not recommended for monitoring because, due to the steep high walls and undercut trees, it would be difficult to safely survey the stream. Additionally, the high amount of development upstream of the segment likely makes the flow regime very flashy and little to no management can be done within the park that would ameliorate the conditions imposed on this stream.



Park Unit: OCMU
Proposed Site Number: Oc010
Stream Name: 'Bamboo Creek' (downstream)
Date: 12.06.2018
Time: 8:08 a.m.
Assessed by: JMM and CSC
Accessible: Yes
Gate Key Required: No
Wadeable: Yes
Recommend for Monitoring: No

Best Point of Access/Parking: Park at end of main park road (past Temple Mound).

Directions from Parking to Site: Walk the southern 'loop' trail to within 100 meters (328 feet) of the stream.

Management Issues Noted: Trash in the stream.

Safety Concerns: High banks and slippery.

Site Summary— 'Bamboo Creek' (downstream; unnamed first order) is a smaller sand and fine bedded stream. Wetted width was approximately 1.5 meter (4.9 feet) and bankfull width around 5.25 meters (17.2 feet). Water depth was approximately 0.2 meters (0.7 feet). Bank heights were approximately 2 meters (6.6 feet) where the stream was cutting into the high terrace. Initial assessment of the creek classified the entrenchment of the segment as high. Floodplains have not developed within the segment. Some lower slump surfaces were observed inset within the high terrace. The banks were sparsely vegetated (approximately 10–40%) with mosses and leaves being the dominant cover where present. Large woody debris is present and serving multiple functions such as habitat creation and bank protection. Many of the banks are either undercut or slumping (or both). There is a large drainage canal approximately 5 meters (16.4 feet) upstream of the assessment point. Flood deposits (dusting of fines) and trash were in the trees overhanging the stream (up to 2.5 meters [8.2 feet] high). The downstream culvert may be too small for the stream and may cause the stream to back up which allows the flood deposits to get so high.

Monitoring Recommendation— This site is not recommended for monitoring because of the safety concerns associated with surveying a stream with steep high banks. Additionally, the segment is too short (due to the drainage canal and the up- and downstream culverts).



Park Unit: OCMU
Proposed Site Number: Oc011
Stream Name: 'Temple Mound Creek' (downstream)
Date: 12.06.2018
Time: 8:44 a.m.
Assessed by: JMM and CSC
Accessible: Yes
Gate Key Required: No
Wadeable: Yes
Recommend for Monitoring: Yes

Best Point of Access/Parking: Park at temple mound parking.

Directions from Parking to Site: Walk the service road upstream to the site. .

Management Issues Noted: Trash in the stream.

Safety Concerns: None.

Site Summary— 'Temple Mound Creek' (downstream; unnamed first order) is a small sand-bedded stream. The stream is located in the center of a small valley. The segment that was assessed was approximately 25 meters (82 feet) downstream from a pedestrian footbridge. Wetted width was estimated to be approximately 1.25 meters (4.1 feet) and bankfull width around 3 meters (9.8 feet). Water depth was approximately 0.04 meters (0.13 feet). Bank heights were approximately 0.25 meters (0.82 feet) where floodplains were present and around 1 meter (3.3 feet) where the stream was cutting into the higher terrace. Initial assessment of the creek classified the entrenchment of the segment as low. Floodplains have developed on point bars and on slump surfaces throughout the segment. The banks were fairly well vegetated (approximately 50–90%) with grasses being the dominant cover where present. Large woody debris is not observed within the stream and no large trees were within 10 meters (32.8 feet) of either bank. Channel banks were not undercut but slumps and benches were prevalent. Most if not all of the bars were vegetated. Briars were very common on the higher terrace on both sides of the stream.

Monitoring Recommendation— This site is recommended for monitoring because it is representative of similar-sized streams in the region and understanding the rates of erosion will help determine rates at which cultural resources may be eroded from the banks. Due to its proximity to the mound sites, an archaeological survey is likely needed prior to installing the survey benchmarks.

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