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April 22, 2015

VIA ELECTRONIC FILING

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Filing of Addendum to Study No. 3.1.1- 2013 Full River Reconnaissance
Turners Falls Hydroelectric Project (FERC No. 1889) and Northfield Mountain Pumped Storage Project (FERC No. 2485)

Dear Secretary Bose:

FirstLight Hydro Generating Company (FirstLight) is currently in the process of relicensing its Turners Falls Hydroelectric Project (FERC No. 1889) and Northfield Mountain Pumped Storage Project (FERC No. 2485) with the Federal Energy Regulatory Commission (FERC). On September 15, 2014, FirstLight filed Study Report No. 3.1.1 entitled 2013 Full River Reconnaissance Report (FRR). On January 22, 2015, FERC issued its Determination on Requests for Study Modification and New Studies. In Appendix B of that document were Staff's recommendations on requested modifications to approved studies.

Relative to the 2013 FRR, FERC indicated that the study report did not include all of the deliverables in the study plan. Specifically, the FRR study report did not include:

(1) A comparison of the specific riverbank features and characteristics from data logging files, or field data sheets, collected during the field surveys to a photograph of that segment of riverbank captured from the digital geo-referenced video and

(2) A comparison of 2007 and 2014 photo logs.

FERC recommended that FirstLight file an addendum to the FRR study that includes this information within 90 days of its letter (or by April 22, 2015). FERC recommended that FirstLight file the addendum after consultation with the Connecticut River Streambank Erosion Committee (CRSEC) and the Connecticut River Watershed Council (CRWC). FERC also requested that FirstLight include documentation of consultation, copies of comments and recommendations on the completed addendum after it has been prepared and provided to CRSEC and CRWC, and specific descriptions of how CRSEC and CRWC's comments were accommodated by the addendum. FERC further noted that if FirstLight did not adopt a recommendation, the filing should include FirstLight's reasons, based on project-specific information.

John S. Howard
Director FERC Compliance, Hydro

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On February 24, 2015, FirstLight sent via email a draft copy of the FRR Addendum to the following stakeholders: CRSEC, CRWC, FERC, National Marine Fisheries Services, Massachusetts Department of Environmental Protection, Massachusetts Riverways, Franklin Conservation District, Landowners and Concerned Citizens for License Compliance, and the Franklin Regional Council of Governments. The Addendum was also posted to the www.northfieldrelicensing.com website. The draft Addendum included two sections as follows:

- Attachment A- Riverbank Segment Quality Assurance Comparison
- Attachment B- 2007 to 2014 Photo Comparison

On March 3, 2015, the same stakeholders were provided a PowerPoint presentation. On March 4, 2015, a meeting was held to discuss the Addendum in Greenfield, MA. A conference call-in line was also offered to those unable to attend in person. At the conclusion of the meeting, FirstLight requested that comments on the Addendum be emailed to FirstLight by April 3, 2015.

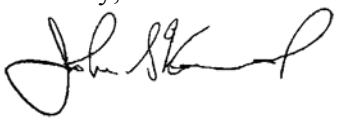
Comments on the Addendum were received by the CRSEC on April 2, 2015. No other comments were received. Per FERC's January 22, 2015 Determination, please find enclosed the following:

- The cover letter provided to stakeholders on February 24, 2015
- The PowerPoint Presentation from the March 4, 2015 meeting
- March 4, 2015 Meeting Minutes
- CRSEC's comment letter
- FirstLight's response to the CRSEC comment letter
- The final draft of the FRR Addendum

The FirstLight responsiveness summary is a matrix listing CRSEC comments and FirstLight's responses to the comments.

If you have any questions regarding the enclosed, or need additional information, please feel free to contact me.

Sincerely,



John Howard

Table 1: Responsive Summary to Comments on Addendum to Study No. 3.1.1- 2013 Full River Reconnaissance Study

Comment No.	CRSEC Comment	FirstLight Response
Connecticut River Streambank Erosion Committee (CRSEC), Letter dated 4/2/2015		
CRSEC-1	[Page 2] The 2015 draft riverbank segment QA comparison submitted by FirstLight lacks key information that would "provide a high level of quality assurance" and a "method for reference checking any subsequent interpretation of the field survey data." A complete data set for the QA comparison should be provided so that FERC staff and stakeholders can replicate the QA methods and have a high degree of confidence in the results of the 2013 FRR.	Field datasheets and GIS layers collected during the land-based survey and observations made during the boat-based survey were compared at the time of initial riverbank segment classification. At the conclusion of 2013 field efforts, a robust QA process was then completed to ensure riverbank segment classifications were representative of actual field conditions as defined in the RSP. FRR data which was used during the QA process included: (1) GIS files containing the riverbank features, characteristics, and erosion classifications of each riverbank segment throughout the Turners Falls Impoundment (Impoundment); (2) video of the Impoundment riverbanks; and (3) photographs of each riverbank segment. While the video was referenced during the QA process it was found that the still photographs provided the highest level of quality assurance and were far more effective for validating or updating field observations. The QA process was completed prior to the final report being submitted; thus, all classifications included in the final report reflect the final, QA'd analysis. From initial classification through final QA, FirstLight used all available FRR data (GIS layers, photos, videos, land-based observations, boat-based observations, etc.) in accordance with the classification and QA requirements of the RSP and QAPP and in compliance with FERC's Study Plan Determination. The addendum provides attribute tables, photos, and observations from the QA process for a select number of riverbank segments while the final report included all data that was collected during the FRR (all photos, videos, GIS Geodatabase, etc.). The combination of the deliverables provided with the final report and addendum provide a complete dataset that would allow the Stakeholders to replicate the QA methods if they so chose.
CRSEC-2	[Page 2] While FirstLight indicated they found gaps that led to adding certain segments, they did not indicate whether or not there was an over-abundance of any riverbank characteristic. FirstLight had said in their QAPP that the QA comparison would be done using video, but they used still images instead.	The selection of segments for the addendum followed a systematic approach of including every 10th segment to cover the full geographic extent of the Impoundment. After review of the coverage with respect to types of riverbank features and characteristics based on the systematic, geographic approach; additional segments were included to ensure coverage of as many riverbank features and characteristics as reasonably possible (e.g., upper riverbanks consisting of boulders are typically found only at bridge abutments which are not of significant interest and were not included in the addendum). No statistical analysis was conducted to evaluate over- or under-abundance of specific riverbank characteristic as the objective was simply to include all characteristics of interest in the addendum. Both the video and the still images were referenced during the initial QA process. After preliminary review of a number of segments it became clear that the still images provided the highest level of resolution and were far more effective for validating or updating field observations than the video was. Furthermore, in order to associate a visual image to a segment and include images in a report, it is necessary to use a still image. If the video is used still images need to be clipped from the video; so it is more direct, and generally provides a better quality image, to directly use the photographs rather than a still image clipped from the video. As such, the still images were used as the primary comparison dataset for all riverbank segments.

Comment No.	CRSEC Comment	FirstLight Response
CRSEC-3	[Page 2] CRSEC continues to believe that sections of the 2013 FRR need to be re-done pursuant to section 5.15(d) of the Commission's regulations because the study was not conducted as provided for in the approved study plan. Specifically, the bank characterization (stage and extent of erosion) should be redone. QA comparison indicates that FirstLight did not follow the definitions laid out in Table 3.1.1-3 of the approved RSP dated August 14, 2013, for Study 3.1.1.	As discussed in both the final Study Report filed in September 2014 and FirstLight's response to ISR comments filed in December 2014, FirstLight conducted the 2013 FRR in compliance with FERC's Study Plan Determination. The methods, equipment, and personnel used for the 2013 FRR were approved by FERC prior to commencement of the survey. FirstLight disagrees with CRSEC's assertion that the stage and extent of erosion should be redone because FirstLight did not follow the definitions laid out in Table 3.1.1-3 of the approved RSP. The RSP states that: *"Riverbanks consist of an irregular surface and include a range of natural materials (silt/sand, gravel, cobbles, boulders, rocks, clay), above ground vegetation (from grasses to trees), and below ground roots of different densities and sizes. Due to these characteristics, there are small areas of disturbance which often occur at interfaces between materials, particularly in the vicinity of the water surface. These small disturbed areas can be considered as erosion, or sometimes can result from deposition, or even eroded deposition. No natural riverbank exists which does not have at least some relatively small degree of disturbance or erosion associated with the natural combination of sediment types/sizes and vegetation. As such, the extent of erosion for generally stable riverbanks that include these small disturbed areas is characterized as little/none."* FirstLight's technical experts applied that principle when determining the stage and extent of erosion. No natural riverbank exists which does not have some degree of disturbance. It was with this principle in mind, combined with the definitions provided in the RSP, that FirstLight classified the stage and extent of erosion for each riverbank segment. This is further explained in the final FRR report (page 6-5) when it is stated that: *"…it is observed in the Appendix figures and summary statistics that along a considerable length of the river erosional features such as undercuts, notching, exposed roots, and creep/leaning trees were observed and noted but were not considered sufficient to elevate segments from one Stage or Extent classification to another. Such segments were well below any reasonable threshold of being considered for stabilization or preventative maintenance efforts."* The methodology used during the 2013 FRR was in compliance with FERC's Study Plan Determination.
CRSEC-4	[Page 2] For example, CRSEC has determined that 24 of the segments used in the QA analysis do not meet the definitions laid out in Table 3.1.1-3. These segments were classified as *stable* but had one or multiple *indicators of erosion* and often a *type of erosion* (e.g., undercut). In Table 3.1.1-3, stable is defined as "riverbank segment does not exhibit types or indicators of erosion." The 24 segments characterized as both "stable" and with an Erosion Type and/or Indicator of Erosion are: 20, 30, 40, 50, 110, 130, 160, 180, 240, 290, 320, 390, 400,410, 430,440,450, 460, 510, 520, 530, 550, 279, and 89.	See response to comment CRSEC-3. No natural riverbank exists which does not have some degree of disturbance.
CRSEC-5	[Page 3] Segment 230 (Addendum page A-76 and slides 21 and 22 of PowerPoint presentation for 3/4/15 meeting) exhibited three indicators of potential erosion. The stage of erosion is listed as "Potential Future Erosion" and the Extent of Current Erosion is listed as "Some," which is defined as 10-40% of the bank has active erosion. The bank indeed has erosion based on the photos. It appears that a fall has occurred where a tree that had been growing on the upper bank is now sitting on the lower bank. We are surprised that, on further analysis, it was not determined that this segment merited a state of erosion as "active erosion or eroded." When asked about this at the March 4, 2015 meeting, Bob Simons said that it was a good question, but he thought this segment had good indicators of erosion. To CRSEC, this is an indication that the FRR does not follow its approved RSP and is very subjective.	For the 2013 FRR, a segment was classified in the potential future erosion category if there were a number of significant indicators of potential future erosion. Segment 230 has Creep/Leaning trees, Overhanging bank, and Exposed roots, which are indicators of potential future erosion. Eroded or actively eroding segments have progressed further in the stage of erosion than those that are in the potential category and show more exposed soil and recent or ongoing evidence of erosion. While Segment 230 demonstrates indicators of potential future erosion, the extent of exposed soil is relatively small and active erosion or ongoing erosion processes or categories are not evident. It is the professional opinion of the expert team that segments, including 230, were appropriately and reasonably categorized according to the definitions in the RSP and QAPP due to the fact that this and other similar segments were dominated by indicators of potential future erosion.

Comment No.	CRSEC Comment	FirstLight Response
CRSEC-6	[Page 3] A review of the pictures and summary table information provided in the QA comparison indicates the stage and extent of erosion were not properly identified using the definitions in Table 3.1.1-3. We've discussed our concerns about characterizing banks as stable (stage of erosion). We also have concerns about the same segments being characterized as having none/little erosion (extent of erosion), which is defined as "generally stable bank where the total surface area of the bank segment has approximately less than 10% active erosion present". The stage and extent of erosion for the segments cannot be verified because FirstLight provided only partial information for each of the QA segments.	In regard to the stage and extent of erosion, see response to comment CRSEC-3. The draft addendum contained: 1) a representative photo of a given segment with all riverbank features, characteristics, and erosion conditions clearly labeled; 2) a map denoting the location of the segment relative to the Impoundment; 3) a table summarizing the classification for that segment; and 4) photos of the upstream, middle, and downstream portion of the segment. In its comment letter, the CRSEC pointed out several sites in the draft addendum that were missing some photos; those oversights have been corrected in the final submission. Furthermore, every video and photo captured during the 2013 FRR was distributed to the CRSEC when the final Study Report was filed in September 2014. FirstLight has provided the Stakeholders with all available information which was collected during the 2013 FRR.
CRSEC-7	[Pages 3-4] We believe the data set for each QA segment should include: 1. The length of each segment clearly identified with start and end points. Part of the QA process should be verifying the characteristics that differentiate one segment from another. We noted in our November 14, 2014 comment letter that Extent of Erosion is highly dependent on the breakdown of river segments and how these segments were mischaracterized in the FRR segments. 2. The field data sheets and data logging files for each segment. This is the only record, other than photographs, of the river bank characteristics, including the stage and extent of erosion for each segment. (See our November 14, 2014letter for a list of deliverables in the approved RSP that were not provided to stakeholders.) 3. All pictures for each segment, presented sequentially (downstream to upstream) and clearly labeled with the downstream and upstream limits of the segment and the riverbank features and erosion classifications pursuant to Table 3.1.1-3. We found that most segments are missing pictures or have pictures that show the same area. For example, the pictures for segment 10 are the same. We further note that the location of segment 10 on the map does not align with the location of the pictures included in the QA addendum. 4. A discussion of how the stage and extent of erosion was determined. When viewed in their entirety, the pictures for each segment should clearly reflect the information in the QA summary table for each segment. Most of the QA segments indicate that the banks is “stable” with “none/little” erosion. These classifications do not meet the definitions in Table 3.1.1-3 and are not supported by the QA data presented by FirstLight.	1. As requested, FirstLight has updated all photos included in the addendum which show more than one segment to include boundary lines marking the downstream and/or upstream extent of each riverbank segment. FirstLight believes the segments were delineated in accordance with the procedures set forth in FERC’s Study Plan Determination. 2. As stated in FirstLight’s response to ISR Comments, the QAPP stated that either field datasheets or dataloggers would be used to record field observations. Field personnel chose to use dataloggers/field computers, as had been done in all previous FRRs. All information was provided to the Stakeholders when FirstLight filed the final Study Report and distributed the geodatabase. The Stakeholders have all information that was collected in the field. There are no other data to provide. See FirstLight’s response to ISR comments for additional information. 3. As requested, FirstLight has arranged all photos sequentially and labeled the downstream and upstream limits of each segment. Specific corrections cited by the Stakeholders were also addressed (i.e., missing photos added, maps updated, etc.). Additionally, FirstLight included one labeled photo for each segment which denoted the riverbank features, characteristics, and erosion classifications. The labeled photos were generally representative of the larger segment and provided insight into how a given segment was classified. Given that the labeled photos were typically representative of the larger segment, labeling of additional photographs was not deemed necessary and not included in the final addendum. Furthermore, the labeling of all photos would have required a significant level of effort with minimal benefits gained. The location of segment 10 on the map and the photos used for segment 10 were reviewed and were found to be the correct photos from the correct segment. 4. Discussion of how all riverbank features, characteristics, and erosion conditions (including the Stage and Extent of Erosion) were classified was included in the final Study Report. The purpose of the addendum was to document a QA comparison of observations made in the field with observations made from examining photographs of each segment and to discuss the findings of the QA process. As such, the addendum was not updated to include this recommendation. In regard to the assertion that most of the QA segments classified as “stable” with “none/little” erosion do not meet the definitions in Table 3.1.1-3, please refer to FirstLight’s response to comment CRSEC-3.
CRSEC-8	Using the definition from the approved RSP that “stable” is having no types or indicators of erosion, then only 233 segments of the 459 segments categorized as “stable” meet the definition of stable. These 233 segments add up to approximately 97,500 feet of river bank length, which is about 43% of the total river bank length (not including islands). This is in stark contrast to Table 6-1 in the FRR which stated that 83.5% of the length of river bank was categorized as “stable.”	See response to comment CRSEC-3. No natural riverbank exists which does not have some degree of disturbance. FirstLight respectfully suggests that the CRSEC is not correctly interpreting the classification methodology laid out in the RSP and discussed in the final Study Report and FirstLight response to ISR comments. FirstLight stands by the riverbank classifications observed in the field, confirmed or updated during the QA process, and published in the final Study Report. The 2013 FRR was conducted by MADEP and FERC approved experts who followed FERC’s Study Plan Determination.

Comment No.	CRSEC Comment	FirstLight Response
CRSEC-9	Based on the information provided in the FRR Addendum, the QA/QC effort did not correct the error of interpreting stage and extent of erosion categorization differently from the definitions laid out in the approved RSP. CRSEC continues to assert that the 2013 FRR was not conducted as written in the approved RSP and instead was conducted based on subjectivity skewed to interpreting banks as stable. The stages of erosion and extent of erosion for the 2013 FRR should be re-calculated according to FirstLight's own definition of the stages and extent. In summary, the QA addendum and the interpretation of the data collected for the 2013 FRR do not support the conclusion of overall bank stability reached by FirstLight.	See response to comments CRSEC-3 and CRSEC-8. The classifications and summary statistics confirmed during the QA process and included in the final Study Report provide an accurate representation of riverbank conditions throughout the Impoundment.

ATTACHMENT A: 2013 Full River Reconnaissance – 2015 Addendum: Riverbank Segment QA Comparison

On 1/22/2015, FERC issued a letter to FirstLight requesting an addendum to the 2013 Full River Reconnaissance (FRR) report. One of the requirements of the FERC letter was for FirstLight to conduct a comparison of the specific riverbank features and characteristics from data logging files collected during the field surveys to a photograph of that segment of riverbank captured from the digital geo-referenced video in accordance with the methodology discussed in the FRR Quality Assurance Project Plan (QAPP). The results of these comparisons are enclosed within.

During the 2013 FRR, Turners Falls Impoundment (Impoundment) riverbanks were subdivided into approximately 600 segments based on their individual features and characteristics in accordance with the methodology outlined in the Revised Study Plan (RSP). As part of the 2013 FRR field work, geo-tagged photographs were taken along the length of the Impoundment to visually document riverbank conditions at the time of the field survey. The segments delineated during the survey combined with the photographs collected in the field were used to conduct a Quality Assurance (QA) comparison consistent with the approach discussed in the 2013 FRR QAPP (p.13):

> *"The process of comparing the data logging files to video/still images of a selected percentage of segments, or any segment of particular interest, provides a high level of quality assurance and control on the field data collected. This approach also provides a method for reference checking any subsequent interpretation of the field survey data after the survey has been completed."*

Riverbank Segment QA Comparison Site Selection

This Attachment was developed in accordance with the QAPP to provide a comparison of the data logging files to images of a *"selected percentage of segments."* In order to cover the length of the Impoundment and to avoid bias in the selection process, every tenth riverbank segment was selected for inclusion in the addendum. Using this approach, 59 segments were identified for comparison. Once the initial set of segments were determined, the riverbank features and characteristics observed at each location were examined. Based on this review, it was found that the majority of the riverbank features and characteristics identified in the RSP were represented; however, several data gaps were identified. In order to fill these gaps, and to complement the original 59 segments with additional segments of interest, 6 supplemental segments were identified. Supplemental segments included: 12, 89, 182, 279, 332, and 403. This systematic selection process ensured an unbiased, representative coverage of not only the geographic extent of the Impoundment but also of the features and characteristics observed during the 2013 FRR.

Table 1 provides a summary of the features and characteristics present at the riverbank segments selected for QA (i.e. every tenth segment plus supplemental segments). As observed in the table, all features and characteristics are present except for:

- Upper Riverbank Sediment – Clay
- Upper Riverbank Sediment – Gravel
- Upper Riverbank Sediment – Cobbles

- Potential Erosion Indicator – Tension Cracks

These characteristics were not included in this addendum because they were found to be either uncommon or non-existent during the field survey.

Table 1 - Summary of riverbank features and characteristics: Every tenth segment plus supplemental segments

Riverbank Features	Characteristics					
Upper Riverbank Slope	**Overhanging** Yes	**Vertical** Yes	**Steep** Yes	**Moderate** Yes	**Flat** Yes	
Upper Riverbank Height	**Low** Yes	**Medium** Yes	**High** Yes			
Upper Riverbank Sediment	**Clay** No	**Silt/Sand** Yes	**Gravel** No	**Cobbles** No	**Boulders** Yes	**Bedrock** Yes
Upper Riverbank Vegetation	**None to Very Sparse** Yes	**Sparse** Yes	**Moderate** Yes	**Heavy** Yes		
Lower Riverbank Slope	**Vertical** Yes	**Steep** Yes	**Moderate** Yes	**Flat/Beach** Yes		
Lower Riverbank Sediment	**Clay** Yes	**Silt/Sand** Yes	**Gravel** Yes	**Cobbles** Yes	**Boulders** Yes	Bedrock Yes
Lower Riverbank Vegetation	**None to Very Sparse** Yes	**Sparse** Yes	**Moderate** Yes	**Heavy** Yes		
Type of Erosion	**Falls-Undercut** Yes	**Falls-Gullies** Yes	**Topples** Yes	**Slide or Flow** Yes	**Planar Slip** Yes	**Rotational Slump** Yes
Potential Erosion Indicators	**Tension Cracks** No	**Exposed Roots** Yes	**Creep/Leaning Trees** Yes	**Overhanging Bank** Yes	**Notch** Yes	**Other** Yes
Stage of Erosion	**Potential Future Erosion** Yes	**Active Erosion** Yes	**Eroded** Yes	**Stable** Yes		
Extent of Erosion	**None/Little** Yes	**Some** Yes	**Some to Extensive** Yes	**Extensive** Yes		

Riverbank Segment QA Comparison Methodology

During the development of the 2013 FRR report, riverbank features and characteristics identified in the field and recorded on the datalogger were cross-checked with the geo-tagged photographs as a means of data QA. This QA process was completed in accordance with the QAPP (pg. 13, see quote on previous page). The QAPP also states that, *"A discussion will be presented in the FRR report based on this comparison."*

Geo-tagged riverbank photographs taken during the 2013 FRR were reviewed for the riverbank segments to compare, verify, and modify (if appropriate) riverbank features and characteristics that were recorded in the field. The first step in this process was to associate geo-tagged photographs with riverbank segments. This was conducted by comparing the riverbank segment maps with the location where the photographs were taken from the boat and the characteristics found at each segment. The riverbank segments selected for comparison are presented in Figures 1 through 5. The riverbank segments were delineated using the process and equipment described in the RSP. This process included shooting the endpoints of each segment from the boat to the riverbank with a laser rangefinder linked to the GPS antenna. The geotagged photo then used another GPS antenna location linked to the camera to provide the approximate location where the photograph was taken from the boat.

Material provided in this attachment for each selected segment includes:

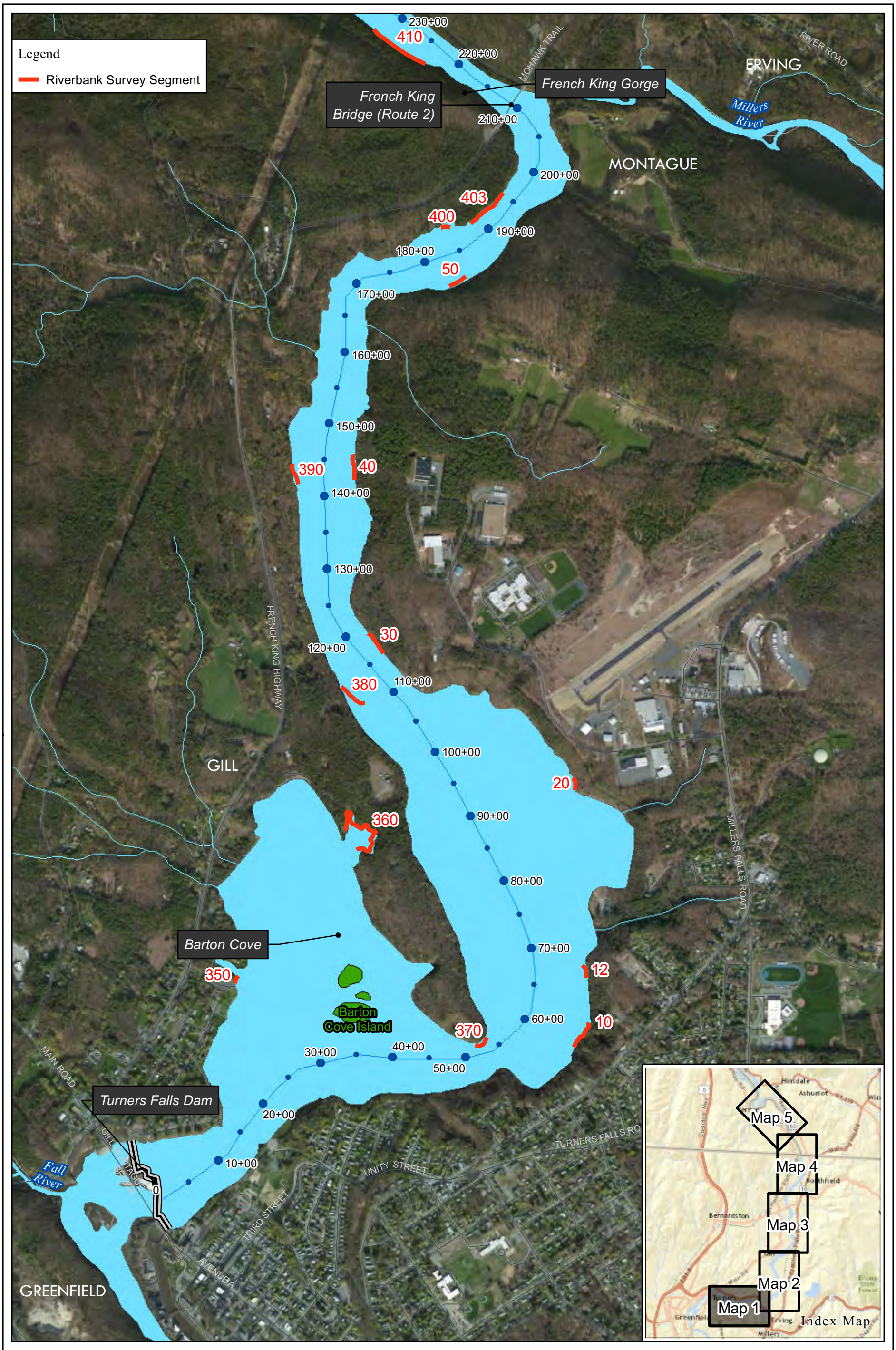
(1) All photographs for each selected segment (due to the size of many of the segments, multiple photographs were required to capture the entire segment);

(2) One photograph per segment labeled to demonstrate the identification of various riverbank features and characteristics;

(3) A table of riverbank features and characteristics found at that segment;

(4) A Google Earth screenshot depicting the approximate location of the photograph created from Red Hen Systems software (IsWhere);

(5) A brief sentence detailing any QA observations.



FIRSTLIGHT POWER RESOURCES

RELICENSING STUDY 3.1.1
NORTHFIELD MOUNTAIN/TURNERS FALLS
2013 FULL RIVER RECONNAISSANCE

0 650 1,300 2,600 Feet

2015 FRR Addendum
Selected Riverbank Segments for QA
Map 1

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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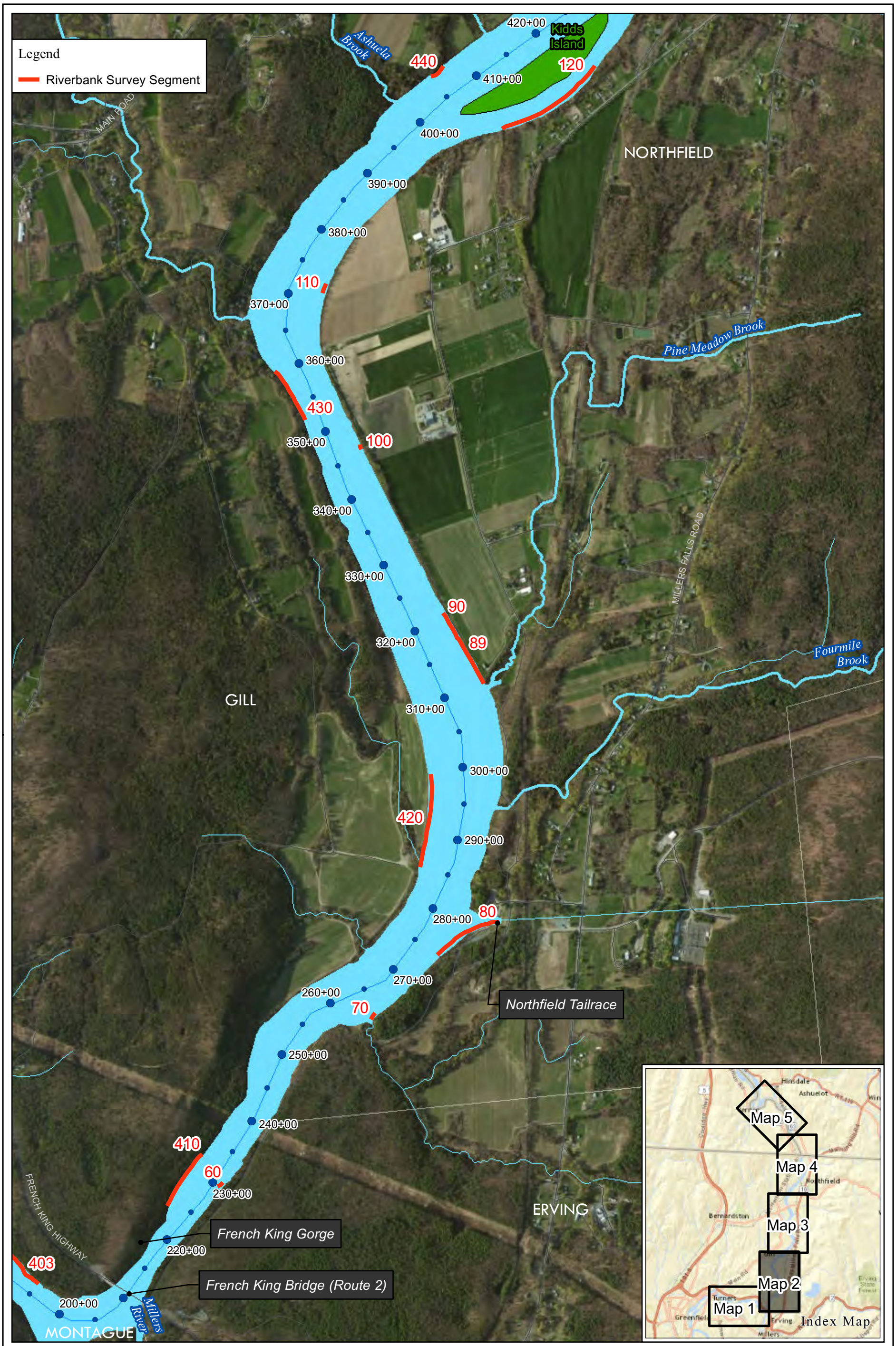

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FIRSTLIGHT POWER RESOURCES

RELICENSING STUDY 3.1.1
NORTHFIELD MOUNTAIN/TURNERS FALLS
2013 FULL RIVER RECONNAISSANCE

0 650 1,300 2,600 Feet

2015 FRR Addendum
Selected Riverbank Segments for QA
Map 2

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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Riverbank Survey Segment

182
180
610+00
600+00
490
170
590+00
580+00
480
570+00
560+00
470
160
550+00
540+00
530+00
150
520+00
460
510+00
140
500+00
490+00
480+00
470+00
450
130
460+00
450+00
440+00
430+00
420+00

Route 10 Bridge
(Bennett's Meadow Bridge)

NORTHFIELD
BERNARDSTON
GILL
Kidds Island

Bennett Brook
Bailey Brook
Miller's Brook
Roaring Brook
Ashuela Brook
Otter Run
Connecticut River

MOUNT HERMON STATION ROAD
ROUTE 10
MAIN ROAD
MAIN STREET
WARWICK ROAD
MAPLE STREET
MILLERS FALLS ROAD

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RELICENSING STUDY 3.1.1
NORTHFIELD MOUNTAIN/TURNERS FALLS
2013 FULL RIVER RECONNAISSANCE

0 650 1,300 2,600 Feet

2015 FRR Addendum
Selected Riverbank Segments for QA
Map 3

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Riverbank Survey Segment

830+00
820+00
810+00
800+00
790+00
780+00
770+00
760+00
750+00
740+00
730+00
720+00
710+00
700+00
690+00
680+00
670+00
660+00
650+00
640+00
630+00

260
530
250
520
240
230
220
510
210
500
200
190

VERNON
HINSDALE
WINCHESTER
NORTHFIELD
VERMONT
MASSACHUSETTS
NEW HAMPSHIRE
MASSACHUSETTS

POND RD
FORT BRIDGMAN RD
Newton Brook
South Scofield Mtn Rd
Bolton Woods
Bolton Rd
South Parrish Rd
Northfield Rd
Staddle Hill Rd
Saczawa Dr
South Parrish Rd
Gosselin Rd
No Name
Avery Cir
Conner Ct
Avery Cir
Mine Rd
Bottom Brook
WEST NORTHFIELD ROAD
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WANAMAKER ROAD
Pauchaug Brook
Louisiana Brook
Mallory Brook
MOUNT HERMON STATION ROAD
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FIRSTLIGHT POWER RESOURCES

RELICENSING STUDY 3.1.1
NORTHFIELD MOUNTAIN/TURNERS FALLS
2013 FULL RIVER RECONNAISSANCE

0 650 1,300 2,600 Feet

2015 FRR Addendum
Selected Riverbank Segments for QA
Map 4

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FirstLight GDF SUEZ

FIRSTLIGHT POWER RESOURCES

RELICENSING STUDY 3.1.1
NORTHFIELD MOUNTAIN/TURNERS FALLS
2013 FULL RIVER RECONNAISSANCE

0 650 1,300 2,600 Feet

2015 FRR Addendum
Selected Riverbank Segments for QA
Map 5

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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Segment 10 – Left Bank

Photo ID 259 (photo covers segment)

Photo ID 260 (D/S, left of line)

Segment 10 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Flat
Upper Riverbank Height	Low
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	Creep/leaning trees
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 20 – Left Bank

Photo ID 231 (D/S, left of line)

Photo ID 232 (D/S, left of line)

Photo ID 230 (U/S, right of line)

Segment 20 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	Low
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 30 – Left Bank

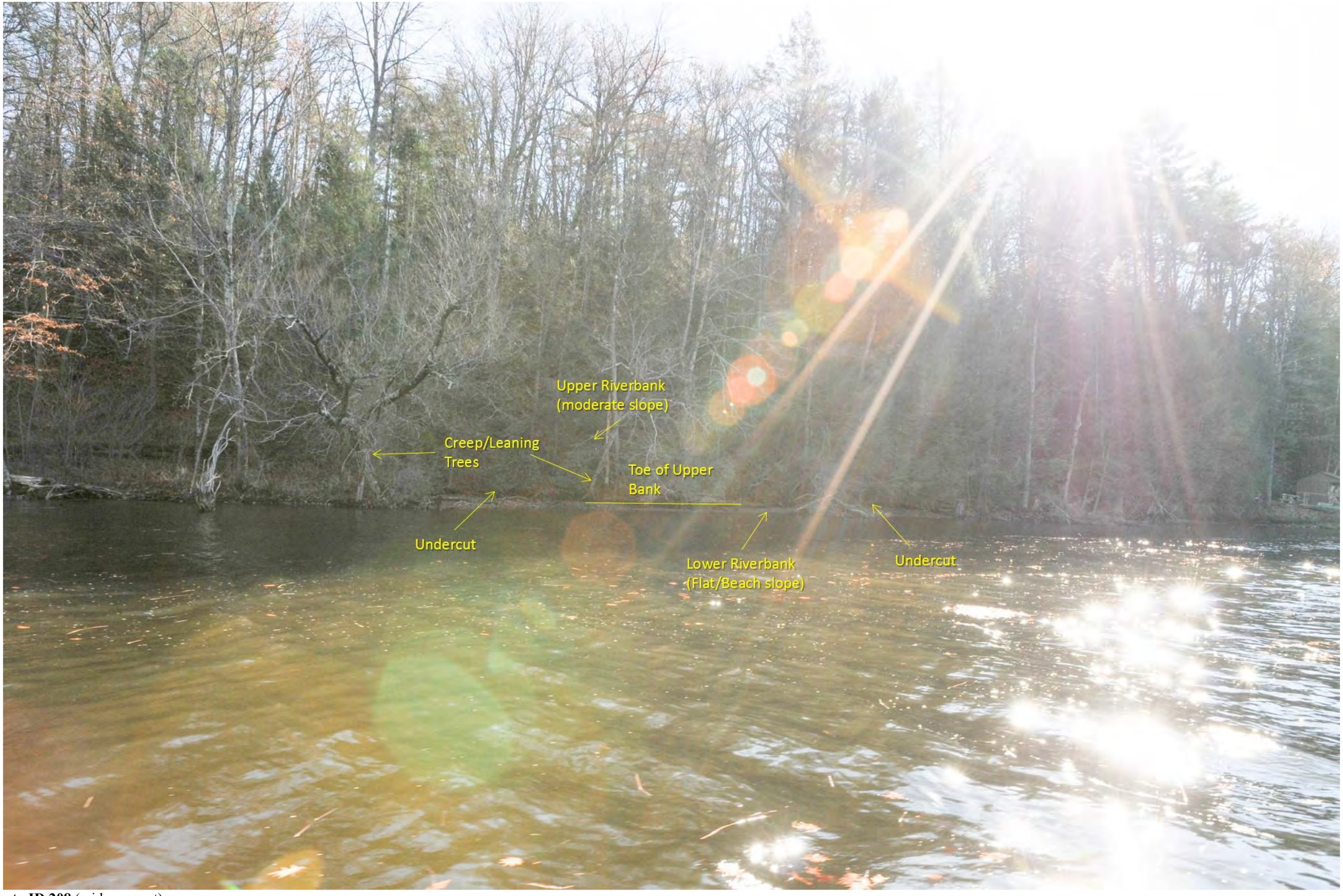


Photo ID 208 (mid-segment)

Photo ID 209 (D/S, left of line)

Photo ID 207 (U/S, right of line)

Segment 30 –Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 40 –Left Bank

Photo ID 193 (mid-segment to D/S)

Photo ID 192 (middle)

Photo ID 191 (U/S, right of line)

Segment 40 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 50 – Left Bank

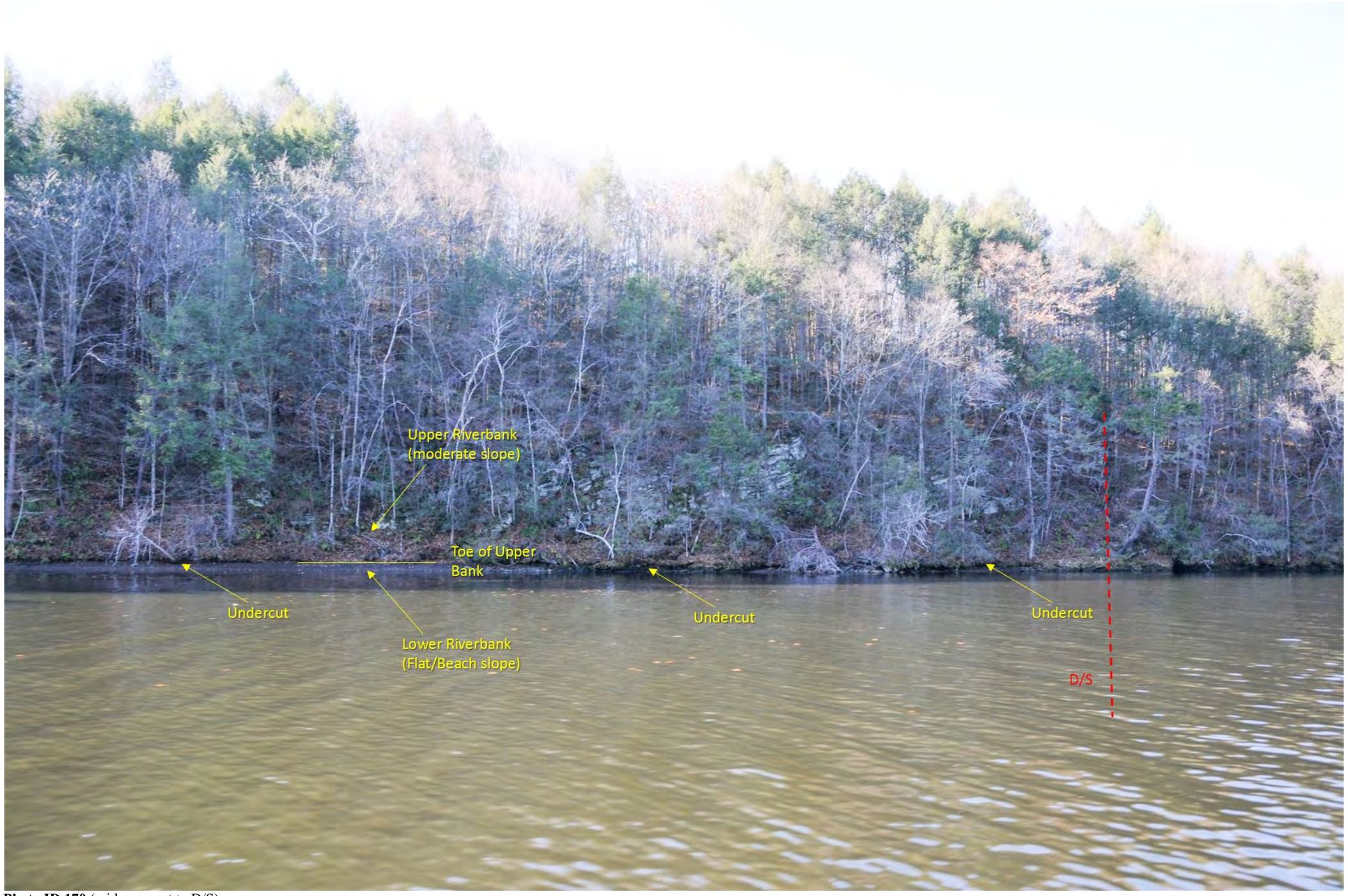


Photo ID 170 (mid-segment to D/S)

Photo ID 169 (U/S, right of line)

Segment 50 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Gravel
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 60 – Left Bank

Photo ID 144 (photo covers segment)

Segment 60 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Bedrock
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 70 – Left Bank

Photo ID 122 (photo covers segment)

Segment 70 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Sparse
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Gravel
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Slide
Potential Erosion Indicators	Creep/leaning trees, Overhanging bank, Exposed roots
Stage of Erosion	Active Erosion
Extent of Erosion	Extensive

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 80 – Left Bank

Photo ID 112 (mid-segment)

Photo ID 115 (D/S, left of line)

Photo ID 114 (middle)

Photo ID 113 (middle)

Photo ID 111 (U/S, right of line)

Segment 80 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Boulders
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 90 – Left Bank

Photo ID 613 (photo covers segment)

Segment 90 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Rotational Slump, Undercut
Potential Erosion Indicators	Overhanging bank, Exposed roots, Creep/leaning trees
Stage of Erosion	Eroded
Extent of Erosion	Extensive

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 100 – Left Bank

Photo ID 632 (photo covers segment)

Segment 100 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	Low
Upper Riverbank Sediment	Boulders
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Boulders
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	None
Potential Erosion Indicators	
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 110 – Left Bank

Photo ID 649 (D/S, left of line)

Photo ID 650 (U/S, right of line)

Segment 110 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	Creep/leaning trees, Exposed roots
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 120 – Left Bank

Photo ID 678 (mid-segment)

Photo ID 675 (D/S, left of line)

Photo ID 676 (D/S)

Photo ID 677 (middle)

Photo ID 679 (middle)

Photo ID 680 (middle)

Photo ID 681 (middle)

Photo ID 682 (middle)

Photo ID 683 (middle)

Photo ID 684 (U/S)

Photo ID 685 (U/S, right of line)

Segment 120 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Cobbles
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 130 – Left Bank

Photo ID 717 (U/S)

Photo ID 716 (D/S, left of line)

Segment 130 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Boulders
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Exposed roots, Creep/leaning trees
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 140 – Left Bank

Photo ID 745 (middle)

Photo ID 743 (D/S, left of line)

Photo ID 744 (middle to D/S)

Photo ID 746 (U/S, right of line)

Segment 140 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Slide
Potential Erosion Indicators	Exposed roots, Creep/leaning trees, Overhanging bank, Notch
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 150 – Left Bank

Photo ID 765 (U/S)

Photo ID 764 (D/S, left of line)

Segment 150 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Cobbles
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Topples, Undercut
Potential Erosion Indicators	Creep/leaning trees, Exposed roots
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 160 – Left Bank

Photo ID 784 (U/S)

Photo ID 782 (D/S, left of line)

Photo ID 783 (middle to U/S)

Segment 160 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Exposed roots, Creep/leaning trees
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 170 – Left Bank

Photo ID 822 (U/S)

Photo ID 820 (D/S, left of line)

Photo ID 821 (mid-segment)

Segment 170 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Overhanging
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Slide
Potential Erosion Indicators	Overhanging bank, Exposed roots, Creep/leaning trees
Stage of Erosion	Eroded
Extent of Erosion	Some to Extensive

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 180 – Left Bank

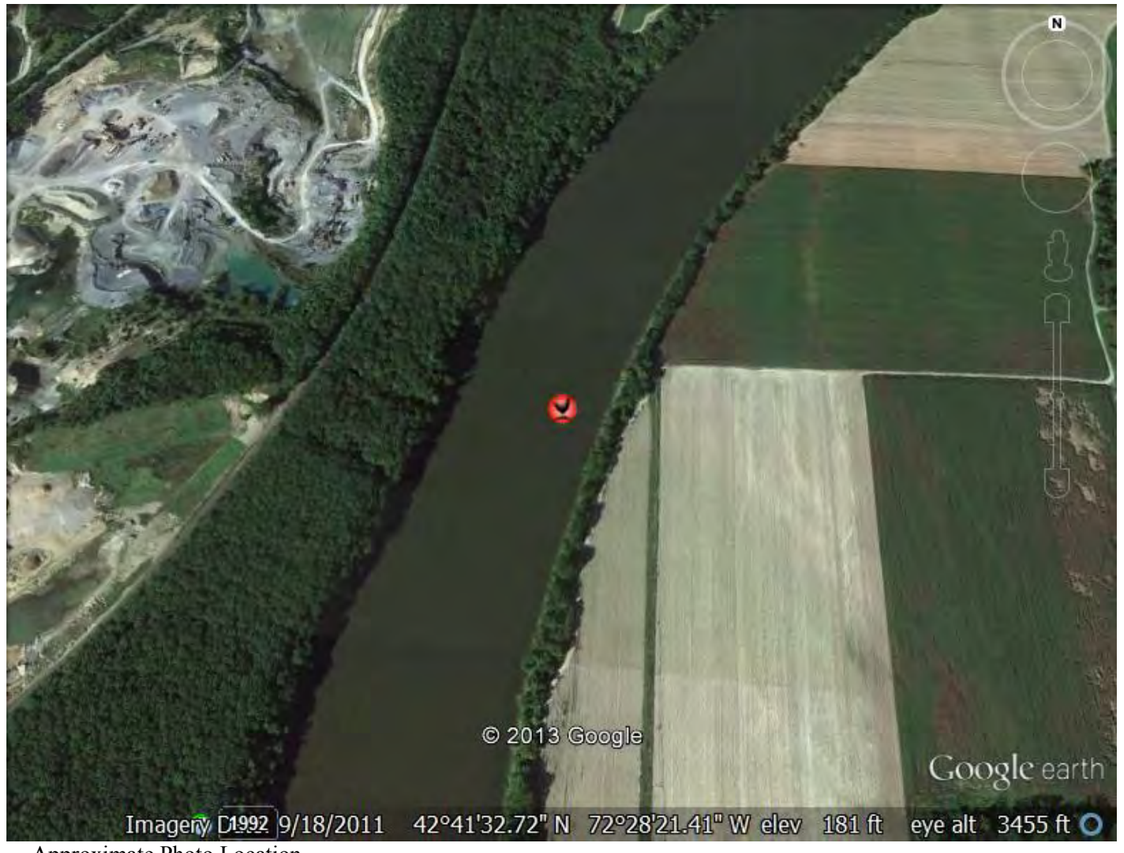
Photo ID 844 (U/S)

Photo ID 843 (D/S to middle/upper portion of segment)

Segment 180 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees, Exposed roots
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.



Approximate Photo Location

Segment 190 – Left Bank

Photo ID 854 (U/S to mid-segment)

Photo ID 853 (D/S, left of line)

Segment 190 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Overhanging
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Slide, undercut
Potential Erosion Indicators	Exposed roots, Overhanging bank, Creep/leaning trees
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 200 – Left Bank

Photo ID 867 (mid-segment)

Photo ID 866 (D/S, left of line)

Photo ID 868 (U/S, right of line)

Segment 200 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees, Exposed roots, Overhanging bank
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 210 – Left Bank

Photo ID 883 (U/S)

Photo ID 882 (D/S, left of line)

Segment 210 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	Low
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Boulders
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	Creep/leaning trees
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 220 – Left Bank

Photo ID 903 (U/S)

Photo ID 902 (D/S, left of line)

Segment 220 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Cobbles
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees, Exposed roots
Stage of Erosion	Potential Future Erosion
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 230 – Left Bank

Photo ID 1707 (D/S)

Photo ID 1706 (U/S, right of line)

Segment 230 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Overhanging
Upper Riverbank Height	Medium
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	Creep/leaning trees, Overhanging bank, Exposed roots
Stage of Erosion	Potential Future Erosion
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 240 – Left Bank

Photo ID 1702 (D/S)

Photo ID 1701 (mid-segment)

Photo ID 1700 (U/S, right of line)

Segment 240 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Vertical
Upper Riverbank Height	Low
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees, Exposed roots, Overhanging bank
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 250 – Left Bank

Photo ID 1670 (photo covers segment)

Segment 250 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Overhanging
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Slide, Rotational Slump
Potential Erosion Indicators	Overhanging bank, Creep/leaning trees, Exposed roots,
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 260 – Left Bank

Photo ID 1661 (mid-segment to D/S)

Photo ID 1660 (mid-segment to U/S)

Photo ID 1659 (U/S, right of line)

Segment 260 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Boulders
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Rotational Slump, Undercut
Potential Erosion Indicators	Creep/leaning trees, Overhanging bank, Exposed roots
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 270 – Left Bank

Photo ID 1647 (D/S)

Photo ID 1646 (U/S, right of line)

Segment 270 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 280 – Left Bank

Photo ID 1628 (mid-segment)

Photo ID 1631 (D/S, left of line)

Photo ID 1630 (D/S to mid-segment)

Photo ID 1629 (mid-segment)

Photo ID 1627 (mid-segment)

Photo ID 1626 (U/S, right of line)

Segment 280 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees, Exposed roots, Overhanging bank
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

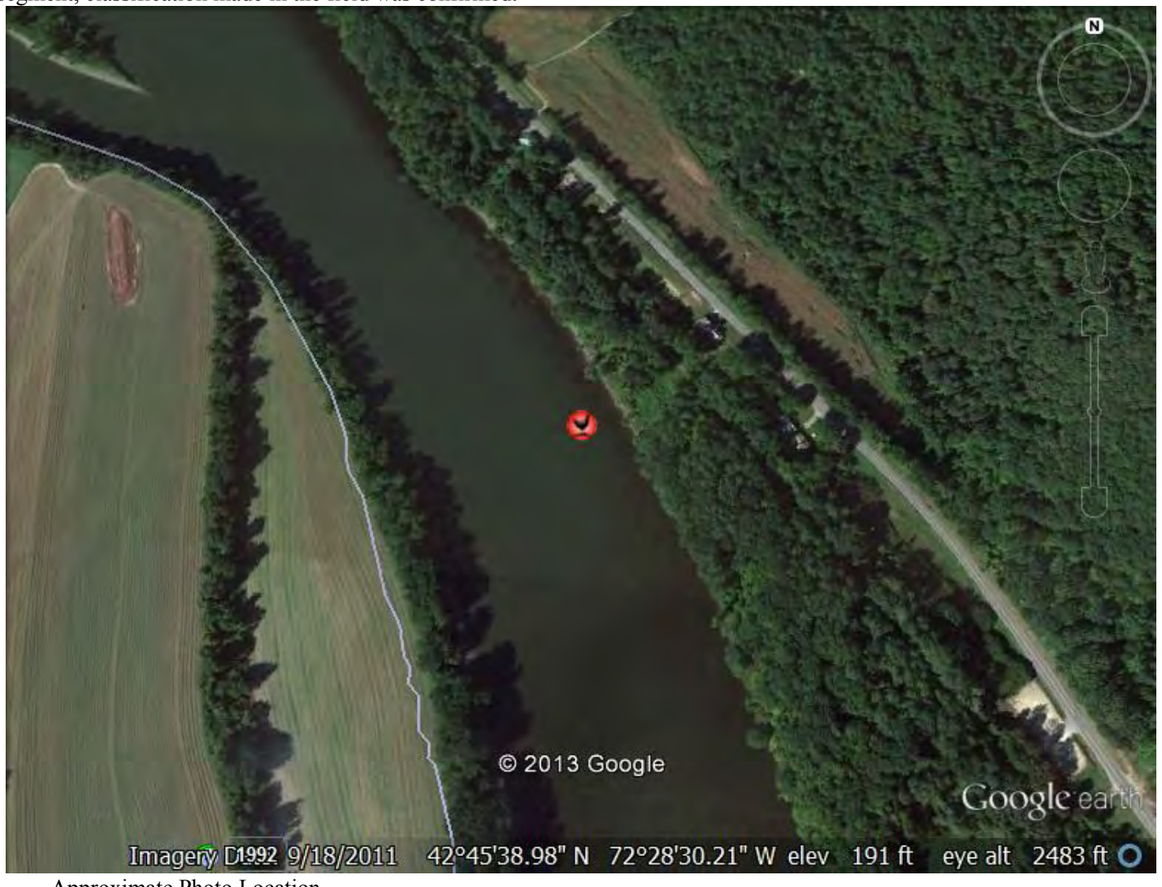
Segment 290 – Left Bank

Photo ID 1605 (photo covers segment)

Segment 290 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	gravel
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.



Approximate Photo Location

Segment 300 – Left Bank

Photo ID 1586 (mid-segment)

Photo ID 1587 (D/S, left of line)

Photo ID 1585 (mid-segment)

Photo ID 1584 (U/S, right of line)

Segment 300 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	Moderate
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 310 – Left Bank

Photo ID 1564 (D/S to middle)

Photo ID 1563 (U/S, right of line)

Segment 310 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	Medium
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Slide
Potential Erosion Indicators	Other, Creep/leaning trees, Exposed roots, Overhanging bank
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 320 – Left Bank

Photo ID 1447 (photo covers segment)

Segment 320 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/Leaning trees, Exposed Roots
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 330 – Left Bank

Photo ID 1429 (D/S)

Photo ID 1428 (middle)

Photo ID 1427 (U/S, right of line)

Segment 330 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Slide
Potential Erosion Indicators	Creep/leaning trees, Overhanging bank, Exposed roots
Stage of Erosion	Eroded
Extent of Erosion	Some

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 340 – Left Bank

Photo ID 1408 (near mid-segment)

Photo ID 1410 (D/S, right of line)

Photo ID 1409 (middle)

Photo ID 1407 (middle)

Photo ID 1406 (U/S, right of line)

Segment 340 – Left Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Bedrock
Upper Riverbank Vegetation	None to very sparse
Lower Riverbank Slope	Steep
Lower Riverbank Sediment	Bedrock
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 350 – Right Bank

Photo ID 314 (photo covers segment)

Segment 350 – Right Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Flat
Upper Riverbank Height	Low
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 360 – Right Bank

Photo ID 348 (near mid-segment)

Photo ID 346 (D/S, right of line)

Photo ID 347 (middle)

Photo ID 349 (middle)

Photo ID 350 (middle)

Photo ID 351 (U/S, left of line)

Segment 360 – Right Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Bedrock
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Steep
Lower Riverbank Sediment	Bedrock
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 370 – Right Bank

Photo ID 383 (near mid-segment)

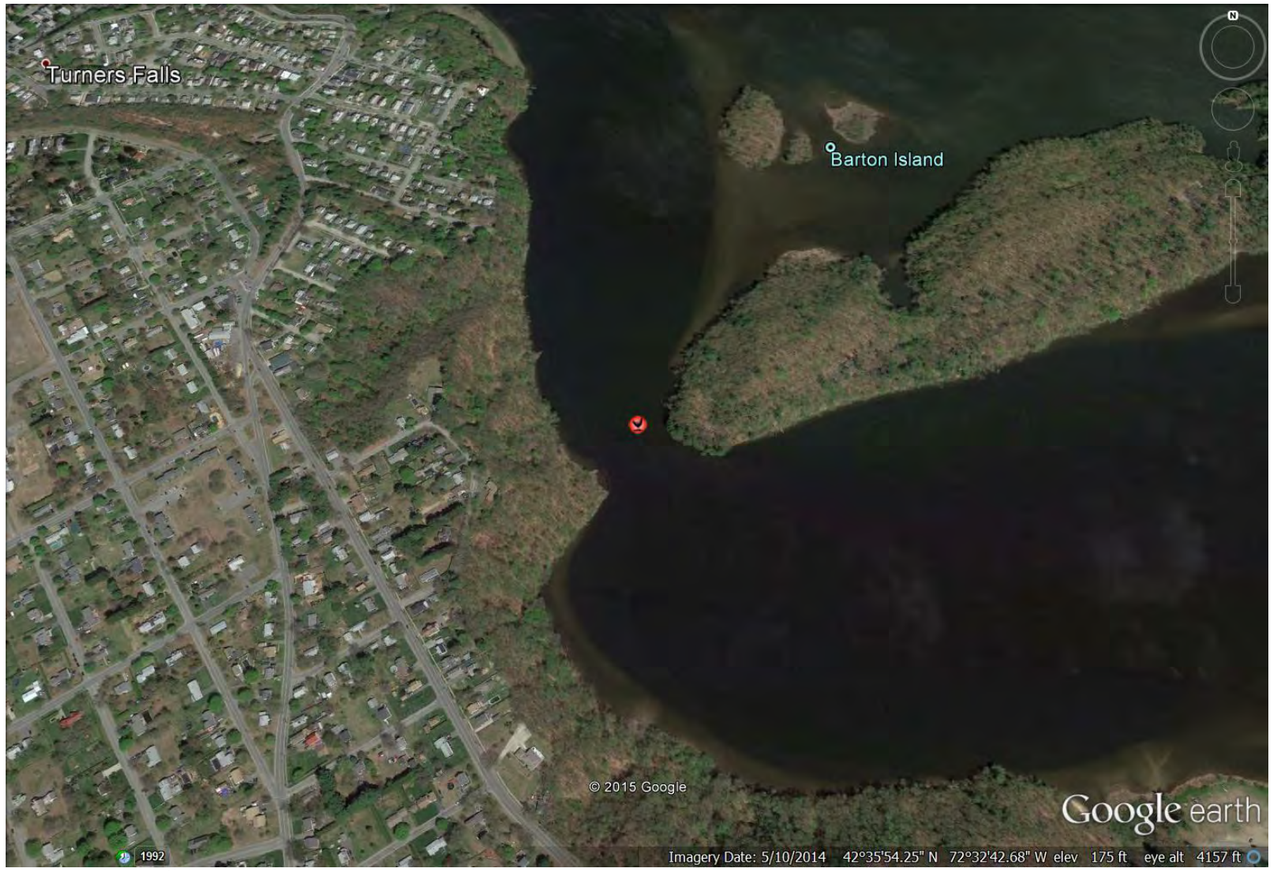
Photo ID 382 (D/S, right of line)

Photo ID 384 (U/S, left of line)

Segment 370 – Right Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Bedrock
Upper Riverbank Vegetation	Moderate
Lower Riverbank Slope	Steep
Lower Riverbank Sediment	Bedrock
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.



Approximate Photo Location

Segment 380 – Right Bank

Photo ID 424 (photo covers segment)

Segment 380 – Right Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	Heavy
Type of Erosion	
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 390 – Right Bank

Photo ID 446 (middle)

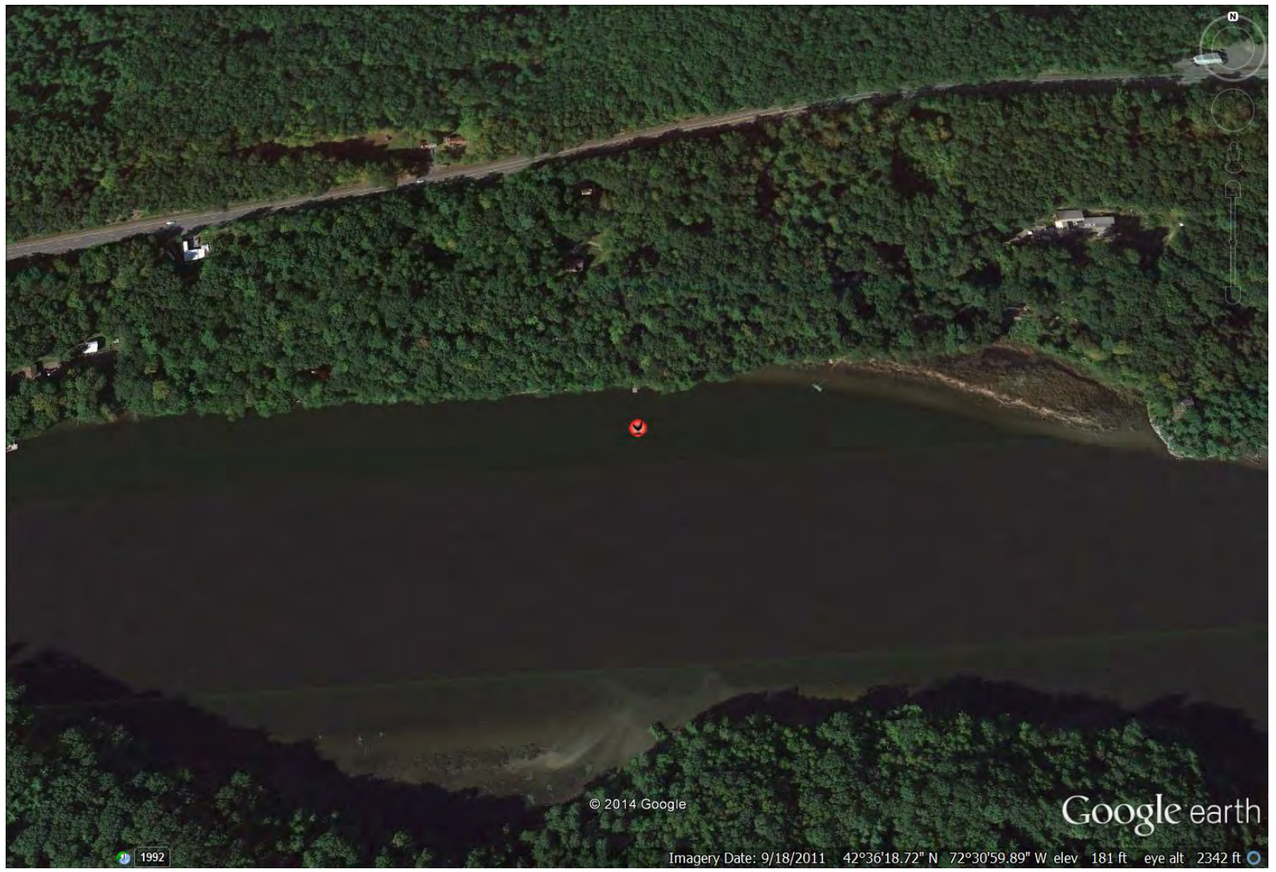
Photo ID 445 (D/S, right of line)

Photo ID 447 (U/S, left of line)

Segment 390 – Right Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Bedrock
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	None
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.



Approximate Photo Location

Segment 400 – Right Bank

Photo ID 476 (U/S, left of line)

Photo ID 475 (D/S, right of line)

Segment 400 – Right Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Moderate
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Flat/Beach
Lower Riverbank Sediment	Silt/Sand
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed.

Approximate Photo Location

Segment 410 – Right Bank

Photo ID 505 (mid-segment)

Photo ID 503 (D/S, right of line)

Photo ID 504 (middle)

Photo ID 506 (middle)

Photo ID 507 (middle)

Photo ID 508 (U/S)

Photo ID 509 (U/S, left of line)

Segment 410 – Right Bank

Riverbank Features	Characteristics
Upper Riverbank Slope	Steep
Upper Riverbank Height	High
Upper Riverbank Sediment	Silt/Sand
Upper Riverbank Vegetation	Heavy
Lower Riverbank Slope	Moderate
Lower Riverbank Sediment	Boulders
Lower Riverbank Vegetation	None to very sparse
Type of Erosion	Undercut
Potential Erosion Indicators	Creep/leaning trees, Exposed roots
Stage of Erosion	Stable
Extent of Erosion	None/Little

QA Observations: Upon review of the photos for this segment, classification made in the field was confirmed and additional indicators of potential future erosion were included.

Approximate Photo Location

Segment 420 – Right Bank

Photo ID 546 (mid-segment)

Photo ID 542 (D/S, right of line)

Photo ID 543 (middle)

Photo ID 544 (middle)

Photo ID 545 (middle)