Remedial Enhancement of the NEw River Watershed (RENEW)

Group 2: Amelia English, Silvie Sandeen, Mary Burrichter, Kathy Kochanowski, Cai Foster

Outline

1 Mission Statement

2 Background & History

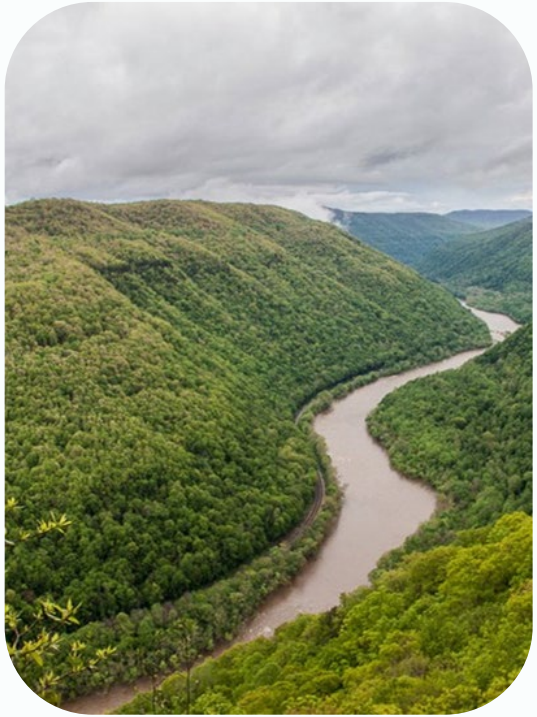
3 Current Policies & Mandates

4 Problem & Goal 1

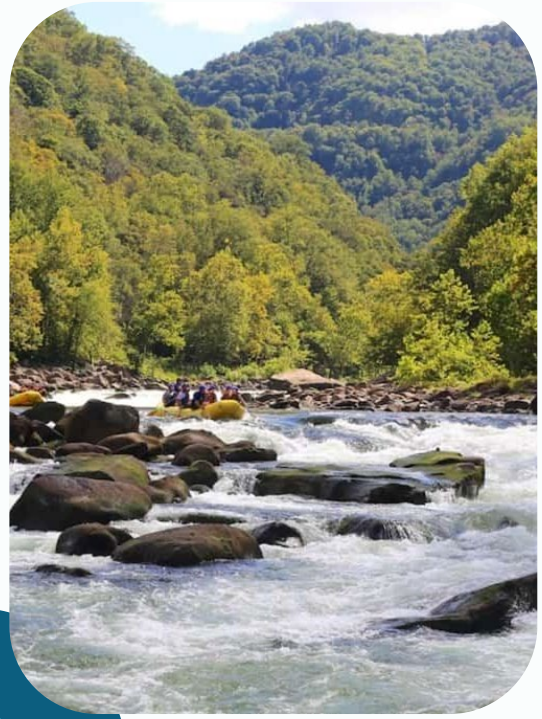
5 Problem & Goal 2

6 Problem & Goal 3

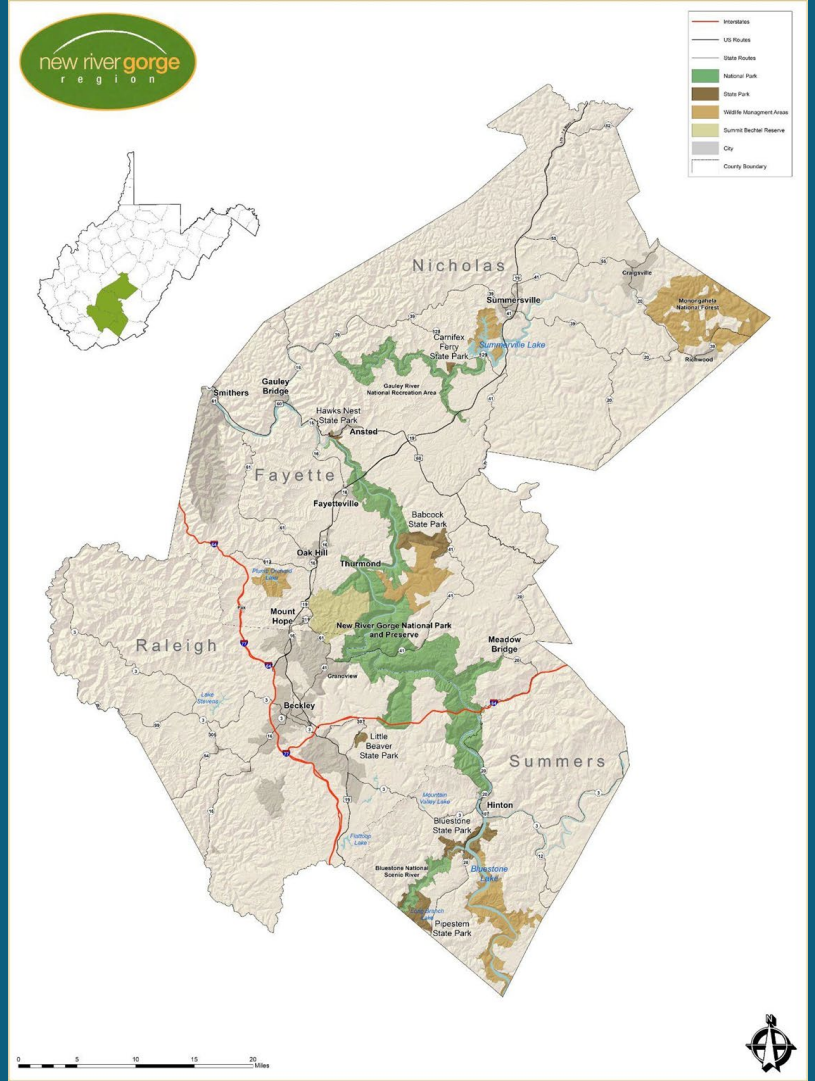
7 Conclusion



Mission Statement



The goal of RENEW is to analyze the impacts of human activities on water quality parameters of the West Virginia reach of the New River and provide recommendations to reduce pollutant levels by 50% by the year 2040.



Map of the Lower New River Watershed in West Virginia. The drainage area encompasses ~1,600 mi².

History

- The New River flows **south to north** from its headwaters in North Carolina into the **West Virginian Gorge** until it meets the Gauley River.
- It is thought to be **one of the oldest rivers on Earth**, estimated to be **65 million years old**.
  - Confirmed to be older than the Appalachian Mountains as it runs through them, not around or away from.
- The gorge was almost entirely inaccessible until **1873 when railroads connected** the more wilderness parts of West Virginia to the bustling east coast and opened it up to mining.
- Upstream the most impactful industry is **mining** , downstream it is **farming** , and as **urbanization** progresses, landfill, runoff, sewage, and industrial pollution also degrade the stream.

Significance

- The river is **utilized by hundreds of thousands of visitors annually** to boat, whitewater raft, kayak, canoe, swim, and fish, making its quality important to **public health**.
- It is designated as a **nationally significant and unique wildlife ecosystem** by the U.S. Fish and Wildlife Service, and is classified by West Virginia as a **high quality stream** because of the **quality and quantity of fishable marine life**.
- In West Virginia part of the river is protected as a **National Park and Preserve**, the New River Gorge. According to the NPS the park:
  - has '**long served as a migration corridor**" for flora and fauna
  - homes **endemic and rare/endangered species** (including the reintroduced peregrine falcon and the rare amphibian called hellbenders)
  - is the "**core of the largest** remaining block of relatively unfragmented, mid-latitude forest in the world"
  - supports the most "**diverse plant assemblage** of any river gorge in the central and southern Appalachians"

Current Policies & Mandates

West Virginia Water Pollution Control Act: Mandates the discharge of pollutants into waterways

- Permits are required by wastewater treatment facilities and industrial discharges and they need to meet specific standards before releasing the water

Riparian Rights (reasonable use)

- Landowners bordering a waterway have the right to use the water for reasonable purposes but can't restrict water use for others

Water Use Permits

- If someone wants to withdraw water from a public source (river or groundwater well) they need a permit, based on case by case scenario
- In accordance to The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion

Current Policies & Mandates

Policies on

- Conditions Not Allowable In State Waters (odors, toxins, distinct colors, deposits ect)
- Antidegradation Policy: maintain high quality waters
- Mixing Zones: concentration of pollutants

Draft General Management Plan/Environmental Impact Statement (5 alternatives for management)

- No Action Alternative
- Resource Protection Emphasis (habitat restoration and stricter regulations)
- Visitor Experience Emphasis (developing new tails or facilities)
- Balanced Use Alternative (resource protection and visitor enjoyment)
- Specific Area Focus Alternatives (some areas might prioritize wilderness preservation)

Foundation Plan: identifies the park resources and values that are fundamental to achieving the park's purpose and policy requirements

The New River Clean Water Alliance (NRCWA)

- Coalition of organizations, government agencies, nonprofits, and watershed groups
- Dedicated to improving and protecting water quality in the Lower New River and its tributaries

Facilitated by the **New River Conservatory**

- Nonprofit organization
- Engages with local communities to identify problems and solutions
- Works with local + state agencies to improve infrastructure and secure funding
- Conducts and publishes research for the public

The New River Clean Water Alliance (NRCWA)

Partners:

- The West Virginia Department of Environmental Protection
- National Park Service
- National Parks Conservation Association
- Southern Conservation District
- Piney Creek Watershed Association
- Region 1 and Region 4 Planning and Development Councils
- Beckley Sanitary Board
- West Virginia American Water
- Plateau Action Network
- WV Rivers Coalition

Problem 1: Fecal Coliform

- Continued monitoring since 1985 → some samples 500x higher than state standard for primary contact recreation
  - Listed as impaired waters by WV DEP
- Often from nonpoint sources →difficult to identify, track, and regulate

- Point sources
  - Public + private sewage treatment facilities and home aeration units (HAUs)
  - Combined sewer overflows (CSOs) and discharge from MS4s
- Nonpoint sources
  - Straight pipes from communities lacking sewage treatment facilities
  - Faulty infrastructure: leaking sewer lines, failing septic systems (3-28%)
  - Agricultural, residential, and urbanized runoff

Goal 1: Reduce Fecal Coliform

- Reduce concentrations to the state standard for primary contact recreation
  - ⩽ 200 colonies per mL of water
- Provide wastewater services to unsewered areas
  - Decentralized solutions
- Replace aged wastewater infrastructure on public + private property
  - Repair leaks, damaged pipes
  - Encourage homeowners to correct problems themselves
    - Educational resources, funding incentives and programs
    - Wastewater systems billing
- Slow runoff and keep it from entering sewer lines
  - Reduce impervious cover
  - Green infrastructure (e.g. wetlands, rain gardens, permeable pavements)
- Community engagement: partnerships, monitoring
  - Septic system database in Fayette County

Problem 2: Acid Mine Drainage

- Water runoff from mining operations can be highly polluted; often highly acidic and carrying heavy metals, creating a toxic environment for animals and humans
- As far back as 1873, coal has been mined from the New River Coalfield in West Virginia
    - “At the height of industrialization, there was a coal mining town for almost every mile of railroad in the gorge.”
- Much of the New River that has poor biological conditions is also affected by acid mine drainage
    - low pH and presence of metals (Iron, Aluminum, Manganese)
    - Current and abandoned mines contribute to this
- Elevated sulfate concentrations in areas of mining
- Areas with higher levels of coal mining measured a decline in the benthic invertebrate community

Goal 2: Preventing Acid Mine Drainage

Proper handling of retired mines:

- Prevent acid mine drainage from reaching waterways:
  - Riparian buffers to stabilize soil and reduce runoff from mines
  - Engineered wetlands to filter water and contain pollution
- Direct treatment of water to neutralize pH
- Filling abandoned mines

WV Abandoned Mine Lands Reclamation Plan

- increase charge per ton of coal for mines on the New River

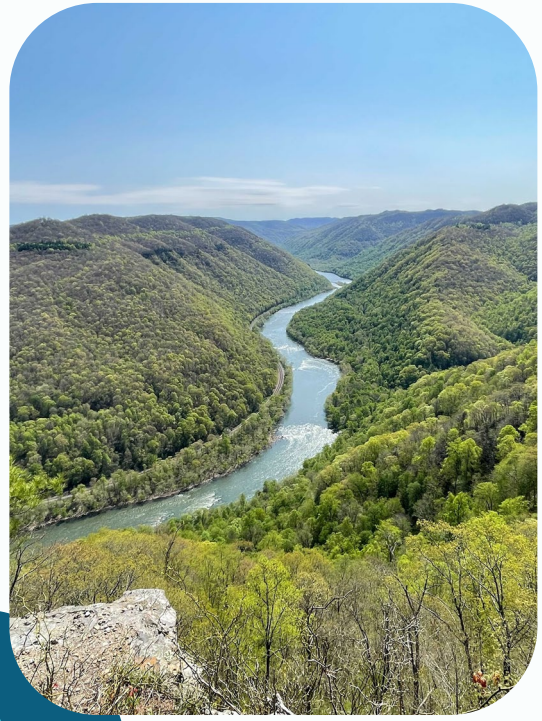
Problem 3: Erosion

- Erosion is a geological process:
  - Materials are worn away and transported by natural forces (wind, water. etc.)
  - The deposition of sediment transportation infrastructure (roads or railroads for example) may reduce availability for aquatic habitats
  - The severity of a storm can impact the severity of a rock slide, rock falls, landslides, and flooding events.
    - These things have made soil erosion worsen along steeper slopes
  - Affects access to walking trails and public areas
- Causes:
  - Development/ urbanization
    - With urbanization comes smaller water holding capacities in the soil. This means that there will be more runoff
  - Increase in impervious surfaces
    - Impervious surfaces increase the volume at which storm water reaches streams

Goal 3: Control Erosion

To help control erosion, it's a good idea to strengthen the root system of the surrounding plants and direct water in different ways to help slow the water flow to help decrease erosion

- Replanting vegetation
  - This includes native plants to colonize and establish a root system, stabilizing the soil
  - This also includes wetlands, which can help with erosion caused by waves
- Mulching around the river
  - Spreading a layer of mulch (woodchips, bark, gravel) over the soil to slow down water flow and retain the moisture in the soil
- Retaining walls/Terraces
  - For steeper areas this can help hold back the soil and stop it from entering the river



Conclusion

By implementing the recommended methods, fecal coliform, metal contamination, and erosion can be significantly reduced by 2040. This comprehensive approach will lead to a cleaner, healthier watershed, fostering a thriving habitat for the surrounding wildlife and boosting state and local economies through increased ecosystem services and recreational opportunities.

Questions?

References

American Geosciences Institute. (n.d.) *What can be done to prevent or clean up acid mine drainage?* https://www.americangeosciences.org/critical-issues/faq/what-can-be-done-prevent-or-clean-acid-mine-drainage#:~:text=Some%20common%20methods%20include%3A,water%20into%20underlying%20contaminated%20material.

County of Fairfax Virginia. (n.d.) *Stop erosion: Solving drainage and erosion problems*. Northern Virginia Soil and Water Conservation District. https://www.fairfaxcounty.gov/soil-water-conservation/drainage-problem-protect-eroding-land

Mathes, M.V., O'Brien, T.L., Strickler, K.M., Hardy, J.J., Schill, W.B., Lukasik, J., Scott, T.M., Bailey, D.E., & Fenger, T.L. (2007). *Presumptive sources of fecal contamination in four tributaries to the New River Gorge National River, West Virginia, 2004* (Report No. 2007-1107). U.S. Geological Survey. https://pubs.usgs.gov/of/2007/1107/pdf/ofr2007-1107.pdf

National Park Service. (2021, January 27). *Environmental factors*. New River Gorge National Park and Preserve. https://www.nps.gov/neri/learn/nature/environmentalfactors.htm#:~:text=The%20quality%20of%20the%20surface,tributaries%20of%20the%20New%20River

National Park Service. (2011). *Foundation plan for New River Gorge National River*. United States Department of the Interior. http://npshistory.com/publications/neri/foundation-plan-2011.pdf

National Park Service. (n.d.). *Planning and civic engagement*. United States Department of the Interior. https://www.nps.gov/neri/getinvolved/planning-and-civic-engagement.htm

National Park Service. (2004, December). *A natural resource assessment for New River Gorge National River* (Report No. 2004/002). United States Department of the Interior. http://npshistory.com/publications/eq/rmp/nrtr-2004-002.pdf

References

The New River Clean Water Alliance. (2011, July). *Lower New River: State of the watershed*. https://npca.s3.amazonaws.com/documents/2294/c2d89988-1a34-4187-9661-6cd953f78419.pdf?1445978582

Paybins, K, Messinger, T, Eychaner, J, Chambers, D, and Kozar, M. (1998). *Water Quality in the Kanawha–New River Basin*. United States Geological Survey. https://pubs.usgs.gov/circ/circ1204/pdf/circular1204.pdf

Tetra Tech. (2008, November). *Total maximum daily loads for selected streams in the New River Watershed, West Virginia*. West Virginia Department of Environmental Protection. https://dep.wv.gov/WWE/watershed/TMDL/grpd/Documents/Upper%20and%20Lower%20New%202008/_Final_EPA_APPROVED_New_River_TMDL_Report_11_24_08.pdf

United States Environmental Protection Agency. (2023, December 4). *Abandoned mine drainage*. Polluted Runoff: Nonpoint Source (NPS) Pollution. https://www.epa.gov/nps/abandoned-mine-drainage

Water Resources Division Of Water And Waste Management (2022). *Title 47 Legislative Rule Department of Environmental Protection Water Resources Series 2 Requirements Governing Water Quality Standards* (47-02). U.S. Environmental Protection Agency. https://www.epa.gov/sites/default/files/2014-12/documents/wv-series2.pdf

West Virginia Explorer. (n.d.) *New River coal field*. https://wvexplorer.com/coal-mining/coal-fields/new-river-coal-field/

New River Clean Water Alliance. New River Conservancy. (2023, October 13). https://newriverconservancy.org/restore/new-river-clean-water-alliance/