Lower Kanawha Watershed Action Plan (LKWAP)

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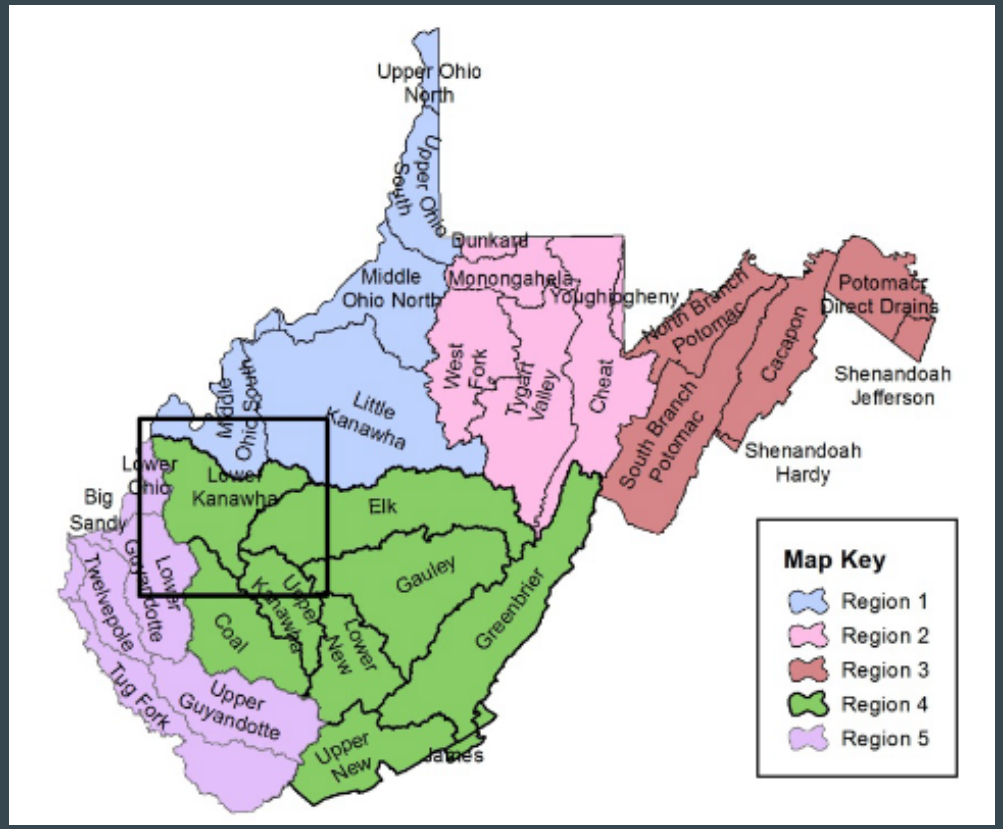
Watershed Background Information



Source: WVDEP, 2013.

South Charleston	13,450	6,819	69.9%	$46,390	14.1%
Teays Valley	13,175	5,438	82.5%	$70,419	6.8%
St. Albans	11,044	5,436	69.4%	$44,758	13.3%
Cross Lanes	9,995	4,580	70.9%	$55,773	11.8%
West Virginia	1,853,000	881,917	72.5%	$41,751	17.9%

Source: USCB, 2010.

TMDL

A TMDL was developed for 2006 and 2012.

The TMDL targeted 22 subwatersheds that contained 122 impaired streams

Major impairments

- Metals
- Fecal Coliform
- Biological Impairment

Wasteload Allocations (WLAs) and Load Allocations (LAs) included

- Point Sources: active mining operations, construction stormwater, municipal storm sewer systems, and sewer treatment plants

Major Policies & Developments

Clean Water Act (1972)

Safe Drinking Water Act (1974)

Toxic Substance Control Act (1976)

Surface Mining Control & Reclamation Act (1977)

WV Water Resources Protection & Management Act (2004 & 2008)

Environmental Concerns & Proposed Solutions

Fecal Bacteria in Streams

Industrial Pollution

Heavy Metals Traced in Wildlife

Fecal Bacteria in Streams

Questions

Higher than State contact standard of 200 col/100 ml (West Virginia Department of Natural Resources), and
Higher than 400 colonies/100ml established by the Environmental Quality Board.

Causes

Individual sources covered under the NPDES program such as wastewater treatment plants, combined sewer overflows (CSOs), municipal separate storm sewers (MS4s), and general sewage permits
Unpermitted sources: on-site treatment systems, storm water runoff and agriculture.

Influence

Human health: ear infection, dysentery, typhoid fever
Environment: reducing dissolved oxygen levels due to aerobic decomposition of this material

Fecal Bacteria in Streams

Goals

Reduce and prevent influx into streams

By 2040, meet the numeric standards of WV Department of Natural Resources and NPDES permits, which is 200 col/100 ml, helping achieve the Watershed Action goal of swimmable and fishable in 2040

Fecal Bacteria in Streams

Solutions

Best management practices (BMP) required by CWA

- Actions

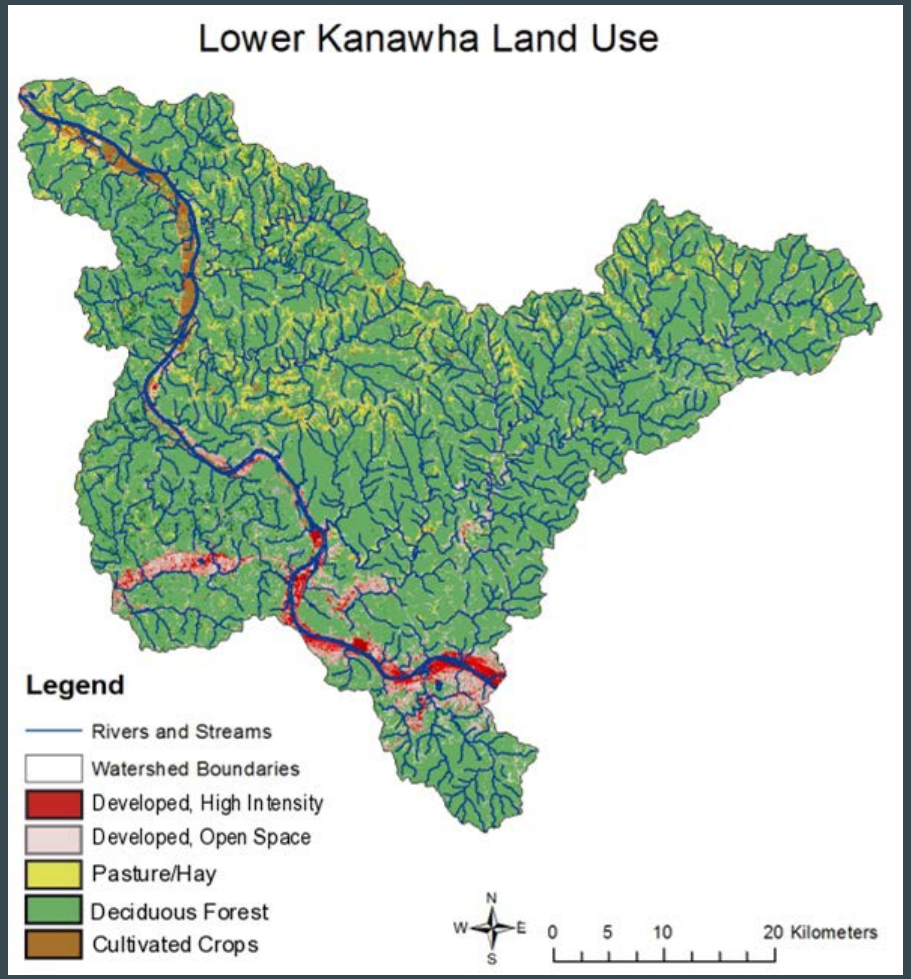
Pollution	Action
Urbanization and storm water runoff	Reduce impervious cover, build bio-retention covers, build drainage swales.
Wild and domestic animals	Build fences
Household sewage	Education to individuals and families

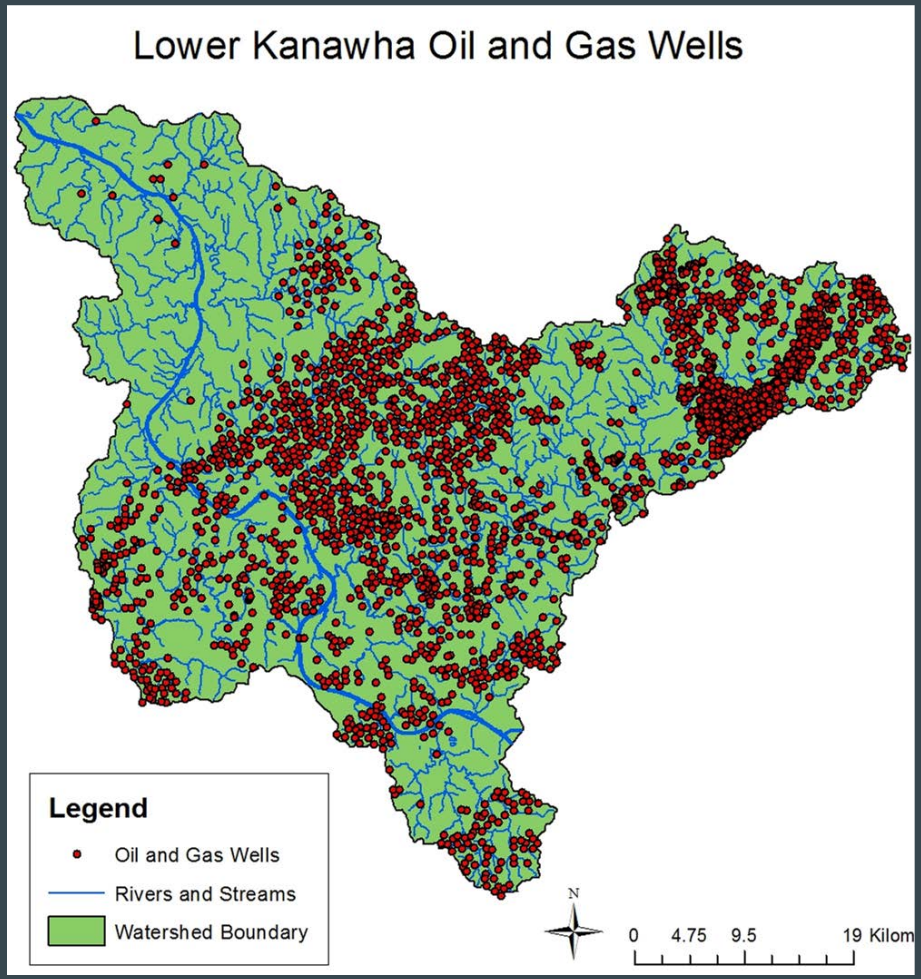
- Technology
  - Two publicly owned treatment works (POTW)
  - 231 general sewage treatment plants.
  - New disposal systems
- Monitor
- Review and revise

Industrial Pollution

Three primary forms of industrial pollution

- Chemical Spills
  - Frequent chemical spills along Kanawha River
  - 2014 Elk River MCHM spill
  - 300,000 people without water
- Waste from Abandoned Mines
  - Acid mine drainage
  - Large quantities of iron and aluminium
- Oil and Gas Wells


Lower Kanawha Land Use
Legend
Rivers and Streams
Watershed Boundaries
Developed, High Intensity
Developed, Open Space
Pasture/Hay
Deciduous Forest
Cultivated Crops
N
W
E
S
0
5
10
20 Kilometers


Lower Kanawha Oil and Gas Wells
Legend
Oil and Gas Wells
Rivers and Streams
Watershed Boundary
N
0
4.75
9.5
19 Kilom

Industrial Pollution

Goals

- Reduce frequency of chemical spills to every 5-10 years
- Improve monitoring of industrial facilities to limit incidence of major point-source pollution events
- Ensure chemical safety protocols and standards are being met and enforced
- Reduce 50% of metal toxicity by 2040

Industrial Pollution

Solutions

- Neutralize acidity from AMD with constructed wetlands and/or lime as part of a BMP
- Increase the AML&R tax on coal
- Encourage industrial companies to update equipment and facilities
- Educate industrial workers on proper safety techniques and the risks of exposure to hazardous chemicals

Heavy Metals Traced in Wildlife

Problem

- Non-point source pollution
  - Logging, energy extraction, construction/ urbanization and agriculture
- Trace elements found in common carp and rock bass tissue samples
- Iron and Manganese
  - Concentrations exceeded EPA Secondary Maximum Contaminant Levels (SMCL)
- Wildlife dependent on aquatic life
  - Reptiles
  - Amphibians

Heavy Metals Traced in Wildlife

Goal

Maintain “fishable” status for the Lower Kanawha River Watershed streams

Manage non-point source water runoff and pollution by the year 2040

Protect wildlife dependent on watershed

Heavy Metals Traced in Wildlife

Solutions

- Conduct tests
  - Habitat monitoring
  - Capture and blood sampling of migrant songbirds
    - Louisiana Waterthrush (*Parkesia motacilla*)
    - Volunteers and Interns
      - Cost effective
- Evaluate potential wetland and terrestrial habitat for larger birds:

https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwiW-sPd2o3TAhWFTCYKHQrZCHsQjRwIBw&url=http%3A%2F%2Fwww.chesapeakebay.net%2Ffieldguide%2Fcritter%2Fgreen_heron&psig=AFQjCNHGDDmsNqysXaqVhG9zT3enMJbtTw&ust=1491495185177337

Heavy Metals Traced in Wildlife

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Solutions

Repair degraded streams and waterways

Edges - Plant native grasses

Maintain and create riparian buffer in protected areas

Canopy and understory trees

Marbled Salamander *(Ambystoma opacum*)

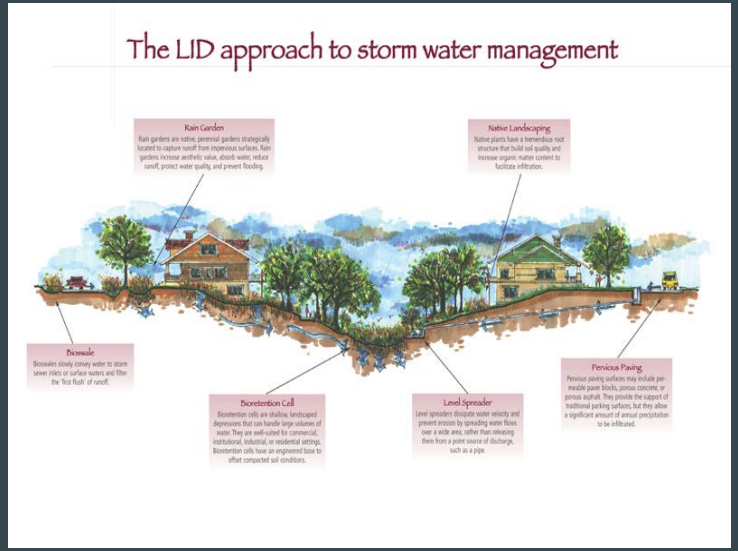
Goal: 2027

Establish new protected areas with riparian

Heavy Metals Traced in Wildlife

Solution

- Implement Low Impact Development (LID) methods
  - Bioretention
    - Soil- and plant-based filtration devices
    - Absorbs excess stormwater runoff
    - Install in Kanawha valley
    - 90% reduction of copper, zinc and lead in water
  - Permeable pavements



https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ia/newsroom/factsheets/?cid=nrcs142p2_008518

Stakeholder Summary

US Environmental Protection Agency - Federal

US Geological Survey - Federal

WV Division of Natural Resources - State

WV Office of Land & Streams - State

WV Department of Environmental Protectio

WV Conservation Agency (Nonprofit)

Coal River Group (Nonprofit)

Questions?