

A satellite photograph of the Mississippi River delta region. The river is a prominent dark blue-green line winding through a vast, arid, tan-colored landscape. The river's path is highly irregular and meandering, especially in the lower half of the image. The top of the image shows the river's mouth where it meets a larger body of water, likely the Gulf of Mexico, with a dark blue hue. The surrounding land is mostly flat and devoid of significant vegetation, with some lighter-colored patches that could be salt flats or sand dunes.

ISSUE ELEVEN : SUMMER 2018
OPEN RIVERS :
RETHINKING WATER, PLACE & COMMUNITY

PARADOXES OF WATER

<http://openrivers.umn.edu>

An interdisciplinary online journal rethinking the Mississippi
from multiple perspectives within and beyond the academy.

ISSN 2471-190X

The cover image is of The Nile River, July 19 2004. To the right of the Nile is the Red Sea, with the finger of the Gulf of Suez on the left, and the Gulf of Aqaba on the right. In the upper right corner of the image are Israel and Palestine, left, and Jordan, right. Below Jordan is the northwestern corner of Saudi Arabia. Jacques Descloitres, MODIS Rapid Response Team, NASA/GSFC.

Except where otherwise noted, this work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/). This means each author holds the copyright to her or his work, and grants all users the rights to: share (copy and/or redistribute the material in any medium or format) or adapt (remix, transform, and/or build upon the material) the article, as long as the original author and source is cited, and the use is for noncommercial purposes.

Open Rivers: Rethinking Water, Place & Community is produced by the [University of Minnesota Libraries Publishing](https://www.libraries.umn.edu/) and the [University of Minnesota Institute for Advanced Study](https://www.umn.edu/institute-for-advanced-study/).

Editors

Editor:
Patrick Nunnally, Institute for Advanced Study,
University of Minnesota

Administrative Editor:
Phyllis Mauch Messenger, Institute for Advanced
Study, University of Minnesota

Assistant Editor:
Laurie Moberg, Doctoral Candidate,
Anthropology, University of Minnesota

Media and Production Manager:
Joanne Richardson, Institute for Advanced Study,
University of Minnesota

Contact Us

Open Rivers
Institute for Advanced Study
University of Minnesota
Northrop
84 Church Street SE
Minneapolis, MN 55455

Telephone: (612) 626-5054
Fax: (612) 625-8583
E-mail: openrvrs@umn.edu
Web Site: <http://openrivers.umn.edu>

ISSN 2471-190X

Editorial Board

Jay Bell, Soil, Water, and Climate, University of
Minnesota

Tom Fisher, Metropolitan Design Center,
University of Minnesota

Lewis E. Gilbert, Institute on the Environment,
University of Minnesota

Mark Gorman, Policy Analyst, Washington, D.C.

Jennifer Gunn, History of Medicine, University of
Minnesota

Katherine Hayes, Anthropology, University of
Minnesota

Nenette Luarca-Shoaf, Art Institute of Chicago

Charlotte Melin, German, Scandinavian, and
Dutch, University of Minnesota

David Pellow, Environmental Studies, University
of California, Santa Barbara

Laura Salvesson, Mill City Museum, Minnesota
Historical Society

Mona Smith, Dakota transmedia artist; Allies:
media/art, Healing Place Collaborative

CONTENTS

Introductions

Introduction to Issue Eleven By Patrick Nunnally, Editor	5
Guest Editor's Introduction to Issue Eleven: The Paradoxes of Peace and Water By Joseph B. Underhill	7

Feature

Learning from the Dakota: Water and Place By Mona Smith	14
--	----

Forum

New Orleans Was Once Above Sea Level By Richard Campanella	19
Water as a Source of Regional Cooperation in the Middle East: The Work of EcoPeace Middle East in Jordan, Israel, and Palestine By Giulia Giordano	24
Water, Conflict, and Peace By Peter Gleick	33
Meandering and Riversphere: The Potential of Paradox By Irene J. Klaver	45
The Sources of the Nile and Paradoxes of Religious Waters By Terje Oestigaard	66

Feature

Writing the River By Leslie Thomas	86
---	----

Primary Sources

Paradoxes of Water: A Reading List By The Editors of <i>Open Rivers</i>	110
--	-----

Perspectives

An Endangered River: The Mississippi River Gorge By Olivia Dorothy	119
---	-----

Teaching and Practice

Paradise Lost: The Struggle to Preserve the Pongola River and its Inhabitants
By Shira Lanyi 126

Geographies

Water Unifies Us All
By Kristi Achor Pursell 142

In Review

A Tour of the Mississippi River Visitor Center
By Joanne Richardson 149

TEACHING AND PRACTICE

PARADISE LOST:

THE STRUGGLE TO PRESERVE THE PONGOLA RIVER AND ITS INHABITANTS

By Shira Lanyi

In December of 2016, I went on the journey of a lifetime to kwaZulu-Natal, South Africa on a faculty-led excursion titled “Summits to Sea”

with Virginia Commonwealth University (VCU). Along with nine other students and two faculty members, we traversed across South Africa from



Jozini Dam, South Africa, during a drought. Image courtesy of Shira Lanyi.

ISSUE ELEVEN : SUMMER 2018

the source of the great rivers in the Drakensburg Mountains all the way to their opening in the Indian Ocean. For three weeks, we hiked, swam, and kayaked our way through the various water systems that affect the economy, ecology, and public health in South Africa. The dramatic impact that drought has on the availability of clean, drinkable water in South Africa is staggering. The great Pongola River Dam represents one of the greatest challenges between balancing the influence of government-controlled infrastructure and the health and vitality of the river's stakeholders.

As I look out from Pongola River Camp onto the luminescent banks of the sun-kissed South African soil, the chirping of an African Jacana,

the laughter of children splashing in the shallow water, and the solemn croak of a lonely toad paint the perfect image of the beauty and biodiversity that shape this river system. Pongola River Camp, located about twenty kilometers downstream from the Jozini Dam, is a secret get-away tucked into the riparian vegetation along the river bank. This is the last stop on our week-long exploration of the Pongola River watershed as part of a VCU course exploring the intersection of freshwater resources and biodiversity along the Tugela and Pongola Rivers in kwaZulu-Natal, South Africa.

The Pongola River is one of South Africa's most biologically diverse ecosystems rich with hundreds of species of fish, birds, and animals.



Wetland on the Pongola River. Image courtesy of Shira Lanyi.

The region is also home to thousands of local Amathonga people who have used this water system as their primary resource for generations. However, the contemporary scene of the Pongola River is one that is defined by the troubles of rapid population growth and poverty. As we drove to the river's access point for our kayaking excursion, we passed through the dirt streets of sprawling low income housing developments near the Jozini Mall. The trash littering the shores and waters of this major flood plain are an

indication of the serious threat humans have on the future health and conservation of the river's ecosystem. During the wet season, the Pongola normally flows deep, swift, and clear. The river is now barely deep enough for our kayaks to scrape through and are choked with native and invasive aquatic plants. The rainy season typically begins in October and lasts until April; however, the excessive drought now haunts this region year-round.

Pongolapoort Dam and Water Management

Our explorations of the Pongola watershed extended upstream and downstream of the impressive Pongolapoort Dam. This is the fifth largest dam in South Africa and blocks the narrow Pongola gorge at the town of Jozini (Van Vurren 2009; Department of Water Affairs and Forestry, South Africa 2004). Jozini overlooks the dam's vast reservoir at the base of the Lebombo Mountains. As we passed through the town, the streets were busy with the morning rush of local people setting up their carts along the road to sell brightly colored clothes, produce, meat, and stylish haircuts. The town of Jozini was originally established to house the estimated 900 black employees used during the building project of the Pongolapoort Dam in the 1960s (Colvin et al 2016). The Jozini Dam, or Pongolapoort Dam, was constructed by the South African Department of Water Affairs (DWA) to alter the natural flows of the Pongola River in order to provide adequate water for the irrigation of sugarcane fields along the adjacent flood plains. During the 1930s, the rich soil and natural resources along the Makatini Flats, the fertile region directly adjacent to the Pongola River, attracted white farmers who established large-scale commercial farms. A government irrigation scheme was enacted to assist in the growth of sugar cane, maize, and other cash crops (Van Vurren 2009; Dube et al. 2015: 269–272). The intent to provide commercial

farmers with the resources to promote economic growth within the region has subsequently been met with criticism for its effects on the natural hydrology and flow patterns of the Pongola River. As our group peered over the curved edges of the vast dam wall, the blanket of green algae in the shallow outflow pool was an indication of the trouble facing this region.

The social and economic implications of the Pongolapoort Dam and the timing of the flood-releases are a complex balancing act between the needs of the flood plain ecosystem and the needs of commercial agriculture. Driving through the plains surrounding the Pongolapoort Reservoir, we see fields of sugarcane carpeting the valley and foothills of the surrounding Lebombo Mountains. Upon completion of the dam in 1973, conservationists recognized the threat the dam had on the health and vitality of the floodplains directly downstream. Water management programs were initiated by Coca-Cola Company, South Africa under the directorship of Professor Charles Breen and Jan Heeg in the 1970s. These programs aimed to protect the “social-ecological system” by simulating the natural flooding patterns of the region (Colvin et al. 2016). The annual flooding of the Pongola River is vital for the desalination of the nutrient-dense waters and is a cue for indigenous fish species to migrate and breed

ISSUE ELEVEN : SUMMER 2018

upstream (Dallas 1997: 85-89). Without these flood releases, the river becomes as it is today, inundated with dense aquatic plant growth blanketing the river's surface. The local Amathonga people rely on the Pongola River for their livelihood and agriculture, and as a food source for their families and cattle. To address these needs, the Cooperative Scientific Program by Breen and Heeg proposed a flow regime to simulate the endemic Pongola River flows at 2 cubic meters per second in the winter and between 600 and 800 cubic meters per second during the summer (Colvin et al. 2016; Dallas 1997: 87).

More recently in post-apartheid South Africa, the new government enacted a series of progressive

laws designed to protect both societal and environmental reliance on freshwater resources. In the years following the proposal for the planned flooding of the Pongolapoort Dam, the South African Ecological Reserve became a part of the National Water Act of 1998 (Dallas 1997: 82-85; Dube et al. 2015: 271). An Ecological Reserve is also known as environmental flow, or "the quantity and quality of water required to protect aquatic ecosystems to secure ecologically sustainable development and the use of the relevant water resource" (Department of Water Affairs and Forestry, South Africa 2004). South Africa's National Water Act was one of the first in the world to specifically allocate water for use by the environment as part of national legislation



Sugarcane fields in the Pongola region. Image courtesy of Shira Lanyi.

ISSUE ELEVEN : SUMMER 2018

(Department and Water Affairs and Forestry, South Africa 2004). In January of 2006, a Sustainable Usage Plan (SUP) was proposed by the Department of Water Affairs and Forestry to implement a more sustainable pattern of flood releasing that would follow the guidelines of the Ecological Reserve and the National Water Act of 1998. The SUP planned to protect the usage, development, conservation, and management of the water of the Pongolapoort Dam in an appropriate and sustainable manner. The plan

included provisions for the protection of “both the aquatic and associated ecosystems, inclusive of their biodiversity” as well as the development of a “suitable institution that is representative of the host community both in racial and gender terms” (Dube et al. 2015: 270–272). Despite research spanning more than three decades and progressive national water policy laws, the persistent drought and burgeoning populations have given way to more haphazard releases negotiated by the local municipality.



Hippopotamus spotting in Pongolapoort Nature Reserve. Image courtesy of Shira Lanyi.

The River's Stakeholders

One of the river's stakeholders is Dr. Peter Calverly, wildlife ecologist and owner of the Pongola River Camp. Calverly, a thirty-year-old native South African, received his Ph.D. in Biology from VCU's South African "sister school" the University of kwaZulu-Natal. Calverly and his family also own Zingela Safari & Rafting Company, based on a private game reserve along the Tugela River. The Tugela flows from the Drakensburg Mountains to the Indian Ocean further south in kwaZulu-Natal. The Calverly family run a rafting company that normally brings in many enthusiastic kayakers and white-water rafters. Our group spent an entire day paddling down the rocky rapids of the Tugela River with Peter, an avid kayaker and outdoorsman. During our paddle down the Tugela, the rapids were often so low that our inflatable

kayaks, called "cros," barely made it down without a strong push to heave over the muddy rocks. The environmental challenges faced by the river affect not only the water system itself, but also the future of the Calverly family's rafting business. The Calverly family manage their land for wildlife, giraffes, kudu, and other antelope to provide the sustainable control of these populations through the practice of controlled hunting on the Zingela game ranch. Peter's father bought Zingela with the dream of restoring riparian habitats and preserving the natural state of this precious stretch of the Tugela River. Peter now assists in sustaining the family business and often brings his wife, a provincial veterinarian, and his six-week-old baby to relish the beauty of this landscape.



*Lecture from Peter Calverly in the Pongolapoort Nature Reserve.
Image courtesy of James Vonesh.*

ISSUE ELEVEN : SUMMER 2018

The Pongola River Camp, another ecotourism business owned and operated by the Calverley family, is also threatened by the multi-year drought and resulting low flows along the Pongola River. Calverley believes that the 2015 construction of the Jozini Mall, the housing operation across the river; severe drought; and the corrupt allocation of municipal resources have led to the current state of the river. Only two years ago, Calverley described this river as “crystal clear.” In previous years, the annual flood releases were timed appropriately to create an environmental flow pattern that allowed the river to return to its natural state. The damage this dam has done to the natural flows of the Pongola River has been a key factor in the decline of many of the local fish species, including the tigerfish,

a source of income for local fishing and gaming businesses, like Pongola River Company. The overgrowth of such alien species as the hydrilla verticillata and the aquatic red-fern, azollaceae, are also the result of the low, nutrient-rich water (Van Vurren 2009). Due to the inability to sell fishing and paddling trips on this river’s murky, overgrown water system, the Pongola River Company is now at risk of closing.

As we paddled down the river, we came upon small groups of people laughing, washing, and bathing in the golden afternoon sun. These are the rural Amathonga people who rely on the river as their major water source. The Pongola River plays a pivotal role in their everyday lives and its decline has a direct impact on their culture and



The tiger fish is one of Pongola River Company’s main attractions that is gradually becoming less abundant with the increasing drought. Image courtesy of the Pongola River Company.



Hydrilla overtaking the production in the Pongola River due to excessive drought and water mismanagement. Image courtesy of Shira Lanyi.



The red water fern growing along the Pongola River. Image courtesy of Shira Lanyi.

society. The Pongola provides the Amathonga people with the water necessary for the survival of their small-scale vegetable gardens and their cattle herds, and it is their primary source for drinking water. Along the river's edges, Peter Calverley and his employees found the carcasses of hundreds of cattle only months ago. Drought coupled with lack of proper water allocation led to their demise. The cook at Peter's camp is the daughter of a local Amathonga farmer and cattle rancher who lost 80 head of cattle this year due to the drought and low water levels that plague the Pongola River and its dependents. Walking along the pan adjacent to the river, our group stumbled upon some of the remains of a doomed Nguni cow.

The people of the town of Jozini represent a third group of stakeholders who live along the Pongola just below the dam. The complexity of their situation is heightened by the growing human waste and pollution, products of the construction of Jozini Mall and low-income housing developments across the river. Our group took a brief stop at Jozini Mall on our way to kayak down the Pongola. The litter surrounding the periphery of the mall, down the dirt roads toward the watershed, and in the neighboring streets was horrifying. As we began our journey downstream, our paddles pushed aside diapers, used toothbrushes, candles, food containers, and other rubbish.

[See a map of Jozini and Pongola here.](#)



*An Nguni cow's carcass discovered along the banks of the Pongola River.
Image courtesy of Shira Lanyi.*



Abe Nzuzi in Somkhanda Game Reserve South Africa. Image courtesy of Shira Lanyi.

Ecological Action on the River

During our journey through South Africa, we were fortunate to have Abe Nzuzo, a native Zulu and expert in the field of South African conservation, as our guide. Abe, who now lives in Jozini with his wife, a local nurse, is a proud local radio talk show host, educator, and wildlife guide. Abe was born in a traditional Zulu village and first met a white person at the age of eleven. His strong ties to the community and his heritage make him an invaluable resource to his community and the preservation of this region.

As a Jozini town local leader, Abe expresses the concerns of his community. Abe confirmed that the recent construction of these two projects on the banks of the Pongola have created a challenging situation that threatens the health and sustainability of the surrounding ecosystem. Abe feels as though education is the next clear step in preventing what is a very rapid decline in the preservation of the natural landscape. “We must target efforts in the schools to improve the situation,” Abe stated in an interview. Few



Local school children being taught about the ecological issues associated with drought and water mismanagement. Image courtesy of the Pongola River Company.

ISSUE ELEVEN : SUMMER 2018

members of the local community play an active role in sustainability in large part because of the lack of education and understanding of the threat pollution has on their home.

The Pongola River Camp, under Peter's directorship, is taking steps to link ecotourism and local education. Menzi, one of the workers at Peter's camp, will begin teaching in local schools this year with a new curriculum focused on the conservation of the region. Pongola River Camp received donations from Kevin Lawrence and Angus Wingfield from Africa Wild Trails, to construct Bush Baby Education Centre, dedicated to the education and exposure of young South Africans to their rich wildlife heritage. Local and

international students are offered the opportunity to have a hands-on lesson in conservation in this unique ecosystem by completing a South African scoring system (SASS) survey of the Pongola River. An SASS survey focuses on the observation of macroinvertebrate species among various ecosystems within a narrow range of the river (Van Ginkel 2011). Macroinvertebrate studies are an important resource in evaluating the quality of the river system in which they thrive (Van Ginkel 2011). Aquatic macroinvertebrates are small invertebrates that spend a portion of their life cycle within the river system. Often these organisms utilize the sediment, leaves, or rocks as shelter or homes during the early phases of their life cycles.



The nature center at Pongola River Camp Image courtesy of James Vonesh.

ISSUE ELEVEN : SUMMER 2018

These small macroinvertebrates rely on certain temperatures, pH, and nutrient levels to survive and are therefore an invaluable resource in determining the health of an aquatic ecosystem (Van Ginkel 2011). Our group participated in a survey along the rocky and sandy shores surrounding the Pongola River Camp. We found shrimp, leeches, snails, dragonfly larvae, mayfly larvae, small fishes, and aquatic worms. Based on the SASS scoring system, our collections suggested that the river is in “poor condition.” This is a fun, interactive way to involve the local community in understanding the importance of conserving this precious resource on which they are unequivocally reliant.

The problems created by the Pongolapoort Dam since its completion in the 1970s cannot be repaired by simply disassembling and removing this vast structure (Dallas 1997: 81). One of the largest sugarcane farmers in the region has purchased access to the reservoir to not only supply his fields, but also to provide the local towns with their water. Much of the area surrounding the reservoir is now a nature reserve and source for ecotourism business (Colvin et al 2016; Dallas 1997: 81–85). These protected areas provide pontoon-boating excursions for groups such as ours. Hippos snorted and laughed their hearty cacophony as we waded past looking out over the backdrop of the Lebombo Mountains. This



Two local men bathing in the Pongola River. Image courtesy of Shira Lanyi.

ISSUE ELEVEN : SUMMER 2018

ecotourism business provides an opportunity for economic gain and a means to utilize the dam to its fullest capacity in its present state.

The intersection of this precious water system, its inhabitants, and the surrounding ecosystem shows how they are currently at odds with one another. The battle over conservation and societal pressures is one that will continue to have an impact on the health and vitality of the Pongola River for future generations. In just the short

amount of time that I visited South Africa, I observed the need for better water distribution and conservation. This is evident from the city of Johannesburg all the way to the small river communities that rely on these systems for survival. While there is no one solution to the severe pressures placed on this river system, small steps can be taken to educate our future generations to value and care for their natural resources and create a world that they wish to call home.



Children playing along the Pongola River. Image courtesy of Shira Lanyi.

References

- Colvin, C., D. Muruven, D. Lindley, H. Gordon, and K. Schachtschneider. 2016. "Water Facts and Futures: Rethinking South Africa's Water Future." *WWF-SA 2016 Water Facts and Futures*. 2–96.
- Dallas, H. F. 1997. "A Preliminary Evaluation of Aspects of SASS (South African Scoring System) for the Rapid Bioassessment of Water Quality in Rivers, with Particular Reference to the Incorporation of SASS in a National Biomonitoring Programme." *South African Journal of Aquatic Sciences* 23: 79–94.
- Department of Water Affairs and Forestry, South Africa. 2004. Sustainable Utilization Plan Pongolapoort Dam. Retrieved from: <https://www.dwa.gov.za/Documents/Other/RMP/Pongolapoort/PongolapoortDamSUPJan06.pdf>.
- Dube, T., V. Wepender, J.H.J. van Vuren, N.J. Smit, and L. Brendonck. 2015. "The Case for Environmental Flow Determination for the Phongola River, South Africa." *African Journal of Aquatic Science*. 40(3): 269–276.
- van Ginkel, C.E. 2011. Eutrophication: present reality and future challenges for South Africa. *Water SA*, 37(5), 693-701. Retrieved February 15, 2017, from http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1816-79502011000500010&lng=en&tlng=en.
- Van Vurren, Lani. 2009. Pongolapoort Dam-Development Steeped in Controversy. *The Water Wheel* (May/June 2009). Retrieved from: http://www.wrc.org.za/Knowledge%20Hub%20Documents/Water%20Wheel/Magazine/WaterWheel_2009_04_WW%20Jul-Aug%2009.pdf.

Recommended Citation

Lanyi, Shira. 2018. "Paradise Lost: The Struggle to Preserve the Pongola River and its Inhabitants." *Open Rivers: Rethinking Water, Place & Community*, no. 11. <http://editions.lib.umn.edu/openrivers/article/paradise-lost/>.

About the Author

Shira Lanyi, a Richmond native, graduated with a Bachelors in Science in biology with High Honors from Virginia Commonwealth University in May 2018. She will begin her first year of medical school at Virginia Commonwealth University School of Medicine this fall, where she will pursue her second career after a first career as a professional ballerina.