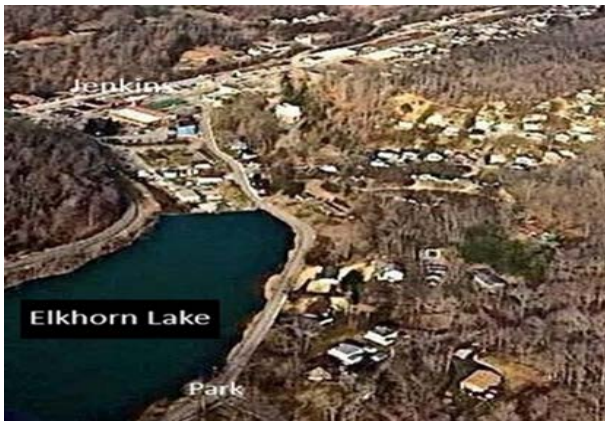




ELKHORN LAKE IMPROVEMENT PROJECT

Health Impact Assessment: Summary Report

In January 2018, Kentucky River Area Development District (KRADD) was awarded funding for a Health Impact Assessment. A Health Impact Assessment (HIA) is an examination of a proposed public project's possible health impacts. KRADD's southeast Kentucky planning region was selected by the grantors because of the region's many health challenges. Annually, KRADD publishes a Comprehensive Economic Development Strategy (CEDS) to inform the Kentucky government and other entities of these activities. Since all local elected officials are on the KRADD Board of Directors, the CEDS provides them with a means of communicating their local development goals.



The KRADD region has many challenges including a lagging economy, high disability rates, twice the U.S. rate for "deaths of despair," decreasing population and failing industries. Many state and national reports of the KRADD region rank residents' health among the lowest in many categories. Coal mining served the region as the economic engine of the past century. Now as mining industry employment declines, developing a more diverse economy becomes paramount. The KRADD counties are mountainous, making infrastructure development more challenging. Projects such as road and bridge construction, public water systems and wastewater treatment become

more expensive, though a priority. All counties seek to improve the quality of life for its residents while finding new ways for progress and employment. Recent efforts have also focused on tourism for the area since the mountains provide a recreation destination for the adventurous traveler.

The Health Impact Assessment (HIA) for the Elkhorn Lake Improvement Project (ELIP) informs the City of Jenkins and the health impact of their policy decisions. Elkhorn Lake is not just a reservoir for the city's water supply; it also impacts upon the entire health, social and economic development of the community. Quality water is the most essential building block for an individual's survival and a community's ability to prosper and grow. The initial goal of the Elkhorn Lake Improvement Project was to improve the reservoir capacity, improve the structural integrity of the dam and landscape around the dam and reservoir. This HIA seeks to emphasize additional environmental and social health determinants as priority goals. Paul Nesbitt, the City Engineer for Jenkins, and Mayor Todd DePriest have long sought Elkhorn Lake improvements as a matter of public health and safety.

HISTORY'S INFLUENCE ON THE JENKINS, KY HIA

In 1911 Jenkins, Kentucky was carved out of 100,000 acres of the southeast Appalachian mountain wilderness owned by the Consolidation Coal Company. Jenkins thrived for half a century partly because the coal company-built Elkhorn Lake, made possible by constructing a 40-foot-high dam on Elkhorn Creek which marks an earthquake fault. Jenkins, with a population of over 2,300, is unusual because the city's 600 houses were constructed entirely as a coal camp for the miners who worked in the area's underground mines. Elkhorn Lake,



which sits above the City of Jenkins, has changed little since Consolidation Coal built it in 1912. The 19th century construction standards used for the Elkhorn Dam do not compare favorably to the 21st-century standards. However, the dam was well constructed for the time using some concrete and steel. This concrete and steel construction produce stronger dams compared to many existing earthen dams.

Now, heavy rainstorms cause fierce torrents and dam overtopping. The ongoing water seepage through the dam face is a growing matter of concern because of the recent earthquakes. The relief pipes through the dam base that were created to supply water to a long-gone hydroelectric plant are now dysfunctional crumbling derelicts. In addition, potentially noxious vegetation and possibly toxic sediments from the upstream surface mines may have contaminated the reservoir over the past 106 years. This Elkhorn Lake history is important to this HIA because the single industry nature of the town's development from its inception has contributed to some serious health challenges, requiring a broad-based approach to address thinking about public health.

PROCESS FOR THE HIA

The HIA team followed the six-step HIA process for conducting an HIA as depicted here. The first step began with the KRADD document called the CEDS. All the major projects planned for the region were screened. Yet the CEDS has not concentrated on improving health as a priority for the region despite health indicators painting a picture of poor health. Introducing HIA into the southeast Kentucky region's planning process presents a promising approach for examining community health as an important part of economic development strategies. The HIA methodology involved community surveys, focus groups, subject matter experts' interviews, engineering reports, technical reports, literature reviews, and site visits.



What does this mean for KRADD? KRADD has the opportunity, through its network of elected officials and members, to provide leadership and training to create a new future for the region. Looking at all available indicators of health, economy, social factors and community for the Jenkins area and all the KRADD counties shows many challenges—so many, in fact, that it appears daunting. Overcoming this apparently overwhelming variety of challenges requires transformational leadership and transformational change. KRADD could use its membership as a forum to develop resilience plans for their communities. Rather than simply focusing on economic development, these plans would include resident health and a stronger more engaged community. Training current and future community leaders and other key players or stakeholders in “Building Community Resilience”, “Health in All Policies”, and community engagement could, over time, lift southeast Kentucky out of the doldrums. Many small change projects will gradually overcome the plethora of challenges. As a wise one said when asked how to eat an elephant, “One bite at a time.”

OVERARCHING RECOMMENDATION: JENKINS RESILIENCE

The overarching recommendation for Jenkins is to mobilize the local community residents, led by a group of community leaders, to develop a community resilience plan for Jenkins. The Elkhorn Lake Improvement Project (ELIP) goals are necessary and worthy but relying on external entities to solve the problems in Jenkins is a poor strategy for progress. While a large grant from a major government source would be welcome, action on several lesser changes, perhaps those “low hanging fruit,” could more quickly target changes, by using individualized funding mechanisms from local and external sources. This ELIP Health Impact Assessment could be fodder for the Community Resilience Plan

team. The troubling social, health and economic indicators could become useful for developing the Jenkins Community Resilience Plan. Transformation of a city beset with a wide variety of challenging issues will not be easy or fast, but it can be done with persistence and belief in the power that resides within the community to control its own destiny. Jenkins can demonstrate to its residents and the region that the city has a new vision for the future, including a culture of health and prosperity. Promoting health and a hopeful, positive outlook will make the residents and city more attractive and easier to market to investors and potential employers. So, where does one begin? Looking at the “Health in All Policies” approach embedded in the Health Impact Assessment tool would guide the chosen community development approach. This broader health approach guides policy makers to keep from simply targeting the economy. Creating a strong, healthy community where people *feel good and want to work and live* is the mission.

GUIDING PRINCIPLES FOR COMMUNITY DEVELOPMENT

Use this set of principles, derived from research in the U.S. and elsewhere to guide the Jenkins community.

1. Use a definition of community development that's beyond housing and jobs to include health and resilience;
2. Create incentives for developers to have a broader community perspective that includes health;
3. Empower more local persons to be active community leaders;
4. Support ideas that reflect increased internal cognitive controls;
5. Recognize changing roles for men and women without demeaning anyone;
6. Support resilience in children and the community;
7. Engage the community institutional leaders in the process;
8. Develop local policies that reflect local challenges and priorities;
9. Revitalize downtown areas and make the community more attractive;
10. Create attractive communities where people ***feel good*** about living there.

HIA RESEARCH ISSUE 1 – DAM SAFETY AND HEALTH



Elkhorn Dam Spillway

Since 1912, the dam has deteriorated, with seepage from the dam face constant and increasing. *At the time the dam was constructed, the coal company likely did not know that the dam was in an earthquake zone with an earthquake fault running directly through the dam.* Since the Elkhorn Lake Dam's construction, there have been over 800 of small earthquakes around Kentucky which have increased to Richter 4.6 and the dam seepage has increased tenfold but has not yet caused a breach. The Kentucky Division of Dam Safety has rated Elkhorn Lake as a High Hazard dam in Poor condition. When constructed, the dam's design called for pipes to penetrate the base and a spillway at the top of the dam to release pressure on the dam during flood conditions. Over time, these efforts have diminished to control hydrologic pressure. Overtopping is a condition

attributable to a large share of dam failures worldwide. Any heavy rainstorm causes the lake waters to overtop the dam. If there were a dam failure, several hundred lives could be lost if no warning and evacuation occurred.

RECOMMENDATIONS 1.1 –

Because of the possible dam structural deficiency, the presence of the frequent low-level earthquakes in the area, and the increased geologic instability, Emergency Action Plans need to be devised to prevent potentially catastrophic consequences for the community.

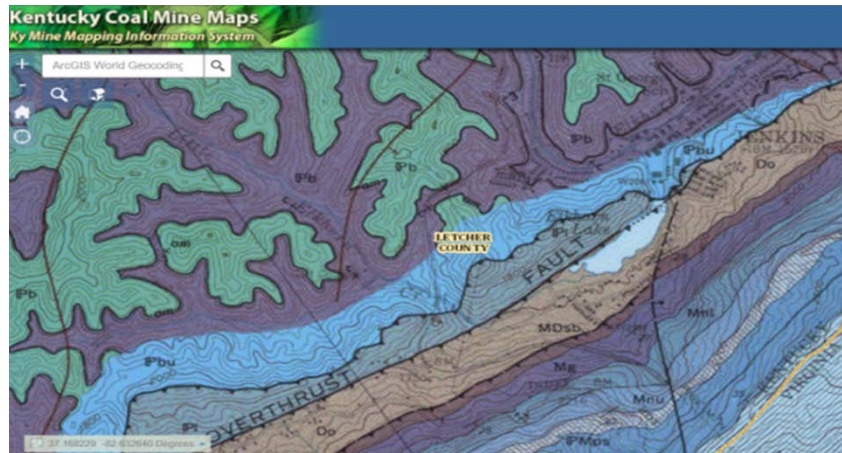
Community organizations such as volunteers, fire, police and emergency management play a role in preventing disasters. The ability of some communities to prevent disasters and mitigate the impact of disasters has declined, as traditional communities have decreased, and younger people have left the area seeking employment. Older adults and persons with physical and mental disabilities have increased. To prevent loss of life due to a dam breach disaster, it is necessary to

make local disaster prevention efforts a priority and an ongoing occurrence. The public as well as the governmental authorities need to participate and cooperate to protect their communities. In order to find ways to involve local residents in disaster prevention, city officials, fire department and police must develop an alert mechanism, conduct drills with evacuation exercises, engage in ongoing prevention education activities and offer provisions for the transportation of local residents to safety as required components of disaster preparedness activities.

RECOMMENDATIONS 1.2 – The City of Jenkins is encouraged to follow the recommendation of prior dam inspectors and engineers to routinely manage and maintain the dam face, and as soon as possible, rehabilitate the discharge pipes to relieve pressure on the dam at times of flooding. Improving the maintenance, brush control and debris located in the public works area below the dam could decrease erosion and increase public perception of the city's attitude toward safety and prevention. In addition, the city needs to begin closely monitoring the dam for overtopping, cracks or increased seepage by at least two persons every day as recommended by dam inspectors. These steps could help reduce community stress and increase preparedness. In other words, prepare for the worst and hope for the best, until resources become available to perform the major safety improvements.

HIA RESEARCH ISSUE 2 - WATER QUALITY AND HEALTH

Public trust in the drinking water supply is a major hurdle to overcome around the world because of declining water quality. Even when the tap water is clean and pure, customers may choose a less healthy alternative or rely on bottled water. Recent water quality tests show repeated violations for a variety of contaminants. Water quality could be improved, and the possibility of selling more water to nearby water districts could produce more badly needed income for the city. Water quality violations citations have resulted from missed scheduled testing and required notifications to the consumers.



USGS Geologic activity around Kentucky since 1900. The diameter of the circle corresponds with Richter Scale.



Ironically, more health-related damage may be due to substituting sugar-sweetened beverages for plain tap water because of misperceived poor water quality or mistrust of the water than by actual toxins or contaminants in city water. Public perception of the water quality and trust in the water is essential to health outcomes. Dredging of Elkhorn Lake would remove the water lilies and their roots so the plants would not regrow, thus increasing the reservoir capacity. Dredging the lake is estimated to cost over \$1 million and require draining the lake for months. Furthermore, the dredging would unearth the estimated thousands of yards of buried sediments that potentially contain pockets of naturally occurring heavy metals. Although removing the water lilies and other unwanted debris and vegetation from the lake would improve the water quality, the health benefits of taking less drastic steps than dredging is preferable to waiting until enough funding becomes available. Modern industrial technology could remove the water lilies and debris from the lake without disturbing the sediments or costing so much.



Elkhorn Lake Park

RECOMMENDATION 2.1 - Developing mechanisms for improved community monitoring and frequent consumer notifications about water quality and safety would also likely result in improved public confidence in the water quality. The improved public confidence in the water quality would have the added benefit of improved public health from increased drinking water consumption rather than other less healthy beverages.

RECOMMENDATION 2.2 - Creating a community-based organization such as a *Friends of Elkhorn Lake* group comprised of local residents and students to assist the city with communications about water quality improvement, planning, and lake clean-up activities would have the added benefit of mobilizing the community to take action in managing the water lilies and clearing debris from the shorelines. The Friends of Elkhorn Lake group could become an advocacy group for the city to obtain the funding needed for lake cleaning machinery and with disaster prevention monitoring.

HIA RESEARCH ISSUE 3 - PARK AMENITIES AND HEALTH

The Elkhorn Lake Park area in Jenkins consists of a few park benches along the water's edge, a boat ramp, a small pier, playground equipment, picnic area, swimming pool, softball field, and restaurant. Mayor De Priest would like to expand the park by providing a walking trail around the entire lake. The lake is situated as a focal point for the city. There exists a large volume of scientific literature on the community benefits of urban or neighborhood parks such as at Elkhorn Lake. The social determinants of health such as physical activity levels, stress relieving recreation, social interactions and healthy lifestyles would improve the overall health behaviors and longevity of the people of Jenkins. Parks as a social environment, impact health behaviors and outcomes. Public parks are among the most common places for healthy outdoor physical activity. Health behaviors can be improved through the utilization of the park with desirable amenities.

Park Playground



RECOMMENDATION 3.1 - Jenkins and City Council should work with the local health department to increase awareness of the health effects of an improved park and the amenities offered by utilizing the Surgeon General's Call to Action to promote walking and walkable communities.

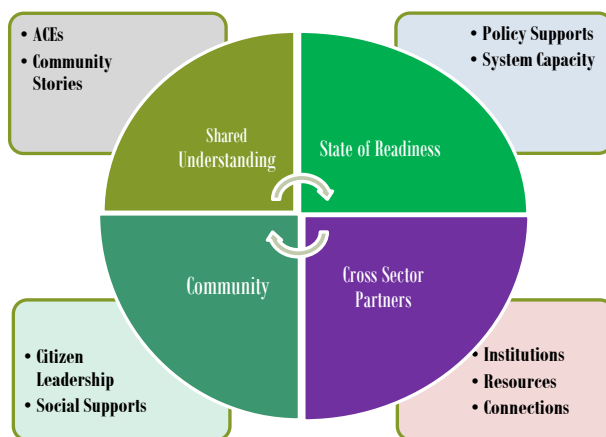
RECOMMENDATION 3.2 - While the data shows promise for health benefits by the expansion of a park walking trail, and the cost of a walking trail around the entire Elkhorn Lake has been incorporated

in the Abandoned Mine Lands applications, these improvements have not been considered as an individual project. City leaders should consider separating various components of the Elkhorn Lake Improvement Project and plan other funding mechanisms or grant opportunities to strategically improve amenities in the park. Community engagement and mobilization are key components park to improvements. The proposed *Friends of Elkhorn Lake* could be the key.

HIA RESEARCH ISSUE 4 - COMMUNITY DEVELOPMENT AND HEALTH

The people of southeast Kentucky see opportunities for new jobs and community development as paramount. One accounting of the Appalachian cultural sociology, based on the colonization of the coal camps by international owners, was described as a failure to develop a strong sense of civic responsibility. Public health researchers understand that overcoming poverty is an essential component to health promotion. Lately health promotion theorists have attributed adult health problems and poor social adjustment to adverse experiences in childhood caused by family stress and poor community environments. Strategies to engage the community in planning will result in healthier people and more prosperous communities. Community development vision must include health as a key component. Any call for community engagement must also involve the major institutions in the process. These institutions such as banks, schools, churches and health care agencies should provide leadership to improve civic participation. One journalist contended that today, jobs come to where the workers choose to live rather than workers going to distant jobs. The workers choose where they live by how they feel about a place. With the long history, traditions and culture of Appalachia, people love the land they have worked so hard to build up. They do not want to leave their family and community just for a job. Making communities attractive to workers and businesses leads to improved quality of life and better health outcomes.

Building Community Resilience



Ellis, W. & Dietz, A Framework for Advancing Adverse Childhood Experiences and Community Experiences: The Building Community Resilience (BCR) Model, Academic Pediatrics (2017)

RECOMMENDATION 4.1 - The City of Jenkins' leaders need to undertake a program of civic engagement that clarifies and sets priorities for the City. The City needs a planning process that clarifies the major goals for the city and actions to take now, but also looks at overall long-term needs. The City should concentrate on what the residents could accomplish themselves without depending upon outside assistance or funding. This kind of grassroots initiative would strengthen the community and make it a healthier place to attract new job opportunities.

RECOMMENDATION 4.2 - Jenkins should make the Elkhorn Lake Improvement Project the first component in a series of

local improvements to make the City more attractive to residents and businesses. A team of residents, formed as an action team, would identify which priority steps must be taken to improve the dam, park, and water quality, while creating Jenkins' ownership of the actions. Involving the city government, banks, churches, schools and businesses in identifying their individual and collective parts will help assure success.

Thanks to everyone who made this possible, particularly the people of Jenkins, KY. For the full report contact the authors by email, David Mathews, Ph.D. wdmphd@gmail.com or Donna Hardin, M.B.A. at donna@kradd.org or see the website below or the HealthImpactProject.org. While this Health Impact Assessment is supported by a grant from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, it does not necessarily represent their views, but those of the authors.