



Gabions installed to protect riverbanks from the meandering river have been ripped off banks and deposited in the river or swept downstream. Unmitigated erosion undercuts riverbanks. Eco-Justice Collaborative. May 2, 2018

REQUEST FOR ACTION

To Protect the Middle Fork of the Vermilion, a National Scenic River

Prepared for the Illinois Department of Natural Resources

by Eco-Justice Collaborative
919 West University Avenue
Champaign, IL 61821
773.556.3417 / 3418



Aerial photographs of Dynegy / Vistra's coal ash pits by Jeff Lucas, Gutting the Heartland. 2013.

TABLE OF CONTENTS

Purpose and History	4
Purpose	4
History of the Ash Pits	4
1981 - Riverbank Stabilization	5
Background.....	5
Illinois Power Acts to Stabilize Banks	5
1989 - National Scenic River Designation	6
Status Granted 1989.....	6
Corridor Management Plan	6
Advisory Committee	6
2009 - Gabions Not Long-Term Solution	7
Dynegy Request to Repair / Replace Gabions.....	7
National Park Service Opposes Use of Gabions.....	7
2013 - Erosion Study	8
IEPA Notice of Violation Triggers CCA	8
URS Erosion Study	8
2016 - Emergency Stabilization, New East Ash Pit	8
Twenty Feet of Erosion, East Dam	8
Continued Calls to Remove the Ash	9
2017- Erosion Advances at Old East and North Ash Pits	10
Erosion Rates Faster than Previously Estimated.....	10

TABLE OF CONTENTS *(continued)*

2018 - Riverbank Stabilization Proposal	11
NWP vs. Individual Permit.....	11
Objections to the Proposal	11
Section 401 Water Quality Certification and Public Hearing	11
Harm to the River / Calls for Interim Stabilization	11
Second Notice of Violation and Referral to the AG’s Office	12
Dynegy / Vistra Withdraws Application	13
2019 - Another Slope Stability Analysis	13
Concerns Raised Over Destabilization of Old East Ash Pit	13
Illustrations of Erosion, 2016, 2018, and 2020	14
Photographs	14
Key Map	14
SECTION 1	15
Series #1, North Ash Pit, Typical.....	15
Series #2, North Ash Pit, Typical.....	16
Series #3, Old East Ash Pit, Bend.....	17
SECTION 2	18
Series #4, Old East Ash Pit, Bend	18
Series #5, Old East Ash Pit, Bend	19
Series #6, Old East Ash Pit, Bend.....	20
Series #7, Old East Ash Pit, Downstream of Bend	21
Series #8, Old East Ash Pit, Downstream of Bend	22
Series #9, Old East Ash Pit, Downstream of Bend	23
Series #10, Old East Ash Pit, Downstream of Bend	24
Meandering Rivers - Erosion Downstream of a Bend	25
Erosion is Most Severe Downstream of a Bend	25
Streamflow Dynamics and the Middle Fork	25
Ash Pits Are Vulnerable to Storm Events	27
2018 Storm Destroyed Banks and Gabions	27
Protect the River Long-Term by Moving Ash	27
2020 - Ash Pits Remain Unprotected	28
Failure to Act	28
Agency Responsibility	28
2021 - IDNR Request	29
Determine Need for Immediate Stabilization	29
Regularize Inspection and Require Emergency Stabilization / Repair As Needed.....	29
Cost-Effective Solutions Exist for Interim Stabilization	30
IDNR Response to EJC Requested	30

PURPOSE AND HISTORY

Purpose

This document has been prepared by Eco-Justice Collaborative (EJC) as an official request to the Illinois Department of Natural Resources (IDNR) to protect the Middle Fork of the Vermilion River from two coal ash pits associated with the Vermilion Power Station in east-central Illinois. These coal ash pits are owned by Dynegy / Vistra, and both sit in the floodplain of Illinois' only National Scenic River.

The document shows the impact the meandering Middle Fork has had, and will continue to have, on riverbanks along these ash pits and the structures installed to protect the coal ash. It identifies the potential for a catastrophic spill from riverbank erosion, particularly in an area along the Old East Ash Pit identified by a consulting engineer as requiring immediate protection.

The Middle Fork of the Vermilion is considered to be the “crown-jewel” of east-central Illinois. Because the IDNR is the designated state-administrator of this National Scenic River, it has both the authority and the responsibility to protect it. Decisions related to when and how to protect the river should not be left up to a private landowner. Specifically, EJC is asking the IDNR to:

- Immediately inspect (or require Dynegy / Vistra to inspect and submit their findings to the IDNR) riverbanks along the Old East and North Ash Pits to assess slope stability and the need for temporary, emergency riverbank stabilization at selected locations.
- Direct Dynegy / Vistra to immediately install temporary, emergency stabilization at locations determined by the IDNR as necessary to prevent a catastrophic coal ash spill. Any emergency stabilization proposal that involves fill below the Ordinary High Water Mark of the river would need to be permitted by state and federal agencies. Dynegy / Vistra could prepare proposals for temporary, emergency stabilization and submit them to these agencies for expedited review.
- Implement a regularized program of riverbank monitoring and dam inspection focused on all three coal ash impoundments, and produce a publicly-available report documenting its findings with respect to the potential for coal ash release. Inspections should take place at least annually, and after each significant storm event. When determined necessary, targeted, temporary, emergency stabilization should be provided.

History of the Ash Pits

The Old East and North Ash pits were constructed by Illinois Power in the mid-1950's and mid-1970's, respectively, for the purpose of receiving coal ash combustion waste from the now-closed Vermilion Power Station. The New East Ash Pit was constructed in 1989 to receive coal combustion waste, after the first two pits were filled.

All three pits were constructed in the river's floodplain and are unlined. The two oldest storage areas, the Old East and North Ash Pits, are known to be leaking. The New East Ash Pit was constructed downstream on top of the existing bedrock (shale). Although its sides are lined with clay and trenched into the bedrock (diked ring), it is not considered a [lined facility](#) by the U.S. EPA. This ash pit also sits over areas of historic underground mining, raising concerns over potential subsidence.¹

¹ Kelron Environmental. 2003. [Regional and Local Hydrology and Geochemistry, Vermilion Power Station](#). Vol.1 of 2. Page 47.

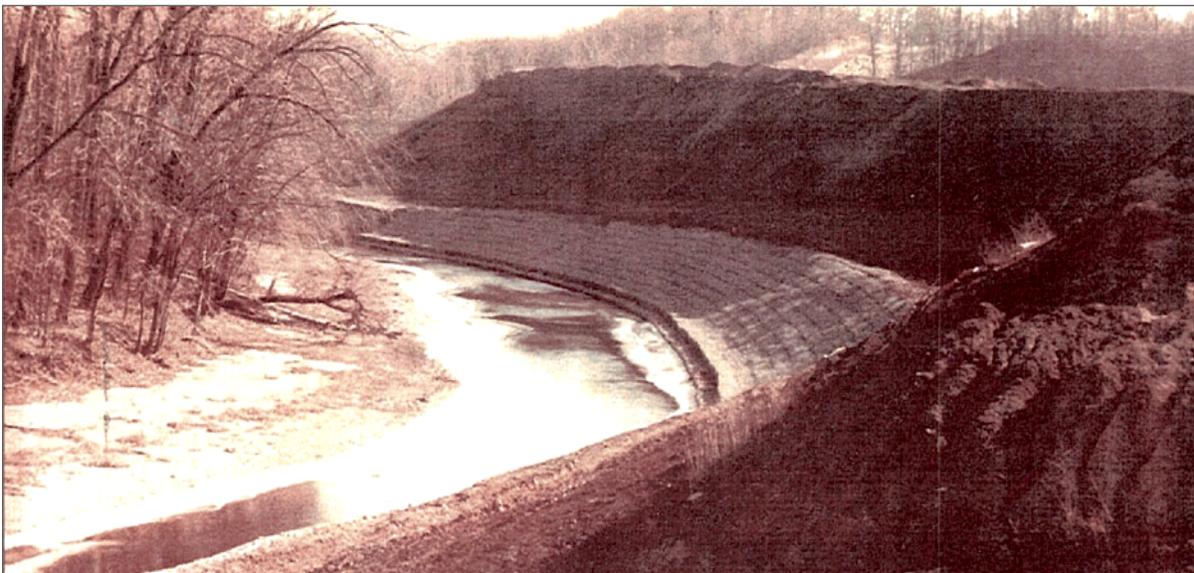
1981 - RIVERBANK STABILIZATION

Background

The Middle Fork is a meandering river, with some sections moving precariously close to the coal ash pits. According to URS Corporation (a consultant for Dynegy Midwest Generation), the river has been moving progressively west towards the ash pits since 1966, eroding adjacent riverbanks in the process.²

Illinois Power Acts to Stabilize Banks

In 1981, then-owner Illinois Power realized they had to act to protect these pits from the meandering river. They installed gabion baskets along riverbanks adjacent to the north end of the Old East Ash Pit and southern end of the North Ash Pit. This stabilization project was massive, and intended to last.



Photos of 1981 stabilization project presumed to be taken by Illinois Power. Source: FOIA Request, IDNR.

² URS. 2013. [Geotechnical Report, North Ash Pond and Old East Ash Pond](#), Vermilion Site, Embankment Evaluations, Oakwood, IL Section 4, Page 6.

1989 - NATIONAL SCENIC RIVER DESIGNATION

Status Granted in 1989

In May of 1989, the Secretary of Interior granted National Scenic River status to a 17.1-mile stretch of the Middle Fork. By state law, the Illinois Department of Conservation (now the Illinois Department of Natural Resources) was named administrator of the river and the river corridor.



Sandstone bluffs line this National Scenic River at several locations. Photo by Eco-Justice Collaborative. April 2016.

Corridor Management Plan

In 1992, a Corridor Management Plan was prepared by the Illinois Department of Conservation for the purpose of protecting “the ecological, scenic, recreational and cultural values” for that portion of the river that had been designated a National Scenic River.³ The plan acknowledges the meandering Middle Fork naturally erodes its riverbanks, and that some stabilization might be required in areas where “human activity has eliminated the natural vegetated riparian zone”. However, rip-rap and other water diversion control structures were specifically prohibited because they were determined to be incompatible with the stated values and guidelines of the National Park Service.

Advisory Committee

The procedures in the Corridor Management Plan were drafted to include public participation and oversight. They included the establishment of Citizens Advisory Committee to review and provide comments on proposals for construction or modification within the designated scenic corridor.

Eco-Justice Collaborative, with the support of State Senator Scott Bennett, Vermilion County Board Chair Larry Baughn, Kevin Green of the Vermilion Soil and Water Conservation District, and multiple local organizations, has asked the IDNR to reinstate this Committee.⁴ This request is intended to ensure the National Scenic River corridor is protected from harm, and local impacts are considered in the decision-making process.

³ State of Illinois, Department of Conservation. 1992. [Corridor Management Plan, Middle Fork of the Vermilion River](#). National Wild and Scenic River System.

⁴ [Letter to Director Colleen Callahan](#). Illinois Department of Natural Resources. 2020. Lan Richart, Eco-Justice Collaborative. June 10, 2020.

2009 - GABIONS NOT A LONG-TERM SOLUTION

Dynegy Request to Repair / Replace Gabions

Dynegy Midwest Generation purchased the coal-fired power plant in 2001. By 2008, Dynegy realized the river was moving rapidly towards its coal ash pits. Several areas of concern were identified. In 2009, Dynegy attempted to obtain approval from the U.S. Army Corps of Engineers and the National Park Service to:

- Install 440 linear feet of new gabions along the New East Ash Pit.⁵
- Repair 740 linear feet of gabions along the Old East Ash Pit, and also repair a section where rip-rap along the pump house had washed out.⁶

National Park Service Opposes Gabions / Stream Barbs

The National Park Service (NPS) repeatedly objected to the use of gabion baskets initially proposed to protect riverbanks along this National Scenic River, citing their use as incompatible with the Wild and Scenic Rivers Act.⁷ The NPS also opposed the proposed use of stream barbs (rock structures that extend into the stream flow to modify flow patterns and bed topography); gabion mattresses; and cabled concrete blocks for this same reason. By 2010, Dynegy's field observations showed that erosion had progressed at an alarming rate. In just 12 months, the river had moved:⁸

- Eight feet closer to the toe of the slope of the north dam of the New East Ash Pit.
- Two feet closer to the toe of the slope of the east dam of the New East Ash Pit.

The NPS maintained its opposition to gabions and other structural solutions proposed, and asked Dynegy to consider alternative solutions, including relocating the coal ash. No other solutions were provided at that time, and nothing was done to protect the eroding banks.



Deteriorating gabions installed along riverbank next to the Old East Ash Pit in 1981. Eco-Justice Collaborative. May 2, 2018.

⁵ Dynegy Midwest Generation. 2009. Application for Riverbank Stabilization, [New East Ash Pit](#). January 20, 2009.

⁶ Dynegy Midwest Generation. 2009. Application for Riverbank Stabilization, [Old East Ash Pit and Pump Station](#). January, 2009.

⁷ Dynegy Midwest Generation. 2008 to 2010. [NOTES, Vermilion Project Overview](#).

⁸ IBID.

2013 - EROSION STUDY

IEPA Notice of Violation Triggers CCA

In July of 2012, the IEPA sent a Notice of Violation to Dynegy Midwest Generation for alleged exceedances of groundwater quality standards at monitoring wells near the Old East and North Ash Pits. This began the compliance commitment agreement process that led to the preparation of a closure plan for all three ash pits.⁹ Dynegy's preferred plan was to cap the pits, leave them in place, and stabilize riverbanks.

URS Erosion Study

By 2013, URS Corporation had completed a geotechnical report that analyzed riverbank erosion and closure options for the Old East and North Ash Pits. They estimated erosion rates of 0.4 and 0.3 feet/year for the Old East and North Ash Pits, respectively, and identified minimum distances between the riverbank and the toes of the ash pit dams required to avoid failure. URS acknowledged that the ash pits would eventually fail unless erosion was mitigated. They estimated the Old East and North Ash Pits would fail within 93 and 83 years, respectively, based on their projected erosion rates (and other assumptions).¹⁰

Failure of the North Ash Pond is estimated to occur when 10 feet separates the toe of the ash pond from the crest of the riverbank.

Failure of the Old East Ash Pond is estimated to occur when 8 feet separates the toe of the ash pond from the crest of riverbank."

Executive Summary, page ii. URS Corporation 2013 Geotechnical Report.

2016 - EMERGENCY STABILIZATION, NEW EAST ASH PIT

Twenty Feet of Erosion, East Dam

In the fall of 2016, Dynegy sought emergency approval from state and federal agencies to shore up the eroding riverbank along the New East Ash Pit. This was because erosion had severely progressed along the east dam of the New East, leaving only 20 feet of protective bank next to the ash pit. At one location, just ten feet remained between the river and the toe of the New East Ash Pit dam, making failure a real possibility.¹¹ The erosion was so extensive that it destroyed two groundwater monitoring wells.

A Section 404 permit was issued by the U.S. Army Corps of Engineers (ACOE) under the provisions of Nationwide Permit 13. In July of 2016, the ACOE and the National Park Service approved the discharge of

⁹ Illinois EPA. 2012. [Notice of Violation](#), Dynegy Midwest Generation. July 6, 2012.

¹⁰ URS. 2013. [Geotechnical Report, North Ash Pond and Old East Ash Pond](#), Vermilion Site, Embankment Evaluations, Oakwood, IL. Section 4, Pages 6 and 7,

¹¹ Dynegy Midwest Generation. 2016. [Field Notes Site Visit](#), conducted on March 11, 2016.

2016 - EMERGENCY STABILIZATION, NEW EAST AS PIT *(continued)*

858 cubic yards of fill material along 485 linear feet of the Middle Fork (right descending bank), for planted stone toe protection.¹² Although the NPS approved the project, it expressed concern over the potential for detrimental effects to the water quality of the river in the event of pond discharges, and encouraged Dynegy to remove the following: the coal ash pits and associated embankments; existing river armoring; the stream side pump house; and all non-operational infrastructure associated with the Vermilion Power Station in the river corridor.¹³



At one location, erosion from the Middle Fork River left just 10 feet of separation between the top of bank and toe of the New East Ash Pit dam.. Eco-Justice Collaborative. April 24, 2016.

Continued Calls to Remove the Ash

From the time the coal plant closed, river advocates have repeatedly expressed concern over the threat the coal ash pits pose to the National Scenic River. The unexpected erosion along the New East Ash Pit only heightened those concerns.

Environmental groups, including Eco-Justice Collaborative; Prarie Rivers Network; and the Protect the Middle Fork Citizens Advocacy Committee have been meeting with representatives of the Illinois EPA and local officials since 2015 to call out the hazards associated with Dynegy's preferred "cap and leave" plan. The Vermilion County Board; former Mayor, City of Danville; State Senator Scott Bennett; and State Representative Michael Marron have joined in calling for the removal of the the ash from the Middle Fork's floodplain, and placing it far from the river, in lined facilities that are built according to best practices.

¹² U.S. Army Corps of Engineers, Indianapolis Regulatory Office. 2016. [Authorization for Bank Stabilization](#), Middle Fork of the Vermilion River. July 21, 2016.

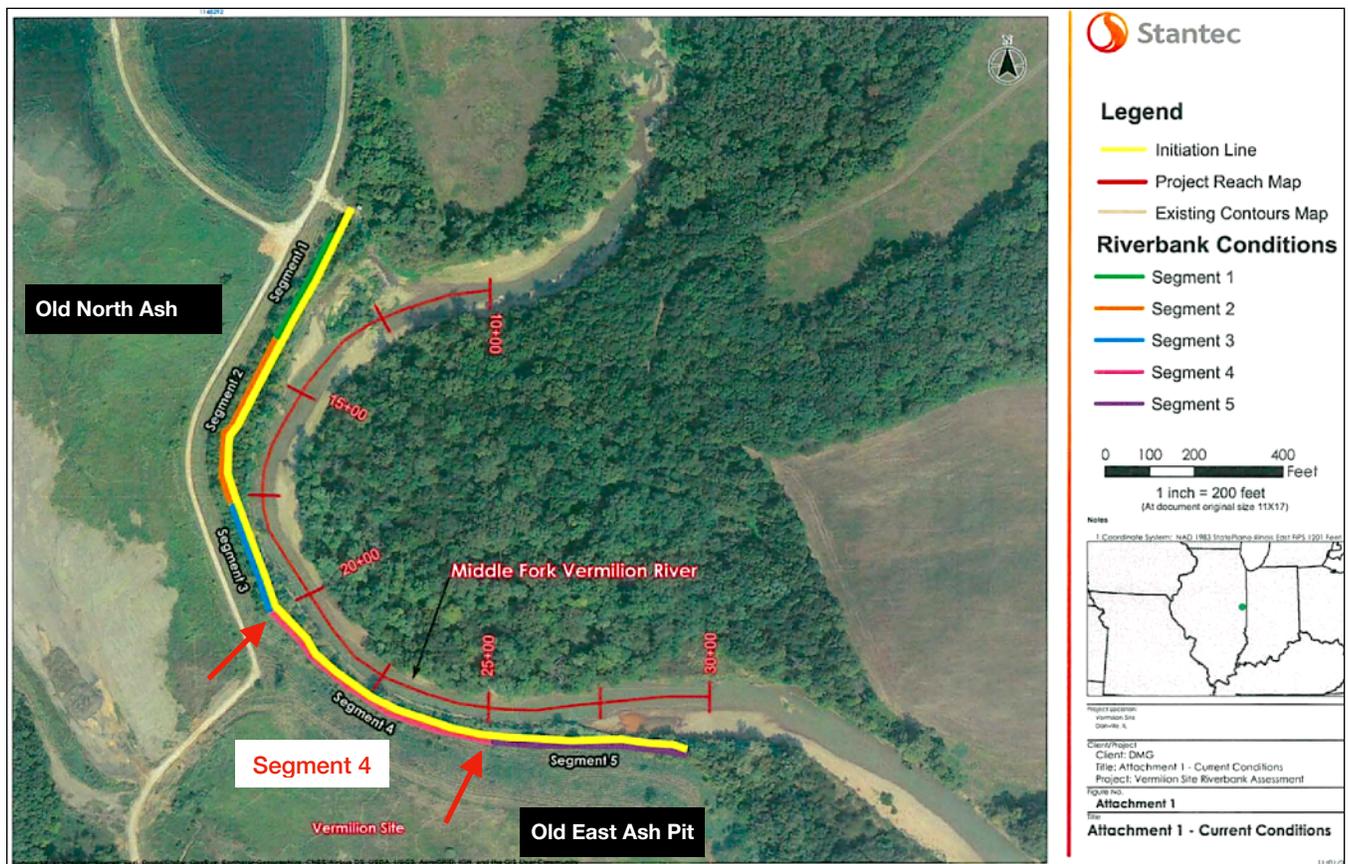
¹³ National Park Service. 2016. [Letter of Determination for New East Ash Pit](#). July 5, 2016.

2017 - EROSION ADVANCES AT OLD EAST AND NORTH ASH PITS

Erosion Rate Faster than Previously Estimated

Riverbank erosion continued to move the river channel toward the Old East and North Ash Pits that hold 2.8 million cubic yards of toxic coal ash. But erosion of riverbanks next to these two oldest ash pits wasn't analyzed again, until Stantec Consulting Services Inc. prepared its 2017 "Vermilion Site Riverbank Assessment". Stantec's report noted¹⁴:

- Distances between the crest of the riverbank and the toe of the Old East and North Ash Pit dams varied from 15 to 30 feet in Segment 1, 3 and 5; and 30 to 72 feet in Segment 2:
 - The exception to this was Segment 4, downstream of the bend, next to the Old East Ash Pit. The line of demarcation was determined to be too difficult to discern, and no estimates of separation between the toe of the Old East Ash Pit dam and the top of the riverbank were provided.
 - This area was identified as having deteriorating gabions.
- Erosion rates range between 1.0 and 3.6 feet / year, with a mean value of 2.3 feet / year, if no erosion controls are implemented.
- The rate of erosion at the North and Old East pits was from 2.5 to 9 times greater than previous estimates made by URS Corporation in 2013.



¹⁴ Stantec Consulting Services Inc. 2017. [Vermilion Site Riverbank Assessment](#). Memorandum dated November 2, 2017.

2018 - RIVERBANK STABILIZATION PROPOSAL

NWP 13 vs. Individual Permit

In July of 2018, EJC became aware that Dynegy Midwest Generation, who had merged with Vistra in June, had submitted a Section 404 Permit Application to the U.S. Army Corps of Engineers, Louisville District. Dynegy / Vistra was seeking permission to place over 13,500 cubic yards of stone below the Ordinary High Water Mark along 1,900 linear feet of the Middle Fork of the Vermilion River.

The Louisville District of the U.S. Army Corps of Engineers (USACOE) initially proposed to approve the project under NWP 13, through a waiver by the District Engineer. Eventually, the USACOE reconsidered, and began processing the permit application as an Individual Permit.

Objection to the Proposal

Eco-Justice Collaborative, along with Prairie Rivers Network, EarthJustice, and the Illinois Chapter of the Sierra Club, objected to Dynegy / Vistra's proposal to massively stabilize riverbanks with a plan that would have allowed them to leave the coal ash in place. Eco-Justice Collaborative's objection was based on the fact that a practicable alternative existed that would have had less impact on the aquatic system, and that the provisions of the National Environmental Policy Act (1969) had not been met. EJC's letter of objection:¹⁵

1. Described how the proposed fill would potentially cause or contribute to significant degradation of the Middle Fork and the values for which this river received its National Scenic River designation.
2. Showed Dynegy / Vistra had not sufficiently identified measures to minimize potential adverse impacts.
3. Called for the preparation of an Environmental Impact Statement.
4. Urged the U.S. Army Corps of Engineers to work with the applicant to obtain approval for targeted, temporary riverbank stabilization in those areas required to protect the coal ash impoundment from destabilization by riverbank erosion, until a final closure plan was approved by the Illinois EPA.

Section 401 Water Quality Certification and Public Hearing

Concurrently, Dynegy / Vistra, sought Section 401 Certification from the Illinois EPA. In March of 2019, the Illinois EPA held a public hearing on the application. Over 300 people attended, and more than 50 testified. An overwhelming majority objected to the massively over-engineered project that would have allowed Dynegy to cap the leaking Old East Ash Pit, and leave the coal ash in place.

Harm to the River / Calls for Interim Stabilization

Eco-Justice Collaborative and others attending the hearing expressed concerns over the harm to the Middle Fork that would result from this proposal, and again called for temporary stabilization and the removal of the coal ash.¹⁶ Eco-Justice Collaborative's concerns included:

1. There was a high probability that project construction would have released contaminated sediments into the river.
2. Both the construction and potential contaminant release would have resulted in safety and operational impacts to the recreational use of the river.
3. The potential for the impacts cited above had not been acknowledged nor adequately addressed in the Agency's evaluation.

¹⁵ Eco-Justice Collaborative. 2019. [Comment Letter](#) to Regulatory Officer Sarah Keller. U.S. Army Corps of Engineers, Indianapolis Regulatory Office. January 7, 2019.

¹⁶ Eco-Justice Collaborative. 2019. [Letter of Objection to Dean Studer](#), Hearing Officer. April 19, 2019.

2018 - RIVERBANK STABILIZATION PROPOSAL *(continued)*

4. The Public Notice offered only generalized and limited information, thus restricting the public's ability to provide meaningful comments on Dynegy / Vistra's proposal.
5. The applicant's proposed project and the Agency's assessment of alternatives were based on a misstated Purpose and Need, and a grossly inadequate analysis of alternatives. The analysis did not fully examine alternatives that could have had less pollutant loading, and caused less impact to the recreational use of the river.

During the hearing, EJC called out the need to protect the Middle Fork from a possible breach of the Old East Ash Pit, given the progressive erosion that was occurring. Because moving the ash out of the floodplain and away from the river was one of the closure alternatives under consideration, EJC and other advocates for the Middle Fork again requested interim stabilization that would provide protection of the river, while closure plans for the ash pits were prepared. Temporary stabilization would have far less impact on water quality, recreational, and scenic values of this National Scenic River.

Second Notice of Violation and Referral to the AG's Office

In June of 2018, Dynegy / Vistra was issued a second Notice of Violation for discharging pollutants into the surface waters of the Middle Fork.¹⁷ On March 21, 2019, just days before the Section 401 Water Quality Hearing, the Illinois EPA referred Dynegy / Vistra's second Notice of Violation to the Illinois Attorney General's office for enforcement. In its referral, the IEPA recommended Dynegy / Vistra:

1. Meet applicable groundwater quality standards at its ash ponds by developing, obtaining approval of, and implementing a closure plan for its three ash ponds.
2. Obtain all necessary permitting/approvals and implement the proposed riverbank stabilization project.
3. Pay a monetary fine for its past violations related to coal ash storage at the Vermilion Power Station¹⁸.

This referral is now two years old. To our knowledge the case has not been settled, nor have any of these recommendations been implemented.

Dynegy Withdraws Its Application

On September 18, 2019, Dynegy / Vistra formally withdrew its Joint Section 404 / 401 permit application.¹⁹ Dynegy / Vistra subsequently told the U.S. Army Corps of Engineers that they were redesigning their project, and would no longer be placing any fill below the Ordinary High Water Mark.

During their reviews of the Joint Section 404 / 401 permit application, both the U.S. Army Corps of Engineers and the National Park Service made clear their concerns over a possible breach of the coal ash stored in the Old East Ash Pit. Both agencies urged Dynegy / Vistra to prepare an emergency plan that could be quickly implemented to provide localized, temporary stabilization. To our knowledge, Dynegy / Vistra has not prepared such a plan.

¹⁷ Illinois EPA. 2018. [Notice of Violation](#). to Vistra Energy Corps, formerly Dynegy Midwest Generation. June 20, 2018.

¹⁸ Illinois EPA. 2019. [News Release](#). Illinois EPA refers Dynegy Midwest Generation to Attorney General for Enforcement. March 21, 2019.

¹⁹ Schiff Hardin. 2019. [Letter to Darren Gove, Illinois EPA](#) dated June 21, 2019.

2019 - ANOTHER SLOPE STABILITY ANALYSIS

Concerns Raised Over Destabilization of the Old East Ash Pit

In the fall of 2019, EJC learned that Dynegey's consulting engineer, Stantec, had prepared a slope stability analysis in March of that same year for a section of riverbank abutting the New East Ash Pit. Stantec selected a cross-section along riverbanks abutting the Old East Pit that was no longer protected by gabion baskets. This section represented a critical location for the CCR facility, based on the slope height and proximity to the river.²⁰ With this analysis, Stantec concluded:

These results show that the outer slope of the Vermilion CCR facility could be destabilized by the eroding riverbank. Six feet of unmitigated erosion would result in a slope that does not meet design guidelines for the factor of safety and reliability. Protection of the riverbank is recommended to maintain satisfactory performance of the CCR facility slope.

*Reliability Analysis for Slope Stability with Assumed Riverbank Erosion,
Stantec Consulting Engineers, Inc., March 2019.*

This last analysis was completed two years ago. Although Stantec's estimated average rate of erosion is 2.3 feet / year, no action has been taken by either Dynegey / Vistra or the Illinois Department of Natural Resources to protect the riverbank as recommended. Documentation of erosion along the ash pits clearly shows that it does not follow those average rates and, at times, the Middle Fork has eroded 8 feet or more of riverbank in just one year's time (see **2009 - Gabions Are Not a Long-Term Solution, page 7**).



Eroding Riverbank downstream of the bend along the Old East Ash Pit. Eco-Justice Collaborative. May 2, 2018.

²⁰ Stantec Consulting Engineers, Inc. 2019. [Reliability Analysis for Slope Stability with Assumed Riverbank Erosion](#).

ILLUSTRATING EROSION: 2016, 2018, AND 2020

Photographs

Photographs on the pages that follow show the progression of erosion along the southern end of the North Ash Pit and the northern end of the Old East Ash Pit. Those dated April 2016 and May 2018 were taken by Eco-Justice Collaborative. Those dated June 18, 2018 were taken by the Illinois EPA. The most recent photos are from Prairie Rivers Network's site visit on December 13, 2020. The gauge at the Kickapoo State Park bridge showed water levels for each set of photographs were as follows:

- April 24, 2016: 1.91 feet
- May 2, 2018: 1.64 feet
- June 18, 2018: 1.93 feet
- December 13, 2020: 0.94 feet

Key Map

Photographs have been divided into two sections (see key map, below.) Most are from SECTION 2, where gabions have been ripped away from riverbanks, exposing the now unprotected banks to the natural forces of the river. Some were taken at the same location (and from different angles) while others have been included to show the progression of erosion leading to where it is most severe (downstream of the bend).

NOTE: Photographs are not tied to specific locations via GPS. Photos by EJC and the Illinois EPA were taken with a digital single-lens reflex camera. Those by Prairie Rivers Network were clipped from video footage taken with a smart phone.

SECTION 1 - North Ash Pit (generally relates to sections 2 and 3 of Stantec's 2017 report).

SECTION 2 - Old East Ash Pit (generally relates to sections 4 and 5 of Stantec's 2017 report).



SECTION 1, NORTH ASH PIT, TYPICAL

(Series #1)



SECTION 1, NORTH ASH PIT, TYPICAL

(Series #2)



SECTION 1, OLD EAST ASH PIT, BEND

(Series #3)



SECTION 2, OLD EAST ASH PIT, BEND

(Series #4)



SECTION 2, OLD EAST ASH PIT, BEND

(Series #5)



April 2016



May 2018



December 2020

SECTION 2, OLD EAST ASH PIT, BEND

(Series #6)



SECTION 2, DOWNSTREAM OF BEND, OLD EAST ASH PIT

(Series #7)



SECTION 2, DOWNSTREAM OF BEND, OLD EAST ASH PIT

(Series #8)



SECTION 2, DOWNSTREAM OF BEND, OLD EAST ASH PIT

(Series #9)



April 2016



May 2018



May 2018

SECTION 2, DOWNSTREAM OF BEND, OLD EAST ASH PIT

(Series #10)



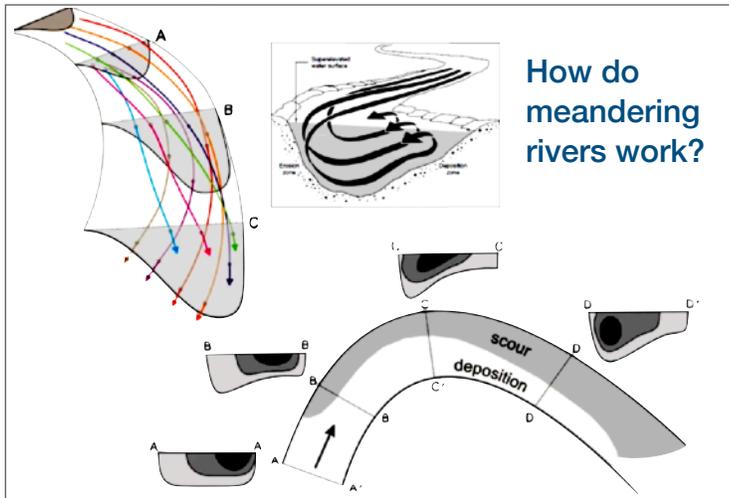
MEANDERING RIVERS - EROSION, DOWNSTREAM OF A BEND

Erosion Is Most Severe Downstream of a Bend

The erosional forces of the Middle Fork of the Vermilion caused the deterioration and dislodgment of gabions installed by Illinois Power in 1981. This sent wire cages and rocks downstream, leaving large swaths of riverbank unprotected. Photographs show that the greatest amount of erosion taking place next to the Old East and North Ash Pits is occurring in SECTION 2, downstream of a bend. This is the same area Dynegy had attempted to shore up in 2009 with its proposal to repair 740 linear feet of deteriorating gabion baskets.

In his June 2018 presentation “Streamflow Dynamics and the Middle Fork of the Vermilion”, Dr. Bruce Rhoads, Professor, Department of Geography and Geographic Information Science, UIUC, explains why we can expect the Middle Fork to continue to move toward the coal ash pits. He concludes there is nothing that can be done, long-term, to protect the ash pits from natural course of this meandering river. The following graphics and accompanying text summarize key points of his presentation. [Click here](#) to watch the 12-minute video.

Streamflow Dynamics and the Middle Fork



Middle Fork - A Meandering River

The Middle Fork of the Vermilion is a meandering river that consists of a channel and an associated floodplain.

When meandering rivers curve, the water that goes through them begins to spiral. The fastest flow erodes sediment from the outer curve of each meander bend and deposits it on an inner curve, downstream of the bend (see illustration to the left). It is this erosion and migration of the channel that is causing concerns over a potential breach of the Old East Ash Pit.



Meandering Rivers Move

The 1940 aerial photograph to the left shows the signature of an old meander bend at the western edge of the Middle Fork's floodplain (see the red arrow).

How many years ago that occurred has not been determined. But it is clear that, at one time, the river was located hundreds of feet west of the existing meander bend.

Illustrations are taken from Dr. Bruce Rhoads slides, [Stream Flow Dynamics and the Middle Fork of the Vermilion](#). Presented at the People's Hearing. June 11, 2018.

MEANDERING RIVERS - EROSION, DOWNSTREAM OF A BEND *(continued)*



North Ash Pit On Top of Old Meander

Dynegy / Vistra's three coal ash pits are shown superimposed on the 1940's aerial.

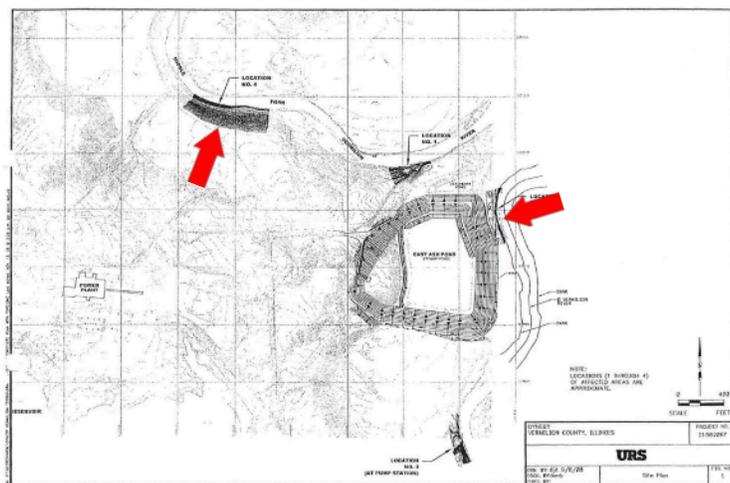
The North Ash Pit, built in the Middle Fork's floodplain, now sits in a location where the river channel once was. This graphic depicts how much the river moved over time, and shows the dynamic nature of the meandering Middle Fork.



Erosion - Downstream of a Bend

This 2017 aerial shows the river channel as it exists today. The purple image shows the channel as it was in 1940. The Middle Fork has clearly moved, with erosion occurring most aggressively downstream of bends in the river. It has moved:

- 100 feet closer to the Old East Ash Pit, causing Dynegy / Vistra to evaluate the potential for failure and a coal ash spill.
- Close enough to the toe of the slope of the New East Ash Pit dam that emergency stabilization was installed in 2016.



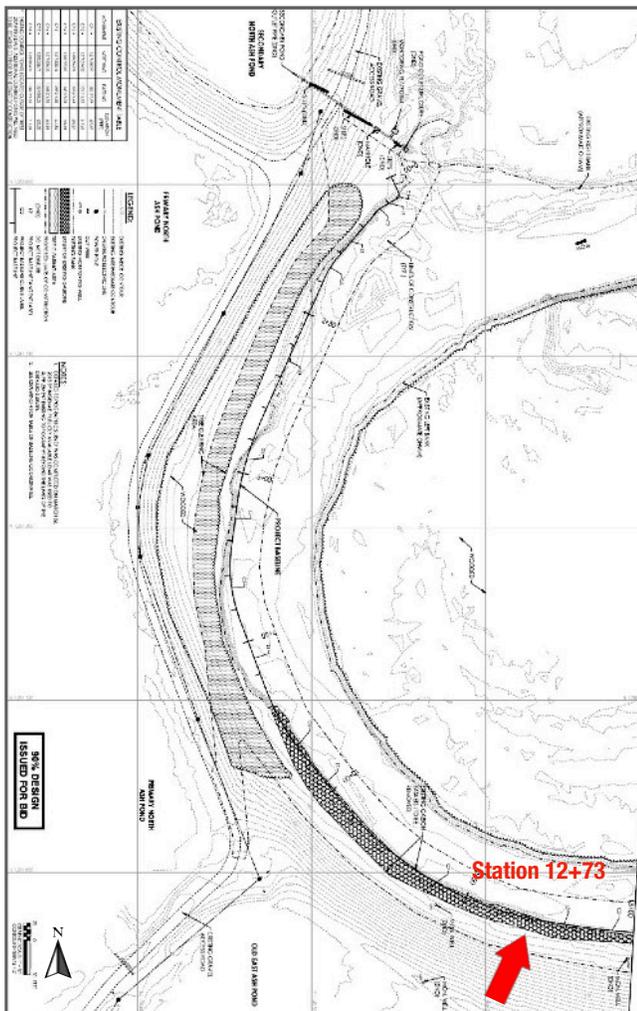
Dynegy's Application for Stabilization

This graphic was part of Dynegy's 2009 application to the U.S. Army Corps of Engineers and the National Park Service to repair 740 linear feet of gabions along riverbanks next to the Old East Ash Pit, and install 485 linear feet of new gabions along banks adjacent to the New East Ash Pit.

Both projects were downstream of one of the bends in this meandering river, consistent with where one would expect to see the greatest amount of erosion to occur.

The top two slides are taken from Dr. Bruce Rhoads' [Streamflow Dynamics and the Middle Fork of the Vermilion](#). June 11, 2018.

ASH PITS ARE VULNERABLE TO STORM EVENTS



Construction Drawings for Riverbank Stabilization, 2019.
Stantec Consulting Engineers, Inc.

2018 Storm Destroyed Banks and Gabions

In February, 2018, a near-record storm event turned the Middle Fork of the Vermilion from a lazy stream into a raging river, as shown in the [video footage](#) captured by EJC on February 21, 2018. Gauge height at the Kickapoo State Park bridge was 18.36 feet and flow was 13,900 cubic feet per second. Large sycamore trees and rocks were swept downstream, slamming into riverbanks and leaving large, deep holes in riverbanks along the New East Ash Pit (see photos in SECTION 2, Series #7 - #10).

Strong currents further destroyed some gabions along the North Ash Pit, and ripped off what remained of gabions downstream of the bend along the Old East Ash Pit. This included the large gabion “steps” that were present in 2016 (see photos in SECTION 2, Series #8 - #10). They also undercut and collapsed banks once covered by gabion baskets. Fully exposed, unprotected banks now are more susceptible to erosion and future storm events.

Thirteen months later, Stantec Consulting Engineers conducted another slope stability analysis. Stantec concluded that the outer slope of the Old East Ash Pit dam at Station 12+73 could be destabilized by another six feet of unmitigated erosion, potentially releasing coal combustion waste into the Middle Fork. Stantec recommended immediate protection.²¹

Protect the River Long-Term by Moving the Ash

The Middle Fork will continue to meander and attempt to reclaim its floodplain. Short-term solutions that keep the ash in place will not stop coal ash pollutants from mixing with surface and ground water. And, no engineering project will last “in perpetuity”. The only way to protect this National Scenic River from a coal ash threat, long-term, is to remove the ash from the floodplain.

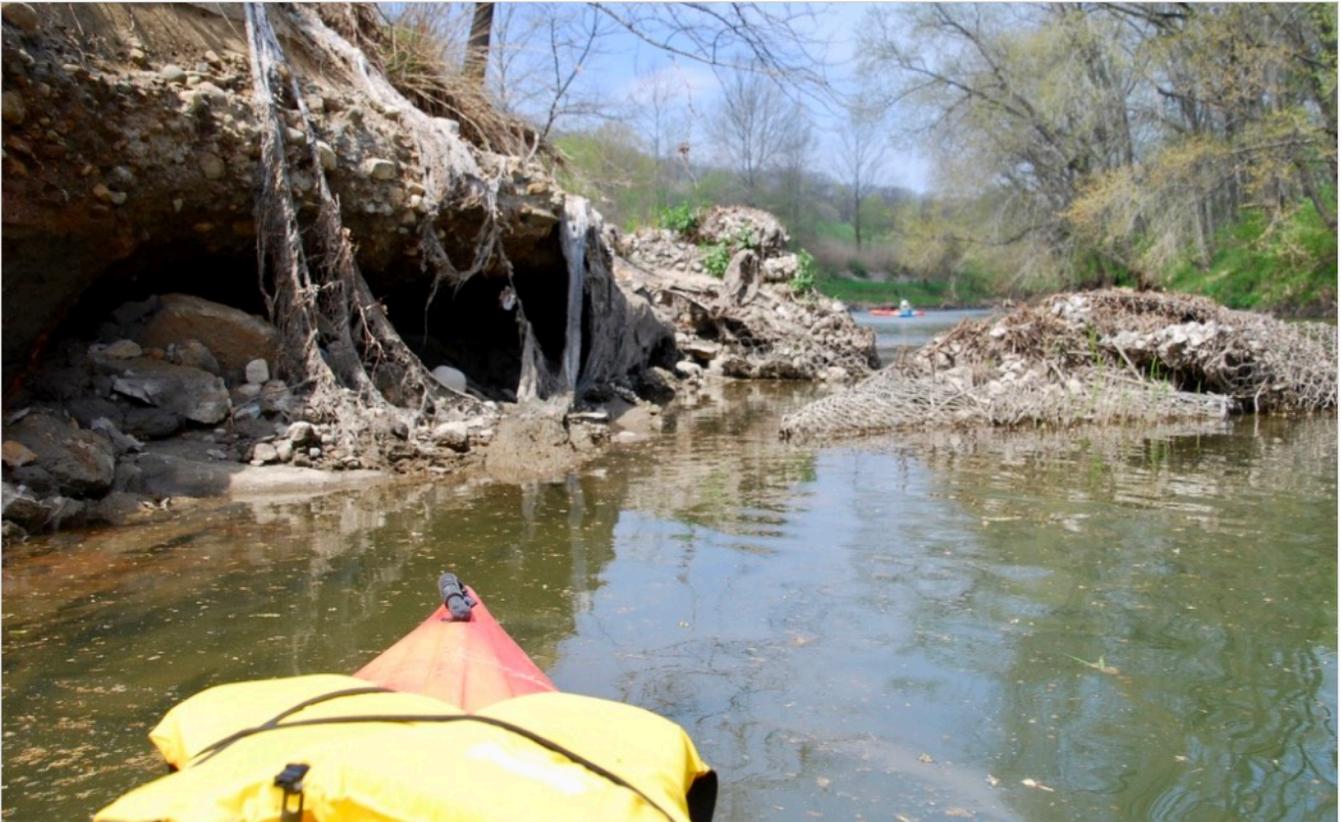
The recent draft of the coal ash rule now being considered by the Illinois Pollution Control Board (IPCB) puts restrictions on the placement of coal ash impoundments in floodplains. Eco-Justice Collaborative is hopeful that these restrictions will be applied to the Middle Fork as closure plans are finalized with the Attorney General’s office. In the meantime, the Old East and North Ash Pits remain in the floodplain, where the meandering river will continue to erode riverbanks that separate this National Scenic River from hazardous toxic waste. No one knows what damage the next storm event will bring, particularly to the area at Station 12+73 recently identified by Stantec as vulnerable and requiring immediate protection.

²¹ IBID.

2020 - ASH PITS REMAIN UNPROTECTED

Failure to Act

Since the 2018 near-record storm event, EJC has been asking for interim stabilization at sections along the Old East and North Ash Pits most vulnerable to erosion. The U.S. Army Corps of Engineers also has asked Dynegy / Vistra to prepare an emergency riverbank stabilization plan for the Old East Ash Pit. To date, no such plan has been prepared and, to our knowledge, riverbanks at Station 12+73 have not been protected as recommended by Stantec Consulting Engineers.



Erosion along Old East Ash Pit downstream of the bend in SECTION 2. Eco-Justice Collaborative. May 2 2018.

Agency Responsibility

The decision to stabilize the most vulnerable sections of river bend along the Old East Ash Pit in order to protect this National Scenic River should not be left solely to the private property owner. Eco-Justice Collaborative knows the Illinois Department of Natural Resources, as state-administrator of this National Scenic River, has both the authority and the responsibility to do what is required to protect the Middle Fork from a catastrophic coal ash spill. That responsibility to preserve and protect the river is clearly outlined in the 1992 Corridor Management Plan.

The Illinois EPA repeatedly has indicated that bank stabilization lies outside their jurisdiction. Without an application that involves fill below the Ordinary High Water Mark, the U.S. Army Corps of Engineers and the National Park Service also lack authority. This means that the Illinois Department of Natural Resources is the only agency with the authority to require emergency stabilization of severely eroding riverbanks. It is up to the IDNR to act now, to ensure the Middle Fork is protected.

2021 - IDNR REQUEST

Determine Need for Immediate Stabilization

EJC is asking the IDNR to conduct its own investigation to determine the need for immediate, interim stabilization to prevent a coal ash spill. We are particularly concerned about riverbanks identified by Stantec in the area along the Old East Ash Pit that they have identified as Station 12+73 (see **Ash Pits Are Vulnerable to another Storm Event**, page 28). This area is downstream of a river bend, and is most vulnerable to erosion. It is important that this analysis be carried out quickly, since any future storm event could erode riverbanks to a point where dam destabilization occurs.

As photographs in this document show, there are several areas along the Old East Ash Pit where riverbanks have been undercut by the Middle Fork. Measurements taken from the top of bank to the toe of the adjacent dam, alone, will not accurately depict distance between the river and the Old East Ash Pit.



Erosion along the Old East Ash Pit downstream of the river bend in SECTION 2. EcoJustice Collaborative. May 2, 2018

Regularize Inspection and Require Emergency Stabilization / Repair As Needed

It could be years before closure plans for all three coal ash pits are finalized; approved by reviewing agencies; reviewed by the public; and then implemented. In the meantime, the river remains at risk. The IDNR should implement a regularized program of riverbank monitoring and dam inspection on all three coal ash impoundments, and produce a publicly-available report documenting its findings with respect to potential coal ash release. Inspections should take place at least annually, and after each significant storm event. When determined necessary, stabilization should be provided.

The U.S. Army Corps of Engineers, Indianapolis Regulator Office and the National Park Service are poised to quickly approve plans for any emergency stabilization project that would require fill below the Ordinary High Water Mark. Both agencies are aware that Dynegy /Vistra is watching a section of bank along the Old East Ash Pit most susceptible to erosion. Dynegy / Vistra could prepare and submit proposals for emergency stabilization to ensure an expedited review.

2021 - IDNR REQUEST *(continued)*

Any emergency stabilization project that is proposed, approved, and subsequently installed should be considered temporary. Commitments from Dynegy / Vistra should be obtained to remove it, upon implementation of their approved closure plan for the three coal ash pits. Consistent with requirements of the Coal Ash Pollution Prevention Act, Dynegy / Vistra should be required to post a bond to pay for removal of an interim stabilization measure in order to ensure the scenic and cultural values of this National Scenic River are maintained.

Cost-Effective Solutions Exist for Interim Stabilization

Cost-effective solutions, such as the articulated concrete mats proposed by Scott Olson, Geotechnical Engineer, exist to address any immediate, emergency need identified by the IDNR.²² These mats could be installed quickly and are designed to be easily removed. While they would reduce the recreational/ scenic value of the river in the short-term, the mats can be vegetated to minimize this short-term, aesthetic impact.

There are other options that could be considered that would minimize harm to the river during installation. Eco-Justice Collaborative is not proposing a design solution, but instead is attempting to show that cost-effective solutions exist to protect the Middle Fork. Any stabilization that is proposed should be evaluated for both its effectiveness and impacts to the river.

IDNR Response to EJC Requested

Eco-Justice Collaborative expects that the Illinois Department of Natural Resources will do what is required to protect the Middle Fork from a potential catastrophic breach of a coal ash pit. This is consistent with, and required by, its mandate as state administrator of this National Scenic River.

Please let us know what steps the agency plans to take to determine the need for emergency, interim stabilization, per our request. You can call Lan or Pam Richart at 773.556.3417 / 3418 to further discuss this request for action, or send an email to the email addresses provided below.

We look forward to your prompt response.



Pam Richart, Co-Director
Eco-Justice Collaborative
prichart@ecojusticecollaborative.org



Lan Richart, Co-Director
Eco-Justice Collaborative
lrichart@ecojusticecollaborative.org

²² Scott Olson, Geotechnical Engineer. 2019. [Letter to Jennifer Cassel](#), Earth Justice, dated January 9, 2019..