Buried Beneath the Reservoir: The Forgotten Injustice of the Kinzua Dam

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Large-scale infrastructure projects often stand at the intersection of technical necessity and ethical responsibility. While engineering endeavors aim to improve public welfare, they sometimes come at significant social and cultural costs. The construction of the Kinzua Dam in the 1960s exemplifies such an ethical dilemma. Designed to mitigate flood risks in the Ohio River Valley and Pittsburgh, the dam displaced the Seneca Nation from their ancestral lands, violating a treaty that had guaranteed them permanent residence. Professional engineers are expected to uphold ethical and fair practices while performing work that enhances the lives of people, yet the story of the Kinzua Dam is one of deceit, inequity, and despair. This paper aims to answer the question: *Did the U.S. Army Corps of Engineers commit an ethical failure, and if so, what key moments in the project's timeline enabled this failure?*

This research examines the Kinzua Dam project through the lens of engineering ethics, stakeholder engagement, and sociotechnical systems analysis. By constructing a timeline of events and applying ethical frameworks, this study argues that the prioritization of flood control and development speed over indigenous rights constitutes an ethical failure of the U.S. Army Corps of Engineers (USACE). Ultimately, this analysis underscores the need for engineering practices that balance technical and economic objectives with social and cultural considerations, a principle emphasized in the American Society of Civil Engineers (ASCE) Code of Ethics.

Background & Context

The Kinzua Dam project was authorized under the Flood Control Acts of 1936 and 1938, with the USACE overseeing its design and construction (USACE, 2024). Situated on the Allegheny River in Warren County, Pennsylvania, the dam was intended to reduce flooding in

Pittsburgh and surrounding regions (USACE, 2024). Despite the total cost of construction reaching roughly $120 million (more than $1 billion in 2025 dollars), the USACE believed the project was justified by the historical record of severe floods in the Ohio River Valley, with engineers emphasizing the dam's necessity to protect citizens and provide clean water to growing cities. Following its completion, the Kinzua Dam demonstrated its effectiveness, particularly during Tropical Storm Agnes in 1972, preventing an estimated $274 million in flood damages, more than paying for itself (Laih, 2008). The dam also provided hydroelectric power and created the Allegheny Reservoir, which became a recreational and economic asset for the region.

However, the dam's construction required flooding approximately 10,000 acres of the Seneca Nation's lands, including the Cornplanter Tract, which had been granted in perpetuity to Chief Cornplanter's people in 1791 (The Avalon Project). The project forcibly displaced around 130 Seneca families, marking what they described as their second "Trail of Tears" (Laih, 2008). Despite legal challenges and appeals to uphold the rights promised in the 1794 Treaty of Canandaigua (also known as the Treaty of the Six Nations), the Seneca were ultimately unsuccessful, as the U.S. Supreme Court ruled that the federal government had the authority to break treaties for domestic infrastructure projects (Diaz-Gonzalez, 2020; Avalon, n.d.). Although the government provided $15 million in compensation and suburban-style housing for the displaced Seneca, the loss of ancestral lands disrupted their cultural and spiritual traditions, causing lasting harm to the community.

The broader historical context surrounding the Kinzua Dam project reveals additional motivations and pressures that influenced its development. The dam's authorization came during the aftermath of the Great Depression, a period in which large-scale infrastructure projects were frequently used as tools for economic recovery and employment generation. Additionally, the

Cold War era played a significant role in shaping federal infrastructure policy. By the 1950s and 1960s, national security concerns were deeply embedded in public works planning. The U.S. government prioritized projects that strengthened domestic resilience, including flood control, energy production, and regional economic stability. Hydroelectric power from projects like the Kinzua Dam was seen as a means of bolstering energy independence, which was strategically important amid fears of geopolitical instability and potential Soviet threats. Overall, the political and economic climate formed the perfect storm to propel hasty infrastructure projects like the Kinzua Dam.

Stakeholder History & Ethical Considerations

The decision-making process behind the Kinzua Dam project involved a complex web of stakeholders. This analysis, however, will predominantly follow the actions and responses of the USACE – the collective designer of the Kinzua Dam proposal, the primary proponent of the project, and the entity that stood to gain the most from its completion.

The USACE, as a group of professional Civil Engineers, is expected to adhere to the following overarching principles outlined in the American Society of Civil Engineers Code of Ethics:

- "create safe, resilient, and sustainable infrastructure;
- treat all persons with respect, dignity, and fairness in a manner that fosters equitable participation without regard to personal identity;
- consider the current and anticipated needs of society; and
- utilize their knowledge and skills to enhance the quality of life for humanity." (ASCE, 2020)

Throughout its history, the USACE has demonstrated a commitment to these principles, not only within the United States but also through its contributions to infrastructure development worldwide. The Corps' current Campaign Plan emphasizes "making a positive impact on the Nation and other nations," and even a century ago its actions seemed to align with that statement (USACE, n.d.-a). Following World War II, the USACE played a pivotal role in the reconstruction of Europe, restoring essential services and strengthening economic recovery (USACE, n.d.-b). In the Middle East, the Corps established the Middle East Division in 1951 to oversee military construction projects, particularly in Saudi Arabia, where it developed airfields and military facilities to enhance regional security and foster international cooperation (USACE, n.d.-c). These efforts highlight the Corps' role as a global engineering force, using its expertise to build and sustain critical infrastructure beyond American borders, while simultaneously emphasizing the USACE's capacity to treat people respectfully and equitably, regardless of their identity, as outlined in the ASCE Code of Ethics.

Outside of military and security-related projects, the USACE has been instrumental in international humanitarian and environmental initiatives, demonstrating a broader commitment to global well-being. This closely aligns with the ASCE principle of enhancing the quality of life for humanity. The Corps has provided flood control, emergency response, and infrastructure reconstruction in disaster-stricken regions, aiding nations in recovering from natural catastrophes. Additionally, its expertise in water resource management has helped expand access to clean water and improve sanitation systems in developing regions, clearly upholding the ASCE principles of creating safe and sustainable infrastructure and considering current and future needs of society. Through partnerships with allied nations, the Corps has also assisted in

the development of ports, roads, and energy infrastructure, fostering economic growth and regional stability (Defense Media Network, 2011).

Despite the USACE's long history of recognition, the sociotechnical situation surrounding the Kinzua Dam project offers much deeper insight into the organization's values. As previously described, the USACE seemingly operates to bring expert technical solutions with their stakeholders' needs in mind, even for those outside of the United States. When presented with the flooding concerns in the Ohio River Valley, the USACE's design prioritized the citizens of Pittsburgh and its surrounding communities to the extent that the Seneca people and land were harmed. However, according to the ASCE Code of Ethics, civil engineers are expected to treat individuals of all identities fairly and equitably.

The USACE's choice to intentionally move forward with a project which negatively impacted the Seneca people suggests that they were not operating with care ethics or Kantian deontology in mind, as these ethical lenses demand that one's actions consider the vulnerability of affected parties and uphold universal moral duties, respectively. Accounting for the USACE's history of adherence to the ASCE Code of Ethics, a more fitting ethical framework to explain their approach is that of act utilitarianism, or consequentialism. This ethical lens prioritizes the net utility that a solution offers over all else (Nathanson, n.d.). In other words, one who subscribes to act utilitarianism will always make the choice which offers the greatest positive impact to the greatest number of people. This framework also allows the user to weigh solutions quantitatively to identify and justify a most optimal solution, based on the expected net utility that it yields. While the USACE may have sought an alternative solution to the Allegheny River's flooding issue that would not harm the Seneca Nation, the Kinzua Dam project could be

soundly justified under the framework of act utilitarianism if there was no other project idea that could offer the same or better net utility.

Methods

With the USACE's apparent ethical lens – act utilitarianism – in mind, this study began by constructing a timeline of key events which highlight turning points in the dam's construction as well as interactions between the involved parties.

The analysis drew upon primary documents and secondary sources containing second hand accounts of the Kinzua Dam's history. Primary sources, such as congressional records, graphics, and brochures, were found nested in a variety of locations, including local news articles, Facebook posts, and online repositories. The USACE's own website was used to identify a catalog of previous projects they have worked on, in addition to statements connected to the group's core values and perception of the Kinzua Dam project's outcome. Due to the scarcity of public-facing information surrounding the Kinzua Dam's development, numerous secondary sources were examined in the pursuit of useful information, but only the most reliable and relevant secondary sources were cited. The information was parsed to identify clear plot developments over the course of multiple decades.

Once the timeline was established, the USACE's actions were scrutinized to determine whether they continued to be justified by the ethical framework of act utilitarianism. This analysis operated under the idea that the use of an ethical framework is only acceptable until it loses legitimacy, typically due to a shift in the normative consensus (Carnegie, n.d.). If new information was presented which de-legitimized the USACE's actions under the ethical lens of act utilitarianism, but the USACE did not adjust its actions accordingly, its response was

categorized as an ethical failure. Additionally, if an action was identified which clearly opposed the principles outlined in the ASCE Code of Ethics, the action was also categorized as an ethical failure. This evaluation was effective for pinpointing where ethical responsibility was neglected, while simultaneously providing insights into how similar failures can be prevented in future engineering projects.

Results & Findings: Timeline of Key Events

1. **1936:** The Great St. Patrick's Day Flood of the Allegheny River and other major rivers desolates Pittsburgh, PA, causing the deaths of 47 persons and $50 million in damage in metropolitan Pittsburgh alone (Brookline, n.d.).
2. **1936-1938:** The Flood Control Acts are passed, authorizing large-scale flood control projects, including what would become the Kinzua Dam (Arnold, 1988).
3. **1950s:** The USACE conducts feasibility studies and selects the Allegheny River as the dam's location, despite the presence of the Seneca Nation's lands (Diaz-Gonzalez, 2020).
4. **1956:** The Seneca Nation relies on the Treaty of Canandaigua and formally protests the project, citing treaty violations (Diaz-Gonzalez, 2020).
5. **1957-1958:** Arthur E. Morgan proposes the Conewango-Cattaraugus plan as an alternative, which gains public support.
6. **1959:** The USACE commissions a consulting firm, Tippetts-Abbett-McCarthy-Stratton (TAMS), to evaluate the Conewango-Cattaraugus plan; TAMS dismisses it, citing high costs, though potential conflicts of interest arise due to their ties with the USACE.
7. **1960:** The U.S. government invokes eminent domain, overriding treaty protections.
8. **1961:** The *United States v. 21,250 Acres of Land Etc.* court case rules in favor of the federal government, setting a precedent for future treaty violations.

9. **1964:** The Kinzua Dam is completed, submerging 10,000 acres of the Allegany Indian reservation and displacing around 130 Seneca families.
10. **1965:** The U.S. government provides $15 million in compensation.
11. **1972:** The dam successfully mitigates flooding during Tropical Storm Agnes.

Analysis & Discussion

The first key moment in this timeline was the proposal of an alternative flood control plan by Arthur E. Morgan, a prominent civil engineer and former chairman of the Tennessee Valley Authority. Morgan's Conewango-Cattaraugus plan (inspired by Nelson M. Fuller's proposal by the same name in 1946) would have achieved similar flood mitigation goals while sparing the Seneca lands by routing water north through the Conewango Valley and emptying it into Lake Erie. Fuller had estimated that his project would cost only $18 million in 1946, less than half that of the Kinzua dam at the time – $37 million (Olean, 2019). This alternative gained public support, yet the USACE dismissed it. In September 1957, Seneca representatives pressured the U.S. government to resolve the battle between the USACE and Morgan by hiring an independent consulting firm to determine whether the Conewango-Cattaraugus plan was feasible (Rosier, 1995). The consulting firm, Tippetts-Abbett-McCarthy-Stratton (TAMS), rejected Morgan's proposal, saying that the alternative plan would actually cost more money, require more land, and displace more people than the Kinzua Dam proposal – people living in white-dominated communities (Rosier, 1995). According to another source, the Congressional Record from May 24, 1960, the Conewango-Cattaraugus plan was overlooked by the USACE and TAMS because of the lack of data available to the Corps to provide a reasonable approximation of the project's costs (Congressional, 1960). Regardless of the reason, the

USACE simply abandoned the Conewango-Cattaraugus plan as an option, moving forward with the Kinzua Dam proposal.

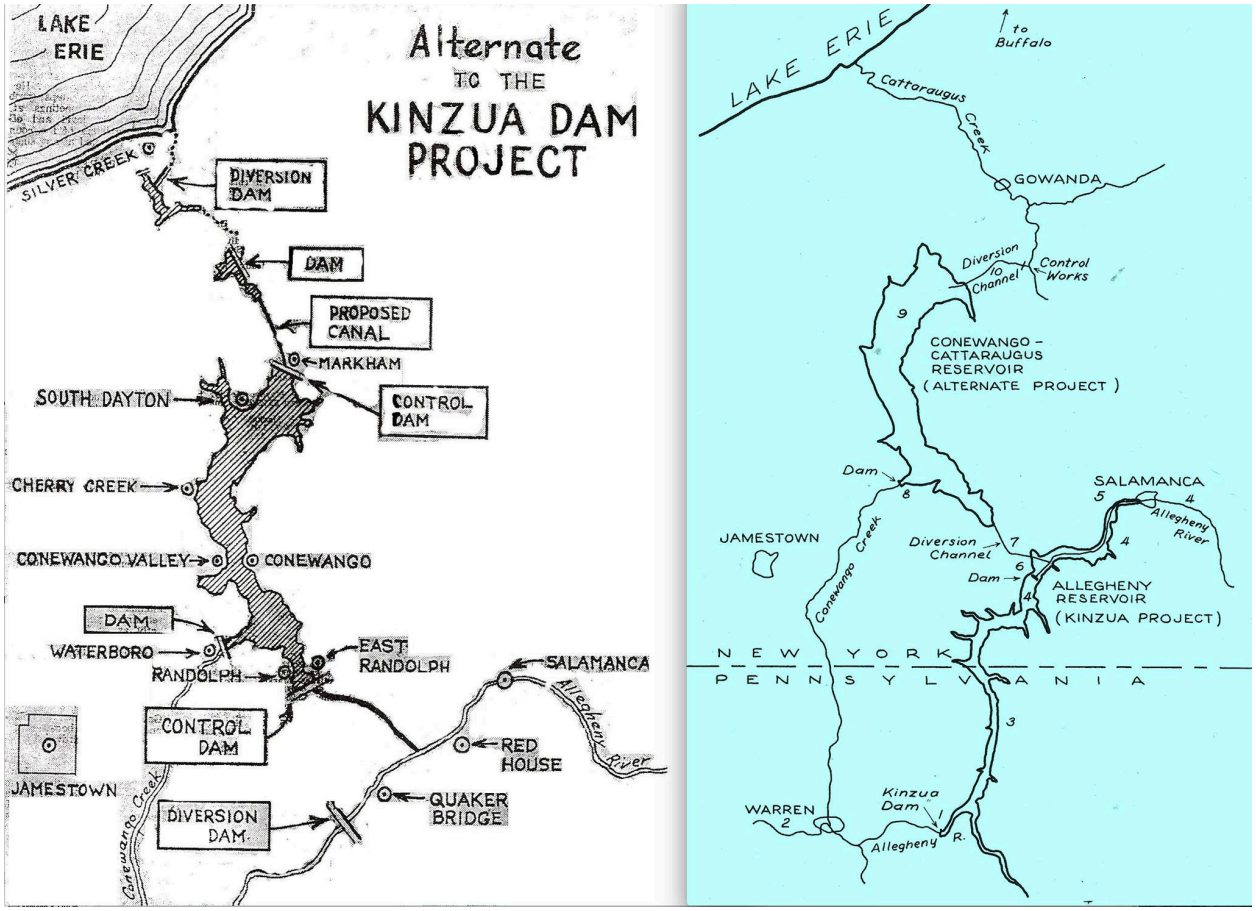

Figure 1. The Conewango-Cattaraugus Plan (Left) and Kinzua Dam Plan (Right) (Schmid, 2019)

Morgan disagreed with TAMS's assessment of his plan, claiming that the Conewango-Cattaraugus plan was both feasible and cost-effective, and that TAMS's judgement was biased due to their ties to the USACE. TAMS was founded by the retired Brigadier General James H. Stratton, who was the former director of civil works for the Corps of Engineers, alongside two other former USACE members (Rosier, 1995). Morgan also discovered that the USACE had been TAMS's biggest client for at least twenty years prior, further suggesting a

conflict of interest (Rosier, 1995). This raises both professional and ethical concerns, as the selection of TAMS as the USACE's independent consulting firm toes the line of ASCE Code of Ethics principle 4B, which states that engineers must "make clear to clients and employers any real, potential, or perceived conflicts of interest" (ASCE, 2020). While it is not obvious whether the Seneca Nation would be considered a client or employer in this situation, the lack of transparency surrounding this conflict of interest certainly does not lend credibility to TAMS's assessment of the Conewango-Cattaraugus plan.

On the contrary, the fact that TAMS acknowledged the feasibility of the Conewango-Cattaraugus plan despite their ties to the USACE seems to indicate that the alternative plan was indeed a solution that would solve the Allegheny River flooding issue from a technical perspective. As mentioned previously, TAMS raised three primary arguments against the Conewango-Cattaraugus plan, citing cost, land use, and the displacement of people. However, the alternative plan would route water up to Erie Lake, depositing it into a significantly larger basin, making it an inherently larger project. In reality, one would expect the cost, land use, and human displacement of the Kinzua dam to be less than that of the Conewango-Cattaraugus plan. However, in response to the TAMS's report, Morgan adjusted TAMS's assessment and stated the following: the Conewango project would consume less than one fourth of the agricultural land in its path, whereas the Kinzua plan would destroy two thirds of the usable part of the Seneca Indian reservation; those displaced by the Conewango project would need to relocate less than a mile away and could sell their land to the government, while the Kinzua plan would destroy entire villages; and the cost estimates of two variations of the Conewango project yielded values of $84 million and $95 million (the TAMS estimate was $123 million), while the Kinzua project was estimated at $106 million (the TAMS estimate was $111

million) (Schmid, 2024). Even with the Conewango-Cattaraugus plan's much greater scope and flood mitigation impact, Morgan fully believed that his plan was superior to the Kinzua dam on all quantifiable fronts.

Despite the existence of a potential solution that would not impact the Seneca Nation and offered benefits rivaling – if not exceeding – that of the Kinzua Dam proposal, the USACE refused to explore the possibility. Under the same ethical framework previously adopted by the USACE, act utilitarianism, these facts would make the Conewango-Cattaraugus plan a more optimal solution, as it offers utility greater than or equal to the Kinzua Dam, but with less drawback. When presented with information which de-legitimized the USACE's actions, the USACE did not change their actions to adapt to that shift, leading to an ethical failure. In the face of a cheaper and culturally favorable option, The USACE's inaction also failed to uphold the ASCE Code of Ethics principle 2C, to "mitigate adverse societal, environmental, and economic effects" (ASCE, 2020).

Broader Systemic Dilemmas

While the USACE was the main focus of this analysis, there were other stakeholders who contributed to and exacerbated the ethical failure of the Kinzua dam. One such stakeholder is the United States federal government. In spite of a treaty guaranteeing the Seneca Nation's land in perpetuity, the federal government invoked eminent domain to seize the land for the dam's construction. This decision not only disregarded legal agreements but also set a precedent that undermined indigenous sovereignty. The ruling in *United States v. 21,250 Acres of Land Etc.* legitimized the government's ability to violate treaties when deemed necessary for domestic projects, reinforcing systemic inequities in legal and political processes (Diaz-Gonzalez, 2020).

This ruling contradicted long-standing legal principles regarding Indigenous sovereignty and treaty obligations. Previous cases, such as *Worcester v. Georgia (1832)*, established that treaties with Native American nations were legally binding agreements that could not be unilaterally violated. However, the court's decision in *United States v. 21,250 Acres of Land Etc. (1966)* disregarded this precedent in favor of the more recent *Lone Wolf v. Hitchcock (1903)* decision, which reinforced the government's ability to unilaterally break treaties with Native Americans (Diaz-Gonzalez, 2020). These rulings reveal a systemic bias against Indigenous land claims, where legal precedent bends to accommodate national interests at the expense of marginalized communities. The Supreme Court's decision in the Kinzua Dam case exemplifies this ongoing pattern of legal and ethical failure, further undermining the integrity of engineering and governmental decision-making processes.

Lessons for Future Engineering Projects

The construction of the Kinzua Dam represents a profound ethical failure in civil engineering and governmental decision-making. While the project was initially justified under the premise of flood control and regional economic benefits, it ultimately came at the expense of the Seneca Nation's rights, sovereignty, and cultural heritage. The USACE, driven by a utilitarian rationale, failed to uphold its own ethical framework by rejecting Arthur E. Morgan's promising alternative proposal, which could have provided flood control without displacing an entire community. Furthermore, the involvement of Tippetts-Abbett-McCarthy-Stratton (TAMS), a consulting firm with conflicts of interest, raises serious concerns about the integrity of the evaluation process.

The U.S. Supreme Court's ruling in *United States v. 21,250 Acres of Land Etc.* set a dangerous precedent, legitimizing the government's ability to violate treaties when deemed necessary for domestic projects. This decision disregarded long-standing legal protections for Indigenous lands and reinforced systemic inequities in how infrastructure projects impact marginalized communities. The ethical shortcomings of the ruling align with a historical pattern of court decisions that have repeatedly failed to uphold Indigenous sovereignty, highlighting the persistent imbalance of power in legal and political structures.

Decades later, the long-term consequences of the Kinzua Dam continue to unfold. While the dam initially met its intended flood control objectives, it now struggles to adapt to modern hydrological challenges. Increased rainfall intensity, sediment accumulation, and constrained storage capacity have led to more frequent flooding both upstream and downstream (Diaz-Gonzalez, 2020). Ironically, one of the key advantages of Morgan's alternative proposal—greater water storage using Lake Erie—would have mitigated many of these issues, underscoring the technical failures that stemmed from the USACE's unwillingness to consider alternative solutions. The dam's limitations serve as a cautionary example of how rigid decision-making in large-scale engineering projects can lead to long-term operational inefficiencies.

The lessons of the Kinzua Dam extend beyond this single project, offering a critical reflection on how engineering ethics should be applied in practice. Engineers must move beyond a narrow technical focus and engage meaningfully with the social, cultural, and legal implications of their work. This requires prioritizing genuine stakeholder engagement, revisiting ethical guidelines to prevent conflicts of interest, and ensuring that engineering decisions do not disproportionately harm vulnerable communities. The ASCE Code of Ethics emphasizes a duty

to the public welfare, yet the Kinzua Dam project illustrates how easily this duty can be overshadowed by political and economic agendas.

As contemporary infrastructure projects continue to intersect with Indigenous land rights, environmental concerns, and climate resilience, the failures of the Kinzua Dam must serve as a warning. Ethical engineering is not merely about technical solutions but about ensuring that those solutions align with principles of justice, fairness, and sustainability. If the engineering profession is to uphold its ethical responsibilities, it must confront past mistakes and commit to more equitable and transparent decision-making processes in the future.

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