I'm not a bot

Cambridge University Press 0521818257 - Ecology of Desert Rivers - by Richard Kingsford Excerpt Rivers channel the world's rainfall into floodplains, lakes or groundwater basins, or out to sea. They provide habitats for diverse biota that often climax in floodplain wetlands, areas of incredible biodiversity. River flows are integral to many coastal and marine environments, processes and organisms (Gillanders & Kingsford, 2002). Their fresh water allows humans to penetrate and flourish in the most inhospitable parts of this planet. They are the arteries that define ecological landscapes and processes for many biota. Climate and the nature of land surfaces primarily govern the size, hydrology, geomorphology and ecology of rivers. For example, the Amazon River, which accounts for about 20% of the world's river flow, is a massive river system originating in areas of extremely high rainfall. Contrast this with rivers from the desert regions of the world (Fig. 1.1) where rainfall is less than 500 mm per year and is usually exceeded by evaporation. In these regions rivers often stop flowing for long periods, sometimes even years. What makes desert rivers any different from other rivers or aquatic systems around the world? This book uses 'desert' and 'dryland' interchangeably to describe land areas and their rivers where there is less than 500 mm of annual rainfall: the arid and semi-arid regions of the world (Fig. 1.1). This encompasses about 47% of the global land surface, including hyperarid, arid, semi-arid and dry humid regions (Table 1.1) (Middleton & Thomas, 1997). Why do we need a book about the ecology and management of these desert or dryland rivers? Intrinsic properties of scarcity and variability of these rivers and their associated floodplain habitats, combined with poor knowledge and increasing human pressures, demand attention. The story of desert or dryland rivers is one of changeable, changing and changed ecosystems, as humans progressively apply control. Desert rivers do not have unique landforms (Nanson et al., 2002) but their hydrology is much more variable than that of mesic rivers (McMahon et al., 1992; Puckridge et al., 1998; Peel et al., 2001). We are only just beginning to understand the implications of such variability for the ecology of these rivers, the effects of river regulation and future management. Rivers in dry regions of the world are the poor cousins in the knowledge base of river and wetland ecology. Their ecology is probably the least known of our freshwater resources (Williams, 1988; Nanson et al., 2002), despite recent advances in understanding (see Bull & Kirkby, 2002), because relatively few people live in such inhospitable parts of the world. Scientific effort is often strongly biased towards humid regions, with most of our knowledge of aquatic ecology from temperate freshwater science (Ward et al., 2001). Even in a relatively affluent country such as Australia, where arid regions dominate (75% of the land area), freshwater scientific effort can be biased towards the mesic regions where most people live (Kingsford, 1995). Desert rivers and their ecology are often out of sight and out of mind, so it is important to consolidate our knowledge and provide a basic framework for ecological understanding of desert or dryland rivers. Desert or dryland rivers of the world Almost 50% of the world's land surface is either arid or semi-arid (Middleton & Thomas, 1997), occupying most continents (Comín & Williams, 1994). Many thousands of streams and large rivers flow wholly or partly through such areas (Fig. 1.1). Rivers and their dependent ecosystems form a continuum of variability, seldom adequately captured by pigeonhole classifications. This variability is characteristically higher in dryland rivers. Rivers challenge us even more because their longitudinal dimensions seldom respect climatic regions; worse, for managers and policy makers, they do not respect jurisdictional or national borders (Postel, 1996; Kingsford et al., 1998). Many large rivers that flow through desert regions (e.g. the Nile, Okavango and Murray) originate in mesic areas. This book adopts a broad definition of what constitutes a desert river because it is impossible to divorce a river from its catchment: desert rivers flow wholly or partly through desert or dryland regions of the world (annual rainfall < 500 mm). Climate drives river flows and dependent ecological responses. Within desert regions rainfall is low and is often highly variable in both space and time (Peel et al., 2001). Hydrology holds primacy in any treatment of rivers, their behaviour and their understanding. By way of introduction, we take the monthly flows of six unregulated desert rivers from different regions of the world: North America, South America, northeast Africa, South Africa, Asia and Australia (Fig. 1.2). Even a simple inspection of monthly flow regimes illustrates considerable differences among rivers from these different regions. Seasonal regularity, particularly in relation to wet and dry seasons in the tropics (Atbara River, northeast Africa) and snowmelt in temperate regions (Huanghe River, Asia) is translated into a clear seasonal signal in river flows (Fig. 1.2), which has considerable implications for ecology and management. Interannual variability is relatively small compared with that of rivers in other desert regions of the world such as South Africa, North and South America and Australia (Fig. 1.2). In these regions annual variability in the timing and volume of flows is also high. Some dryland rivers have periods of no flow or low flow. In some, such as the Atbara River in Northeast Africa (Fig. 1.2), these periods coincide with the marked dry season and their timing and duration are relatively uniform. Others, such as Australia's Darling River and the Gila River of North America (Fig. 1.2), exhibit less predictable periods of low or no flow. Such regions generally have highly stochastic rainfall that results in extremely variable river flows, a pattern particularly well known for Australian and South African rivers (McMahon et al., 1992; Puckridge et al., 1998; Peel et al., 2001; Nanson et al., 2002). Chapter 2 of this book extends this introduction into river ecology by examining in considerably more detail some of the differences in the hydrology of desert rivers and their implications for river ecology and water resource development. It follows that hydrological disturbance patterns exert a dominant influence on the ecology of desert rivers, through the drying and flooding of river habitats: channels, waterholes, floodplains and estuaries. Hydrology affects geomorphological processes of rivers, which in turn drive the distribution of dependent vegetation (Chapter 3, this volume). The next section of the book has a series of chapters that examine ecological responses to variable flows in desert rivers. This begins with food webs and productivity (Chapter 4) and moves to higher levels of biota: plants (Chapter 5), invertebrates (Chapter 6) and vertebrates (Chapter 7). A new force, almost as important as climate, now governs the hydrology and ecology of many rivers: human control. The human responses to water scarcity around the world are driving major changes to dryland rivers. Part II of this book concentrates on how humans have altered the behaviour of dryland rivers, affecting their ecology. Despite our lack of knowledge, we are busily exploiting dryland rivers, wreaking immeasurable ecological damage (Lemly et al., 2000; Gillanders & Kingsford, 2002). Are we changing these unique systems forever? This part of the book begins with an examination of how we change desert river flows and the impact these changes have had on some of the more spectacular and biodiverse habitats in the world (Chapter 8). The next chapter shows the long-lasting and extensive hydrological and ecological effects of even relatively minor river regulatory structures, such as weirs, on the Lower River Murray (Chapter 9). Deserts are naturally salty places, but human land and river management is increasing the salinity of desert rivers with severe ecological consequences (Chapter 10). Expanding human populations represent the greatest pressure on the world's water resources (Postel, 2000), at their most extreme in desert regions (Chapter 11). Finally, a synthesis chapter (Chapter 12) examines the competing demands of the ecology of desert rivers and their changeable nature against our ever-increasing needs for water, imposing simplicity on incredibly complex ecosystems. Hopefully, this book will encourage an interest in the magnificent systems that are desert rivers, will raise awareness of the challenges that they face, and will in turn promote their future conservation. © Cambridge University Press VIDEO ANALYSIS OF THE POEM DESERT RIVERS Hello and welcome! Today we are going to have a poem analysis of "Desert Rivers" by the poet Lade Wosornu. Issues in the poem This poem points out that there are a… VIDEO ANALYSIS OF THE POEM DESERT RIVERS Hello and welcome! Today we are going to have a poem analysis of "Desert Rivers" by the poet Lade Wosornu. This poem points out that there are a lot of life activities which go unnoticed as we go through the ups and downs of our daily lives. This poem seeks to encourage the reader to find hope and courage even in the most hopeless situation. We will go into some details in the poem but first let's go through this amazing poem. Desert Rivers by Lade Wosornu Deserts too have their rivers Entombed from birth in earth Waters mightier than Voltas Lie hid from glare of sun And winds that dry Roofed not by sky But rocks that do not always hold These run their unwitnessed course To their unwitnessed end. Without a sound They gush into bowels of seas Far, far away from unaided human eyes. If you cannot see our tears It does not mean we do not cry. End of poem "Deserts too have their riversEntombed from birth in earth" Deserts are usually described to be wasteful places. The use of the word "too" describes the narrator's effort to bring to light that deserts are also important and that, they also have rivers. The word "entombed" makes the reader aware of the distance between the deserts and its rivers. The poet's use of "entombed" and "birth" in the same line is interesting since one can only be entombed if they pass away. But how can one be entombed from birth? Unless they are alive while still buried. "Waters mightier than VoltasLie hid from glare of sun" The 3rd line states that "buried rivers" are even more impressive than the ones we easily see around. Relating this to our daily lives, perhaps the number of things which go unnoticed are greater than the things we see with our naked eyes. Whether good or evil, our society has its own secrets. "Lie hid from the glare of sun" may also suggest that sometimes the value, potentials and abilities of an individual may not always be visible for the public eye. "And winds that dryRoofed not by skyBut rocks that do not always hold" One of the factors that causes water to dry up is wind. However, the desert rivers have an advantage of not being exposed to the winds. They are therefore protected from losing their importance. They are also said to be "roofed not by sky." This suggests that not even the sky's eyes can see them. This affirms its hidden nature. They are also said to be enclosed by rocks that do not always hold. This describes the phenomena of waters trapped in rocks, where these waters are able to escape once in a while. "These run their unwitnessed courseTo their unwitnessed end. Without a sound" The lines above reaffirms the existence of the unseen rivers. Relating this to life, unwitnessed events, even though they may go unnoticed, can have a significant effect on us. The use of the expression, "without a sound", indicates how private the desert rivers are. "They gush into bowels of seasFar, far away from unaided human eyes" They gush here means, they pour out. The bowels of seas represent the bossom of seas. Also, the use of the word "gush" may also suggest the river's abundance. Again, the human eye is incapable of seeing, perhaps, this serves as a protective mechanism to protect it from the dreaded winds that dry. Line 12 and 13 analysis "If you cannot see our tearsIt does not mean we do not cry" These two lines affirms that the desert rivers mentioned in the poem are real. There is an African-Akan adage which states that, "if the eye cannot see then it can't be considered ugly." The poet therefore suggests that even though the desert rivers are not given much attention due to their hidden nature, their impact, influence and significance cannot be overlooked. End of line by line analysis. 1.There are values in people we sometimes count as valueless. This means irrespective of one's educational background, position or current situation, they cannot be counted as useless. 2. People have hidden talents. The fact that these talents are not seen does not mean they do not exist. Line 12 and 13 clearly explain a this fact. The line reads, " if you do not see our tears, it does not mean we do not cry." 3. Poverty can hide/limit one's potentials and abilities. Eg line 1 and 2 quotes, " Deserts too have their rivers Entombed from birth in earth. "Entombed" here means covered/buried Therefore a person's abilities can be covered right from birth and may even continue throughout the entire life of that individual. 4. Lack of support and motivation may kill/ hide one's talents. Sometimes we all need motivation, support and cheers from our families and loved one's to help us reach our goals. The "rocks" in line 7 of the poem relates to the people mentioned. 5. People may be hurting in the large society that we live in, but they may be suffering silently. Oxymoron 1."Desert Rivers" :These are two contradicting words that are closely held together. Symbolism 1.Desert : Desert represents represents individuals assumed to have nothing good in them. 2. Rivers : Rivers symbolises one's talents and potentials. 3. Rocks : Rocks represent people around us like our families, friends and the society. 4. Sun : The Sun symbolises witnesses, viewers or the society. 5. Sky : It symbolises nature Rhymes 1."Entombed from birth in earth" : Birth and earth have the same internal rhyme. 2. "Dry and Sky" : Lines 5 and 6 have two last words as dry and sky which have the same tail end sounds as /ai/ Metaphor 1. "Bowels of seas" (Line 10). The sea has no bowels or belly. Bowels have been used metaphorically as the middle of the sea. Repetition 1. Far , far away from unaided human eyes: "Far" has been repeated twice on the same line Alliteration 1. Far, far away from unaided human eyes: the two repeated words far and far have the same /f/ consonant sound in the beginning. Simile 1. Waters mightier than Voltas (line 3) : There is a direct comparison between waters and rivers with the connecting word "than" Form and Structure Desert rivers is a one stanza poem with 13 lines which does not rhyme. We can therefore conclude it's a "free verse." 1. What does the reference to the "Voltas" convey? Ans: It Convey's the setting of the poem Note: Volta is a large river in Ghana 2. Complete this line : "if you do not see our tears"…… Ans: it does not mean we do not cry 3. Identify any three literary devices used in the poem. Ans: Metaphor, Simile, Repetition 4. What happens far, far away from unaided human eyes? Ans: The gushing of rivers into bowels of seas. 5. What literary device is found in "waters mightier than Voltas"? Ans: Simile 6. How many lines are in the poem? Ans: 13 lines 7. What can you say about, "these run their unwitnessed course to their unwitnessed end" Ans: People exhibit unseen talents 8. How does the poet describe the underground water? Ans: They move with urgency without a sound. 9. Find two places you can find rhymes Ans: Line 2 and 3 (Dry and sky) Ans: Line 2 (birth and earth) 10. Name one issue raised by the poem. Ans: Sometimes people tend to focus on the outward appearances instead of inner qualities of people. Yes, there are sometimes rivers in a desert. However, this is not typical topography in a desert climate.For bodies of water to survive as large bodies of water, they need the environment they are in to be conducive to supporting the water cycle. A desert does not typically offer that.Still, there are some famous rivers that can last in a desert, such as the Colorado River and the Virgin River, water that feeds off of the Colorado River.The Nile River in Egypt is another famous river that lasts in desert conditions. Some deserts experience short-term rivers called ephemeral rivers, but the arid and dry climate will evaporate them in time.Learn more about deserts and their propensity for handling river climates here.Yes, there are rivers in a desert on occasion, but this is not the norm. Some rivers, such as the Colorado River and the Nile River, are rivers that can last in a desert climate. In other events, rivers known as ephemeral rivers are created that last a short time after some precipitation through a water cycle.For the most part, however, rivers cannot last in a desert, and this is often how deserts are defined.A river is defined as a flowing body of water that is typically freshwater that seeks another body of water to empty into. Rivers are caused by a number of factors, the largest one being a water source that starts them.As the old adage goes, water flows downhill, and that is because water follows the path of gravity.The most basic definition of the water cycle is the flow of water through the Earth's ecosystems. Although rivers do flow towards larger bodies of water, ultimately, most water in the world moves towards the ocean.When it reaches the ocean, much of it evaporates into the sky and becomes clouds. When the temperature in the clouds reaches a certain point, precipitation will fall.If it is cool, the precipitation will be snow or ice. In warmer climates, the precipitation will be rain.When the temperature fluctuates suddenly or has specific drops, the precipitation becomes unpredictable and there will be sleet or hail.When the precipitation falls, the water cycle begins all over again. Much of the water that falls goes into the ground, and when there is excess, or the water cannot be absorbed, rivers form and will flow towards larger bodies of water.In a desert, any water that forms is typically absorbed or evaporated, making it very difficult for rivers to form.A desert is a landscape without water. Water is a basic survival need for humans and almost every other life form on the planet.Plants, animals, people, cannot survive without water. This is why deserts are so barren, arid, and void of most signs of life.Deserts do get rain, however, although it is not usually more than 10 inches every year. When it does rain, the life cycle of that water is very unpredictable.In most cases in a desert, the rate of evaporation into the air will be faster and greater than the amount of rain or precipitation that fell, to begin with. That is because water can take on many forms – ice, water, and steam.Films, cartoons, and novels have all led us to believe that deserts are big sandboxes. The reality is that deserts are only approximately 20 percent sand.Some sand dunes in the desert occur when ocean waves freeze in the desert without any capacity to evaporate effectively. Primarily, deserts are plains.They are terrain that consists of gravel and rock that, for the most part, has been flattened into bedrock.In some bedrock locations, water bodies such as playas and ephemeral rivers can develop, and desert lakes do exist. So do oases.An oasis is an area of the desert that can sustain some moisture and as such sustains some life and vegetation. Many oases in the desert are man-made or artificial, but they are not the "fantasies" that the cartoons have depicted them as in days of yore.This is simply a body of water that develops after the water table reaches ground that is cool enough to sustain it. Habitation can survive here.A typical desert waterfall every year is approximately 10 inches, but that will vary. One year, 44 millimeters or two inches of rain was recorded in the Sahara Desert over a three-hour period.It is common to have storms in the Sahara, with storms being considered as rain falling at a rate of 1 millimeter per minute.When water stays in the desert, lakes, and rivers can form. Rain will form into a drainage basin and when this water lasts, lakes and rivers develop.If it doesn't, a canyon in the desert will be the result. Lakes and rivers need depth to form, and when that depth dries out, a canyon is a geographical outcome.When a small lake goes dry permanently, there will be a layer of salty crust on the surface that remains. This is also called hardpan or playa.Playas are more common in deserts than rivers, and there are hundreds in North America. Some have been there since the Ice Age.Overall, both the climate and terrain make it difficult and typically impossible for deserts to sustain river formation. When hills are formed by lava and rolling sandstone and limestone, plains and plateaus are formed.There might be some gullies formed in the plateaus as a result of weathering.A narrower shape of the plateau is called a butte, and these are all rock structures. The rock that forms in the desert makes it difficult for gullies and canyons to form that could sustain a river body in a desert.Even without the climate, rivers have a difficult time thriving here.Ephemeral rivers are rivers that flow only during rainfall, and the desert is home to many of them. In some cases, these are simply temporary rivers.When these rivers form, they typically drain into a basin of land that is landlocked, and then this water will evaporate.The end result is a body of land that is salty and contains minerals from the rainwater. The precipitation that causes ephemeral rivers can be anything.In Iraq one year, the Arabian desert was home to a massive onslaught of hail and ice in a storm, and an ephemeral river formed. That river is not there today, but it did drain into a land basin that left some cavernous activity.Flash floods do cause rivers, but in a desert, they will often become ephemeral rivers. These rivers have a very difficult time being absorbed by the ground and flowing downhill in any way.Rain falls, meager as it does in the desert, and a stream could develop.For a flash flood to happen, there needs to be heavy rain without adequate drainage places. Flash flooding occurs after heavy rainfall and the flooding happens quickly after, giving it the name flash flooding.When flash floods occur in deserts, they can produce a narrow canyon or gully where rivers or lakes can even eventually form if enough water arrives to support that.The Colorado River does run through the Mojave Desert, the Great Basin Desert, and the Sonoran Desert. It supplies water to the states of Utah, Arizona, New Mexico, California, Nevada, Colorado.Much of the water formed here has shaped history in each of the states that the Colorado River runs through. On the other side of the Hoover Dam is a two-year water supply that has its origins from the Colorado River.The Rocky Mountains have a lot to do with the formation of the Colorado River. When the snow of the mountains melts and moves downhill, it has to find a place to drain.This drainage began as a trickle once and is now the mighty Colorado River.The Amargosa River is another river that has been formed as a result of precipitation, and it has survived desert conditions.That is because it does not solely run through desert land, and, like the Colorado River, has mountains and other water cycle components that contribute to its health.The Amargosa River is in Beatty, Nevada, and it ends in Death Valley National Park. This river is 125 miles long and has traveled approximately 50 miles to form.A lot of its river is under the ground, but much of it is flowing through Amargosa Canyon to sustain some habitat and species in this arid section of the United States.Yes, the Mojave River runs through the Mojave Desert. This river is a great example of how out of place a river looks in a desert.A desert river typically looks like a body of water that just landed in a dry community that can't sustain it, and the Mojave River looks exactly like that. Still, it is a unique river that, like the Amargosa River, has most of its water underground.The water in the Mojave River sustains the sand, as opposed to the oceans, as so many other rivers do.It flows primarily through Apple Valley and into the Afton Canyon until it reaches Soda Lake.The 200-mile long Virgin River runs through the Mojave Desert and is a product of Cascade Falls. The river runs through Nevada, Utah, and Arizona.Its north fork starts at Cascade Falls, moves through Navajo Lake, and runs through Zion National Park in Utah before traveling through Arizona and then emptying into Lake Mead.This river has the climate of the Mojave Desert ecosystem and follows seasonal weather in both winter and summer. It is strong enough to support some flora and fauna as well.Some say the Virgin River was named after an 1827 politician named Thomas Virgin, but others defer the origin of the name to the indigenous people who thought of the Virgin Mary when they named the river.It is a river that has been able to sustain itself, and the life around it, over hundreds of years despite its exposure to the desert climate.Yes, there are rivers in deserts all over the world, but they are few and far between. The climate of deserts just does not support river formation or sustaining rivers.Still, it can happen. When rivers such as the Nile River, the Colorado River, the Virgin River, and others survive in the desert, they create a crucial habitat around them for plants and animals. -- Mojave River flowing after a storm