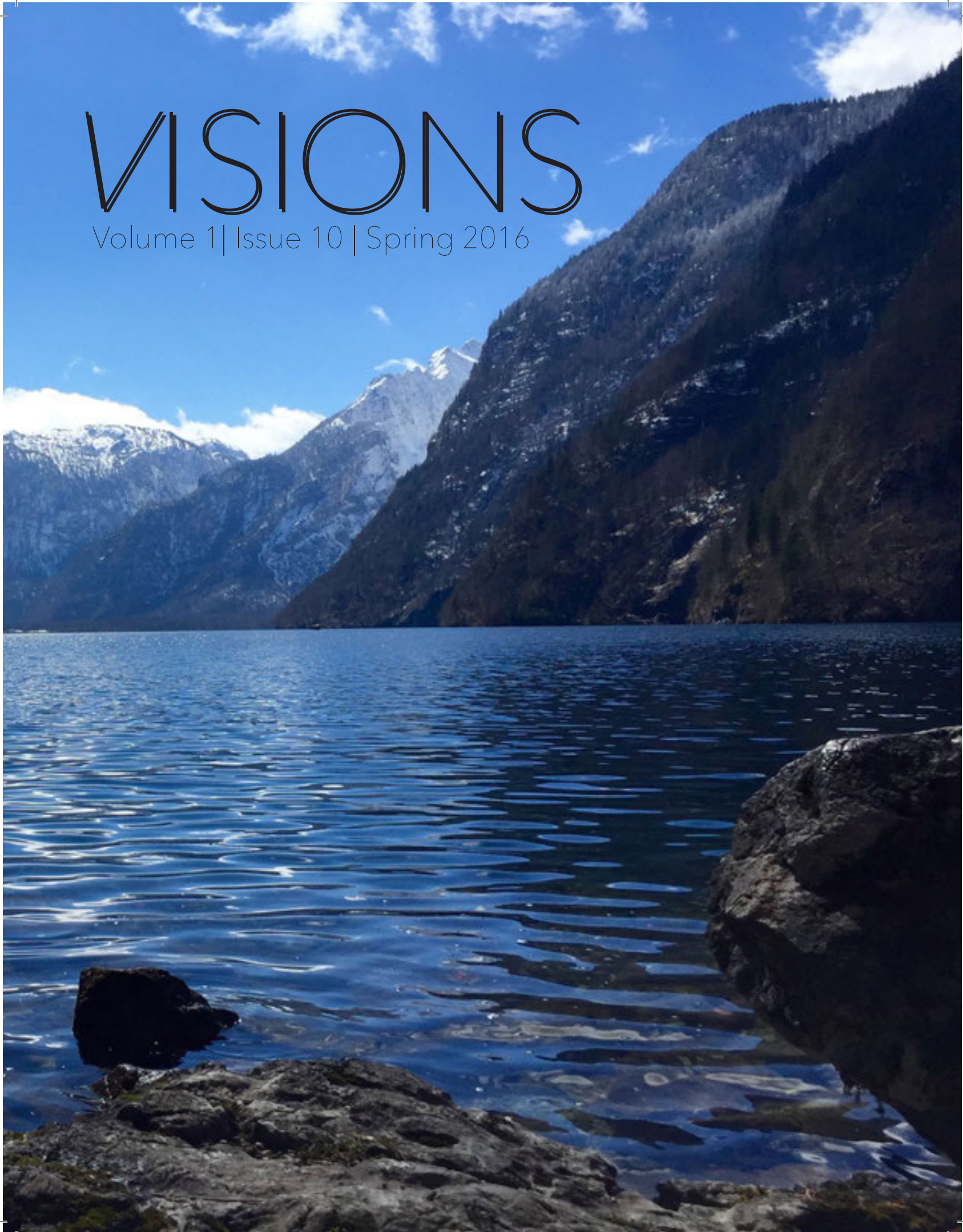


VISIONS

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VISIONS Magazine is dedicated to the world we live in and the world we hope to create. *Visions* is a non-partisan, peer-reviewed publication that contains articles from disciplines associated with environmental studies. Just a few of these disciplines include communications, political science, economics, philosophy, religion, art, and English. *Visions Magazine* is a faculty-student organized and operated publication that features the works of Elon University students and student-faculty collaborations. The ultimate goal of *Visions* is to allow students to explore scholarly research, writing, and review in a professional setting. In addition, *Visions* provides publishing opportunities for students with interests in the environment and sustainable development.

Contributing to *Visions Magazine*:

Visions Magazine seeks compelling, interesting, well-written, creative contributions on environmentally related topics. Major contributions to the magazine should be grounded in scholarly literature and/or reflect the conventions of research and writing associated with a specific academic field of study. All submissions must receive positive blind peer reviews before consideration for publication.

We wish to thank Elon University's Core Curriculum for its support.

Submissions for the Spring 2017 volume of *Visions Magazine* are being accepted! Please e-mail visionsmagazine@elon.edu or go to <http://www.elon.edu/e-web/bft/sustainability/ac-visionsMag.xhtml> for more information about the criteria for submissions and information about the magazine.

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SHADES AND CYCLES OF A BLOOMING SUN

BY ALISSA PARK

1. five months no water

you are my night's
silver air and
your cold uncovered skin
my lips' compulsion

a huddle of expanding breath
trailing hills in your ribcage,
waiting for
a dawn's soft rising flame

that in four weeks
will strip you from
my pale naked hip, make you
my sycamore's bark

and threaten to uproot
what we have
finally
learned how to tend

2. in morning's dewy light

your fingertips danced
across my skin like lily
water softly,
and in bursts
a misting of your warmth
upon my cold, freckled
body
and with sugarcane
lips you trailed path
from mountain to valley
slowly carefully
the way a botanist moves
from yellow ginger to
autumn gold
taking time
and taking in
each shivering
breeze from the sun's
blushing heat and now
in morning's dewy light
sea salt sighs
your name
awaiting reunion
with the ocean's touch



3. six years past

you loved me in that fierce
February winter
snow in a way that brought
the warmth of your skin to
my own
swallowing each
berry-red frosted nip
out to the chill of
the whistles

that even now when
the frozen air hits
the nape of my neck I feel
the soft tingling caress of
the earth's cold, chapped lips
and the late evening
whiskers of evergreen firs
brush my thigh

as if you became
the heat that left my toes
and the gleam of thin unstable
ice not even pebbles could
rest upon
when you laid me down
on glistening white

and when trees undress
and dew expands across
the morning's crisp grass and
you are still gone
I find tranquility in the
woodpeckers
those golden-shafted
northern flickers that soar into
our winter

and how they continue to
drum, drum, and drum
drum, drum, and drum
each morning in the sun's
quiet brightening rise

Alissa Park '17 is studying creating writing with a focus in poetry. She is originally from Dallas, Texas.



Image courtesy of Bethan via Flickr.com

A WEEK IN NC

BY CHUCKIE HAWES

1. Air

When budding breath floats 'cross the sill
through windows warmed by sun,
prompting the hint of rainstorms chill
and sodden earth to come.

2. Earth

Until a blazing solstice high
above will crack the dirt:
the children play with kites a-sky
as hydrants spit and snort

3. Fire

like leaves from trees that coat the ground,
while warmer drinks are brewed
near rustic fires beneath the sound
of northers brewing too.

4. Water

From cobalt clouds the snow may fall
and fly on teething wind
to freeze the land and so forestall
the thaw to come again.

Chuckie Hawes '17 is a double English Lit. and Cinema and Television Arts major from Charlotte, NC. He is an Elon Honors Fellow who enjoys camping, hiking, and adventuring in the outdoors.

Image courtesy of Sharon via Flickr

DISTRIBUTION OF BAT SPECIES AMONG TEXAS ECO-REGIONS

BY CASSIDY LEVY

Wind energy is a growing source of American electricity; however, it can have adverse effects on bat and other wildlife populations. There is a need for a greater understanding of the relationship between land cover and eco-regions and bat activity to identify ways to decrease the impact of wind turbines on bat populations. I began to explore this relationship in Texas on a statewide scale by comparing bat species distributions to defined eco-regions. I found that bat species were not evenly distributed through Texas, with the most species occurring in Texas' westernmost eco-region of Trans-Pecos. The creation of wind farms should concentrate on the Gulf Coast Prairies and Marshes and Backland Prairie eco-regions, which had fewer bat species, in order to avoid collisions.

INTRODUCTION

Wind farms are a growing source of energy in the United States with a projected 42,000 MW capacity (Brannstrom et al. 2011). Wind energy is seen as a way to decrease dependence on fossil fuels and their inherent environmental damage (Kunz et al. 2007). The U.S. Department of Energy's goal is for 20% of electricity to be generated by wind by 2030 (Brannstrom et al. 2011). However, wind energy is not without its faults.

Wind farms can damage wildlife populations. The creation of wind turbines alters habitat, which can affect wildlife populations (Kuvlesky et al. 2007). Construction of wind farms can introduce exotic species, and the creation of service roads also creates barriers to some species and leads to increased wildlife collision (Kuvlesky et al. 2007). Wind farms also affect birds because they collide with the turbines; however, the effects of turbines on birds have been studied widely (Kuvlesky et al. 2007). Research into bat collisions with wind turbines began as bird researchers discovered bat fatalities, so this is a relatively new and understudied topic (Kuvlesky et al. 2007).

Bats contribute to the ecosystem processes and mammalian diversity in North America (Hayes 2013). However, wind farms have been found to kill bats at higher rates than other tall human-made structures (Arnett et al. 2008). This is believed to be because of bats attempting to roost on turbines and the high availability of prey around turbines (Arnett et al. 2008). A review of bat fatality studies found that 11 of 45 species of bats living in the United States and Canada were found dead at wind farms (Arnett et al. 2008). Estimates for bat fatalities in the United States range from 1.2 collisions/turbine/year to 46.3 collisions/turbine/year in different regions (Kuvlesky et al. 2007). There are methods that attempt to minimize bat fatalities at wind sites. The FAA recommends red strobe lights, although they have not been found to be effective against bat fatalities (Arnett et al. 2008). While acoustic "repellers" have not been found to be effective, research is beginning to show that ultrasound broadcasts may discourage bats from approaching wind turbines (Arnett et al. 2013).



Image courtesy of Giles San Martin via Flickr.com

Identifying where bat fatalities occur can help reduce these fatalities with mitigation strategies (Arnett et al. 2008). Localized searches at individual wind farms have been conducted but have found no connection between land cover within 100m of the turbine or distance to wetlands and bat fatalities (Arnett et al. 2008). However, there has been very little larger scale research on bat activity, and therefore potential fatalities, in regards to land cover, elevation, or eco-region. Research has identified that quantifying bat activity with land cover to be an important step towards the goal of minimizing bat fatalities at wind farms (Kunz et al. 2007). This is especially important because some bat species are already at risk because of habitat destruction and fragmentation (Davidai et al. 2015). By looking at the distribution and diversity of bat species, future research on bat abundance and activity can be best targeted to areas with the most potential.

Texas has been the leading state in wind energy production since 2000 with nearly one quarter of the United States' projected wind capacity (Brannstrom et al. 2011). Texas also contains multiple eco-regions and 33 species of bats (Ammerman 2012). Therefore, the goal of this research is to identify bat distributions among eco-regions in Texas.

Scientific Name	Common Name	Used in Analysis	Threatened or Endangered
<i>Mormoops megalophyll</i>	Ghost-faced Bat	No	No
<i>Choeronycteris mexicana</i>	Mexican Long-tongued Bat	No	No
<i>Leptonycteris nivalis</i>	Mexican Long-nosed Bat	No	Endangered
<i>Diphylla ecaudata</i>	Hairy-legged Vampire	No	No
<i>Myotis austroriparius</i>	Southeastern Myotis	No	No
<i>Myotis californicus</i>	California Myotis	Yes	No
<i>Myotis ciliolabrum</i>	Western Small-footed Myotis	Yes	No
<i>Myotis occultus</i>	Southwestern Little Brown Myotis	No	No
<i>Myotis septentrionalis</i>	Northern Long-eared Myotis	No	No
<i>Myotis thysanodes</i>	Fringed Myotis	Yes	No
<i>Myotis velifer</i>	Cave Myotis	Yes	No
<i>Myotis volans</i>	Long-legged Myotis	Yes	No
<i>Myotis yumanensis</i>	Yuma Myotis	Yes	No
<i>Lasiurus blossevillei</i>	Western Red Bat	Yes	No
<i>Lasiurus borealis</i>	Eastern Red Bat	No	No
<i>Lasiurus cinereus</i>	Hoary Bat	No	No
<i>Lasiurus ega</i>	Southern Yellow Bat	Yes	Threatened
<i>Lasiurus intermedius</i>	Northern Yellow Bat	No	No
<i>Lasiurus seminolus</i>	Seminole Bat	Yes	No
<i>Lasiurus xanthinus</i>	Western Yellow Bat	Yes	No
<i>Lasionycteris noctivagans</i>	Silver-haired Bat	Yes	No
<i>Parastrellus hesperus</i>	American Parastrelle	No	No
<i>Perimyotis subflavus</i>	American Perimyotis	No	No
<i>Eptesicus fuscus</i>	Big Brown Bat	No	No
<i>Nycticeius humeralis</i>	Evening Bat	No	No
<i>Euderma maculatum</i>	Spotted Bat	Yes	Threatened
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	Yes	Threatened
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	Yes	No
<i>Antrozous pallidus</i>	Pallid Bat	Yes	No
<i>Tadarida brasiliensis</i>	Brazilian Free-tailed Bat	No	No
<i>Nyctinomops femorosaccus</i>	Pocketed Free-tailed Bat	Yes	No
<i>Nyctinomops macrotis</i>	Big Free-tailed Bat	Yes	No
<i>Eumops perotis</i>	Western Mastiff Bat	No	No

MATERIALS AND METHODS

The main sources of data for this research were existing records of the USGS Gap Analysis Program and the Texas Natural Resources Information System (TNRIS). USGS provided species distribution data for 16 of the 33 bat species present in Texas as can be seen in Table 1. The data shows the environment where the species is likely to be found in a raster, meaning that each cell was either positive for the species and colored, or negative and colorless. Presence data for the remaining species was unavailable from USGS, so those species were left out of the maps and analysis. A shapefile with the eco-regions in Texas was downloaded from TNRIS. The shapefile was created by Texas Parks and Wildlife GIS Lab from plant ecology field work.

The bat distribution data and eco-region data was uploaded and formatted using ArcMap. The bat distribution data for each of the species were overlaid to create a map that shows the different densities of bat species present across Texas within the boundaries of each of the eco-regions. The three threatened species whose distributions were available were also highlighted in a third map.

RESULTS AND DISCUSSION

Figure 1 shows the 11 Texas eco-regions that were used in this study. In Figure 2, there appear to be more species present in the western half of Texas than the eastern half. Figure 2 also shows that there appear to be few species with distributions along the Gulf Coast. No eco-region has a uniform distribution of bat species, although the Trans Pecos and Piney Woods have the most uniform distributions. Figure 3 shows the distribution of the three threatened species separate from the non-threatened species. It illustrates that the threatened species are present in different eco-regions. *Lasiurus ega* is primarily in South Texas Brush Country, *Corynorhinus rafinesquii* is found primarily in the Piney Woods, and *Euderma maculatum* is found primarily in the Trans Pecos eco-region.

The largest assemblage of bat distributions to protect is in the Trans Pecos region in western Texas, which had several areas with nine species present. The Piney Woods eco-region was lighter than much of central and western Texas but had more bat distributions than other eco-regions in eastern Texas. While the Piney Woods region does not have as many species present as

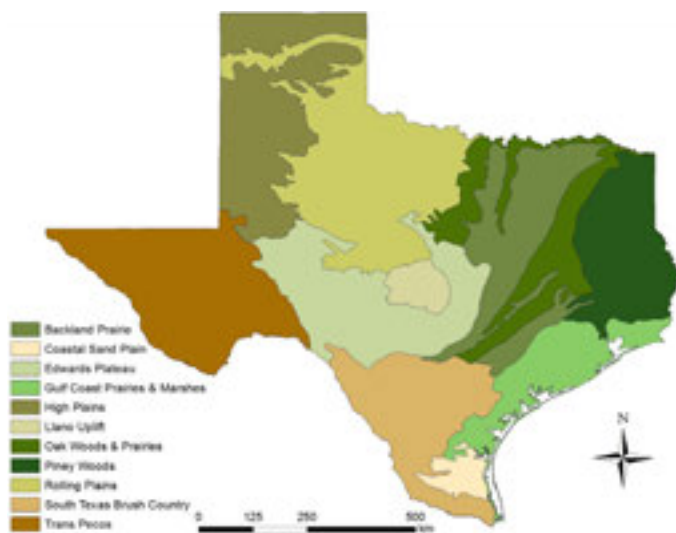


Figure 1 showing the 11 Texas eco-regions used in this study

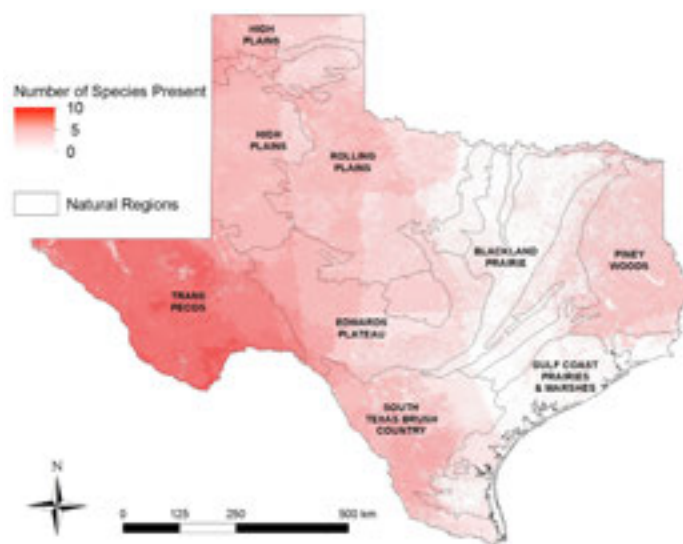


Figure 2 showing species distribution along the Gulf coast

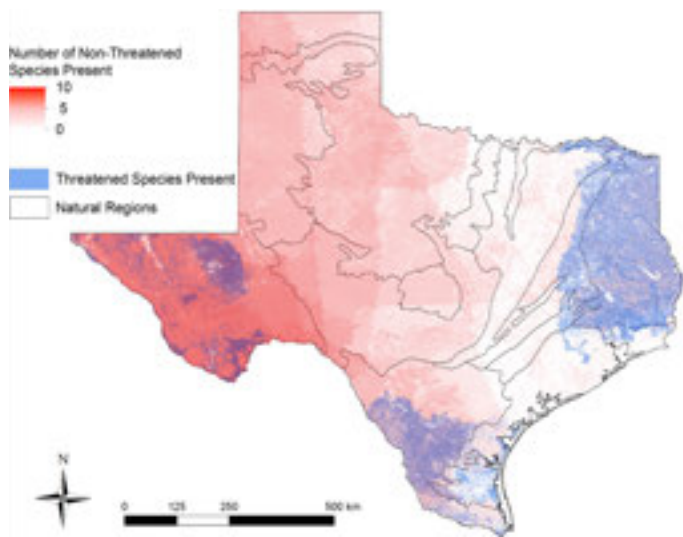


Figure 3 showing the distribution of threatened species against non-threatened species

some of the western eco-regions, it is important to consider that it is likely home to a completely different assemblage of species because of its different habitat, since landscape elements have an effect on bat activity and bat species composition (Heim et al. 2015). Therefore, it is important to protect this region as well because species present there are likely not found in the Trans Pecos region. Wind farm developers should consider both the number of species and which species may be affected when determining where to build new wind farms. However, it is important to note that this study looked at bat diversity rather than species abundance, which would also influence how bat species would be impacted by wind farms. Threatened species were present in the Trans Pecos, Piney Woods, and South Texas Brush Country eco-regions. This is consistent with the consideration of different species assemblages and furthers the case towards protecting these eco-regions.

Based on this data, wind farms within Texas should concentrate within the Backland Prairie, Gulf Coast Prairies and Marshes, and western Oak Woods and Prairies to minimize interference with bats. However, other factors, such as wind speeds, the price of land, human population, protected wetlands, and bird species, will influence where it may be most feasible to create wind farms within these regions. With the coast showing fewer species, it may be worth examining offshore wind options in the Gulf of Mexico. Regions with similar types of land cover and habitat in other states may also be good places to start when searching for land to create wind farms; however, further research is required.

Larger scale field research is necessary for more precise analysis with bat activity and abundance and not just bat distribution, which was one of the major limitations of this study. This study also did not account for the fact that one species had some distribution only during the summer, or the migratory status of the species, and was limited to the 16 species with distribution data available from the Gap Analysis Program. There is a need for more research looking at different species in different regions for a more accurate estimate of bat activity throughout the United States. Field research in predetermined eco-regions or areas of land cover would also allow for statistical analysis of the data that was impossible in this case. 🌱

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GLOBAL WARMING AND ITS IMPACT ON COASTAL COMMUNITIES

BY KATHRYN RUE

On October 29, 2012, Hurricane Sandy made landfall in the United States (University of Rhode Island, 2015). Commonly referred to as “hurricane” by most individuals in the United States, the storm itself had downgraded to a tropical storm upon making its arrival on United States soil. Initially forming in the Caribbean Sea on October 19, 2012, Sandy quickly gathered strength and grew to be the second largest tropical storm to ever make landfall in the United States (Freedman, 2012; Sharp, 2012). The storm’s eventual convergence with a low pressure extra-tropical disturbance is what ultimately led to the storm adopting the nickname of “Superstorm Sandy” (Hall, 2015). The effects of the storm could be felt for 1000 miles, in all directions, from the center of the storm with the damage field ranging from as far south as Florida and as far north as Maine (Billion-Dollar Weather/Climate Disasters, 2013).



Causing between \$65 and \$80 billion in damages throughout the country, Sandy was recorded as being the second costliest storm, second to Hurricane Katrina, in U.S. history (Billion-Dollar Weather/Climate Disasters, 2013). Sandy achieved a record-breaking barometric pressure reading of 940 millibars for a storm affecting the Northeastern portion of the United States (Freedman, 2012). The highest

average wave heights were 32.5 feet, with a maximum storm surge of 13.8 feet produced along some portions of the New Jersey coastline (Freedman, 2012; Stirling, 2012). Conditions were optimal for destruction during the height of Sandy’s landfall. A full moon was present leading to overall higher tides, a high storm surge was predicted and occurred, and the average high tide was predicted to be 20% higher than normal due to the direction the storm took when approaching landfall (Sharp, 2012).

As Sandy developed, it became clear that this was no ordinary storm. Typically, extra-tropical disturbances impact the Northeastern United States as they move parallel to the coast. Ordinary storms tend to move in a northward fashion, simply grazing the coastline. Sandy, on the other hand, was a rare exception to this normal pattern. As shown in Figure 1, the storm approached the coastline almost perpendicular to it, taking a complete left turn before slamming head on into New Jersey (Toro, 2013). The direction of Sandy’s approach directly affected the severity of the coastal flooding, beach erosion, and storm surge impacts that Sandy had on coastal environments lining the northeastern seaboard (Toro, 2013).

This paper focuses on defining how the New Jersey coastline will be affected by future storm surges both in relation to the directionality and strength of storms in combination with the ever present issue of sea level rise. It is crucial to define the elements of climate change and sea level rise and how they interact with hurricanes and extra-tropical disturbances. Describing how coastal populations in New Jersey and other states will be affected by these components in future scenarios and how they will manage future flooding events will also be introduced.

CLIMATE CHANGE AND SEA LEVEL RISE

Throughout its history, the Earth has gone through a series of alternating climate changes. Scientists have determined that significant natural climatic changes develop on a time scale of approximately 100,000 years (England, 2012).

In the grand scheme of things, 100,000 years is a relatively short period of time. Earth has been around for nearly 4.5 billion years (England, 2012). Temperatures have varied from intense cold to extreme heat. These temperature changes have affected every environmental aspect of the Earth, most notably the shifting of precipitation patterns, growth and retreat of huge ice fields, and the dramatic rise and fall of sea level. These past pattern changes are naturally occurring. However, the current climatic trend reveals a speed-up in the processes which cause climate change, a change attributed to anthropogenic influences.

Anthropogenic climate change, which is caused by humans, is fueled by the release of greenhouse gases into the atmosphere. The major greenhouse gases added into the atmosphere on a daily basis include carbon dioxide, methane, nitrous oxide, tropospheric ozone, and chlorofluorocarbons (EPA, 2015). As these gases are released, a build-up of their combined energy reserves remain trapped in the atmosphere (EPA, Climate Change Basic Information, 2015). This build-up of atmospheric greenhouse gases slows the release of the Earth's heat, via infrared radiation, to space and leads to an extensive warming of the Earth (EPA, 2015; EPA, Climate Change Basic Information, 2015). Of the gases mentioned, carbon dioxide is by far the most harmful greenhouse gas being added today. Its present worldwide average concentration is approximately 400 parts per million, a 27% increase from the 1958 recording of 315 parts per million (NASA, 2015).

Carbon dioxide is known to be the primary greenhouse gas contributing to climate change (EPA, 2015). It is found naturally in the atmosphere, biosphere, hydrosphere, and geosphere and it can be released through volcanic eruptions as well as plant and animal respiration processes (EPA, 2015). Additionally, large quantities of carbon dioxide are released into the environment via the burning of fossil fuels (EPA, 2015). Conclusive evidence of climate change shows "natural causes do not explain most observed warming, especially warming since the mid-20th century" (EPA, 2015).

Since the dawn of the Industrial Revolution in the 1750s, global energy consumption through the use of fossil fuels has skyrocketed. Research presented by the United Nations (UN) shows there is "a more than 90% probability

that human activities over the past 250 years have warmed our planet" (EPA, 2015). Over the past century, the Earth has experienced a 1.5°F increase in atmospheric temperature (EPA, Climate Change: Basic Information, 2015). Predictive studies show that the temperature will continue to increase throughout this century and well into the next. The consequences of warming temperatures, referred to as global warming, include ocean acidification, shrinking ice sheets, glacial retreat, declining arctic sea ice, warming oceans, increased observance of extreme weather events, and sea level rise (NASA, Climate Change: How do we know?, 2015).

It has been observed that global sea levels have risen between four and eight inches in the past century (National Geographic, Sea Level Rise, 2015). As greater amounts of scientific research have been conducted on this topic, it can be observed that sea level rise predictions tend to vary from one research source to the next (Gregory, 2013). The heights of both the land and the sea are rising and falling at different levels in various geographic locations throughout the world leading to decreased accuracy in future water level predictions (Gregory, 2013). Annually, global average oceanic levels have risen 0.13 inches/year in the past 20 years (National Geographic, Sea Level Rise, 2015). This increase is predicted to continue as the ocean continues to absorb heat from the atmosphere. In total, 80% of all heat energy produced via fossil fuels is absorbed into the oceans (National Geographic, Sea Level Rise, 2015). As the ocean absorbs heat, the water expands in a process known as thermal heat expansion. Thermal (heat) expansion, as well as the addition of water from the melting of glaciers and ice sheets, will result in an overall rise in sea level for the foreseeable future if global warming continues (National Geographic, Sea Level Rise, 2015).

While scientists have concluded global sea level will continue to rise well beyond the year 2100, it is uncertain exactly how much the current level will change (Gregory, 2013). For example, one researcher expects a 2.5 to 6.5 foot increase by 2100 while another researcher predicts only one foot of increase within the same time frame (Appenzeller, 2007; National Geographic, Sea Level Rise, 2015). Other predictions claim that the Earth will see a 7 foot increase by 2100 and yet another claims that the Earth will only see 1.3 to 3.9 feet of sea level rise

(Rutgers University, Is Sea Level Rising, 2013; Sutter, 2015). This range of predictions makes it very difficult to gain a complete understanding of what to expect by the end of the century. Regardless of the exact increase in sea level “the process is irreversible. Global warming will continue” (Appenzeller, 2007).

Although in disbelief now, coastal populations must begin to plan how they will adapt to encroachment of a rising sea. As sea level rises, it has been predicted that “Hundreds of thousands of square miles of land could be drowned... displacing tens of millions of people” (Appenzeller, 2007). Studies estimate that 147 to 216 million people globally will be directly affected by the warming and rising of ocean waters (Sutter, 2015).

HURRICANES

Hurricanes are slow moving rotational low pressure systems that form over warm bodies of water (NOAA, What is a hurricane?, 2015; Hurricanes: Engines of Destruction, 2013). These low pressure systems go by several interchangeable names. Hurricanes typically form in the Atlantic Ocean region whereas typhoons form in the Western Pacific and cyclones form in the Indian Ocean region. Whether referred to as a hurricane, typhoon, or cyclone, these low pressure systems are increasing in both strength and severity as global temperatures continue to rise (NOAA, 2015).

The path of a hurricane is influenced by the directionality of global wind patterns (University of Rhode Island, 2015). Hurricane propagation, or movement of a hurricane from one place to another, tends to follow the direction of the global wind field (University of Rhode Island, 2015). In most cases, hurricanes move westward whether forming in the Gulf of Mexico, Caribbean Sea, or Tropical Atlantic. This is due to the trade winds at these latitudes (15-30°N) and work to steer storms to the west (University of Rhode Island, 2015). The presence of high pressure systems, typically the Bermuda High, causes hurricanes to deviate northward from their originally planned east to west path. As hurricanes move into higher latitudes, the overall wind field becomes weaker. Continued northward movement of hurricanes is reliant upon the presence of both high and low pressure fields in the mid-latitudes (30-60°N). Without the presence of a pressure field, hurricanes will become weak, slow down, stall,

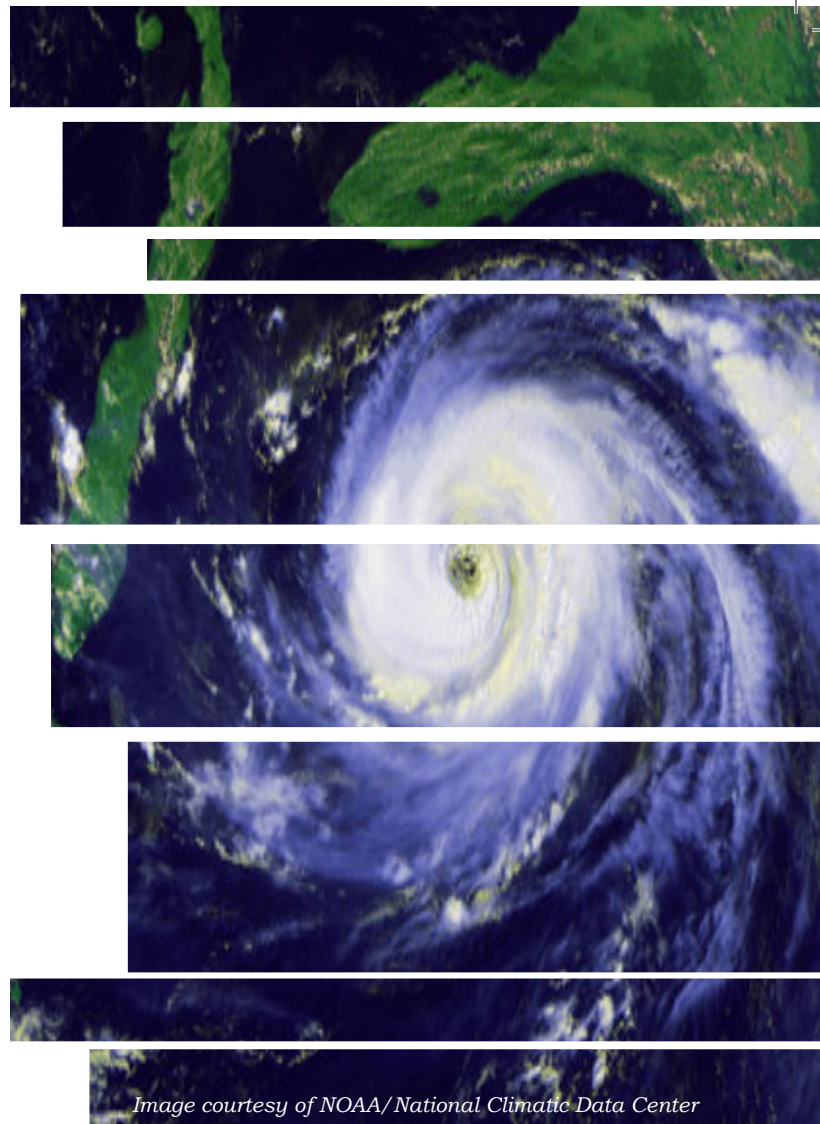


Image courtesy of NOAA/National Climatic Data Center

or even move in unpredicted paths typically away from the shoreline (University of Rhode Island, 2015). If the jet stream is encountered when traveling northward, a hurricane will accelerate very quickly and gain more strength as it moves towards the north, northeast, or eastern United States (University of Rhode Island, 2015).

Beginning as a tropical disturbance, hurricanes are capable of transforming themselves from a minor tropical depression with 23 mph winds, to a more serious tropical storm with sustained winds of 39 mph, into a potentially devastating hurricane exceeding wind speeds of 74 mph (Moran, 2015). A hurricane will likely form if high sea surface temperatures are present, winds are present to some degree, and an adequate Coriolis Effect is in place (Moran, 2015). The Coriolis Effect takes place due to the deflection of winds to the right from a high pressure system to a low pressure system in association with the rotation of the earth in the Northern Hemisphere (National Geographic, 2015). Hurricanes tend to be characterized by strong winds, high seas, extreme rainfall,



Image courtesy of FEMA/ Joeelyn Augustino

and tornadoes. They are capable of developing immense strength and can cause considerable damage wherever they strike and particularly to human inhabited regions throughout the world.

Structurally, a hurricane is made up of an eye, eye wall, and outer bands (National Weather Service, 2005). The eye is an area of sinking low pressure that is characterized by calm and clear weather conditions (National Weather Service, 2005). The eye wall is found to be the strongest part of a hurricane. Heavy rain, winds, and the formation of tornadoes can be monitored in this portion of the storm (National Weather Service, 2005). Naturally, hurricanes will be less severe, or intense, with increased distance from the eye (National Weather Service, 2005). The outer bands of a hurricane are characterized by small bands of non-severe rain storms with minimal winds. No two hurricanes are exactly the same and on average an estimated 10 to 15 significant hurricanes will form worldwide on a yearly basis (Hurricanes: Engines of Destruction, 2015).

Hurricane wind speeds are measured on the Saffir-Simpson Hurricane Wind Scale. Initially developed in 1975, this scale classifies hurricanes into five differing categories (Moran, 2011). Each category is based on a specific wind speed range with “1” being the least severe and “5” being the most severe (Moran, 2011). By monitoring wind speeds, forecasters and researchers attempt to predict how much property damage will occur for individuals

living in the path of the storm (Moran, 2011). While winds are capable of creating a significant amount of structural damage on land, it is important to note that varying oceanic conditions including waves, tides, and surges in addition to wind speeds heavily influence the water level associated with the storm (NOAA, Tides and Water Levels, 2008).

Winds blowing over the ocean create a frictional drag that moves surface waters (Moran, 2011). Winds can influence tidal heights. They also produce or lead to storm surges, which are classified as the most devastating coastal component of any hurricane. A storm surge is characterized by an abnormal rise of water, which is typically generated by a storm (NOAA, 2013). Storm surges often pose the greatest threat to life and property during the landfall of a hurricane (National Hurricane Center, 2014; Moran, 2011). Flood events and storm surges are responsible for a considerable portion of the destruction produced during a hurricane with 90% of all hurricane-related deaths being due to excessive storm surges (Hurricanes: Engines of Destruction, 2015).

COASTAL EROSION AND STORM SURGE

Coastal beach erosion via the powerful forces produced by the ocean, occur after almost every flood or storm-related event. Coastal erosion occurs when waves and currents strip sand from beaches (USGS, 2015). During the



erosive process, larger particles of sand are carried away from beaches and deposited in large sand bars out at sea. While these particles can return to land via deposition during calm weather conditions, the beach replenishment process takes significantly longer than the erosion process (Erosion and Deposition by Waves, 2015; USGS, 2015). Erosion can be particularly damaging to coastal environments when naturally made dunes in various landscapes are destroyed. Dunes serve as protective barriers for human developed infrastructure (USGS, 2015). Erosion of dunes occurs during higher than normal flooding or surge induced events ultimately decreasing the overall volume and elevation of the dunes (USGS, 2015).

Research has shown both the frequency and severity of natural disasters will increase as global warming continues (NOAA, 2015). As natural disasters such as hurricanes develop more frequently as a direct result of climate change, coastal communities will be at risk of experiencing greater than usual storm surges. Significant storm surges are known to be the single greatest threat to life and property from a hurricane as it approaches and makes landfall (National Hurricane Center, 2014). A storm surge occurs when the strong winds push sea water toward the coast, raising the water level 15 feet or higher (NFIP, 2015). Storm surges are characterized by an extreme rise in water level determined by the following hurricane factors: strength, speed, size, angle of approach to coastline, central pressure, width and slant of the continental shelf and beach slope, as well as the natural characteristics and features of already established coastlines (National Hurricane Center, 2014; NOAA, Storm Surge Frequently Asked Questions, 2015). Storm surges are amplified during the presence of naturally occurring high tides particularly during a full or new moon (National Hurricane Center, 2014; Rutgers University, 2013).

Storm surge is not easy to predict. The Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model, developed by the National Oceanic and Atmospheric Administration (NOAA, Storm Surge Frequently Asked Questions, 2013), helps researchers, forecasters, and emergency managers predict how powerful storm surges will be as well as provides a potential coastal inundation risk assessment plan (NOAA, Storm Surge Frequently Asked Questions, 2013).

Additionally, there are currently 175 water level stations located in U.S. coastal waters and several High Water Marks, or lines drawn on infrastructure to mark high elevation levels of water rise, used to measure storm surges (NOAA, Storm Surge Frequently Asked Questions, 2013). In regards to climate change from global warming, it has been predicted as sea level rises the overall vulnerability of coastlines to destruction from water inundation will increase (Rutgers University, How Does Sea Level Rise and Storm Surge Interact?, 2013).

A RISING SEA AND MORE SEVERE STORMS

Research has shown that if sea level were to rise one foot, storm surges could be responsible for a 36% to 58% increase in damages produced (Rutgers University, How Does Sea Level Rise and Storm Surge Interact?, 2013). Even more severe, with a three foot rise in sea level, a predicted 102% to 200% increase in coastal damages will occur (Rutgers University, How Does Sea Level Rise and Storm Surge Interact?, 2013). New Jersey is one of the most densely populated states in the U.S. (Greenberg et al, 2014). With a strong desire to live near the coastline and antiquated policies that do not allow for coastal infrastructural adaptations to occur, it can be concluded that development along the New Jersey shoreline will be susceptible to significantly more flood destruction during future storm events. With this being said, various other coastal locations including Virginia Beach, Charleston, and Savannah, amongst many others, will develop a greater susceptibility to receive flood-related damages as the sea level continues to rise in future years. While a major hurricane has not directly affected these locations, there is still a high likelihood that various coastal locations that have remained unharmed in recent years could be drastically impacted by a major flooding event sometime in the near future.

Statistically, 52% of United States citizens live in one of the country's 673 coastal communities (NOAA, 2015). With nearly half the country's population living along the coastline, there is sure to be high levels of structural damage produced via storm surges, natural disasters, erosion, and sea level rise. As climate change continues and as the global population grows, the further development of coastlines will be put at greater risk for destruction via the advances of nature. 🌊

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PATTERNS IN THE COLLECTION OF CALIFORNIA SEA OTTERS

ENHYDRA LUTRIS NEREIS

BY JULIA L. NEEDHAM

*Aim: This paper looks to examine patterns in the museum collections of *Enhydra lutris nereis*, also known as the Southern or California sea otter, based on year acquired and sex, in order to look at the impact of *Toxoplasma gondii* parasitic infections.*

Location: California, USA

Methods: Data for 2,191 total collections of the California sea otter was retrieved from the VertNet online database. Geographic modeling and statistical analysis of the data were accomplished using ArcGIS and Microsoft Excel software.

*Results: *Enhydra lutris nereis* collections have dramatically increased since the 1980s. Looking at differences in sex, males seem to have higher risks of developing meningoencephalitis, and they are also collected more than females, supporting previous research. Morro Bay has a greater ratio of collections to land size than Monterey Bay, so earlier findings that Morro Bay has a larger percentage of type x *Toxoplasma gondii* infections suggest that the type x strain may be more destructive than the type II.*

*Main: Conclusions The increase in number of specimen collections is likely due to the surge in fatalities from protozoal infections by *Toxoplasma gondii*. Males appear to be at a greater risk of developing an infection because of their migratory nature. There is a potential exception, where females have had greater collections in areas that are both protected and lacking human inhabitants, possibly because they concentrate there for breeding purposes. More research should be dedicated to both marine and freshwater parasitology, and marine protected areas should be expanded to afford California sea otters protection. Because sea otters are an important keystone species for marine vegetation, more research and protection should be devoted to ensuring the recovery of the species.*

INTRODUCTION

The subspecies *Enhydra lutris nereis*, more commonly known as the Southern or California sea otter, was almost driven to extinction in the 18th and 19th centuries by the lucrative fur trade (Larson et al. 2002). Although they experienced great genetic diversity loss, populations were able to recover after an international treaty was passed in 1911, putting the sea otters under the protection of the United States government (Kenyon 1969). However, sea otters are still considered endangered by the International Union for the Conservation of Nature (IUCN), and in the past couple of decades, a new threat has arisen that is preventing *Enhydra lutris nereis* from full population recuperation.

Protozoal meningoencephalitis, a usually fatal inflammation of the brain and spinal tissues, was first perceived to be a threat to California sea otters in 1992 (Thomas & Cole 1996). The cause has been attributed to two protozoans, *Sarcocystis neurona* and the more prevalent *Toxoplasma gondii* (Miller et al. 2004). One study noted that infections due to *T. gondii* are a major cause of death for subadult and adult sea otters and that they account for 16% of total fatalities (Miller et al. 2004). The most accepted hypothesis for the prevalence of *T. gondii* in sea otters is attributed to their food chain. First, *T. gondii*-infected domestic cat feces is entering the ocean, being uptaken by filter feeders, and then being ingested by the otters (Conrad et al. 2005). Since the highest rates of infections in sea otters are concentrated near freshwater outlets, that idea is even more plausible (Miller et al. 2002). Although some speculate that otters have mainly been subjected to the parasite through infected bivalves, there has also been conjecture that sea otters are turning to marine snails, a low-quality alternative to the preferred but scarce abalone (Johnson et al. 2009). This suggests that there is a connection between pathogen exposure and the consumption of low-quality food sources, and that it is possible “elevated pathogen

Image courtesy of Mike Bard via Flickr.com

exposure represents a negative consequence of behavioral adaptations that have evolved to cope with limited resources” (Johnson et al. 2009, p. 2245).

Genetic research on otter tissue that tested positive for *T. gondii* revealed a previously unknown strain of the parasite with the “type x” genotype. As the only other alternative to the known type II genotype, type x *Toxoplasma gondii* accounts for 60% of infections (Miller et al. 2004). The same researchers also found that type II infected sea otters were concentrated near Monterey Bay, while type x otters were near Morro Bay. A different study noted Cambria and San Simeon as areas with high rates of infection, but that are lacking large nearby human populations and freshwater runoff (Johnson et al. 2009). Also, it is possible that male otters are more at risk than females because they travel much further, and therefore cover more area. One estimate from a logistic model showed that males are 12 times more likely than females to be exposed to *Sarcocystis neurona* (Johnson et al. 2009).

The purpose of this paper was to examine data and look for patterns in the museum collections of *Enhydra lutris nereis*, analyzing them statistically and geographically based on year collected and sex. I looked at the areas in California that were mentioned in previous research. My initial hypothesis was that collections would decrease in the past 20 years due to high fatality rates from *Toxoplasma gondii*; however, this was unsupported for reasons on which I will later elaborate.

MATERIALS AND METHODS

Data was retrieved from the VertNet online database (vertnet.org), making sure to include only *Enhydra lutris nereis* that were collected. The data points were imported into Microsoft Excel and all collections without a year were deleted. Simple frequency analysis was used to measure the collections over yearly intervals and to look at which sex, if any, was more predominantly recorded. Finally, further qualitative analysis was accomplished using ArcMap to geographically model patterns in the dataset.

RESULTS

A small-scale map (Figure 1) of all data collections suggests that most California sea

otters were collected in the early and mid-1900s. However, views of local levels (Figure 2) reveal that most otters have been collected in the 1990s to 2000s.

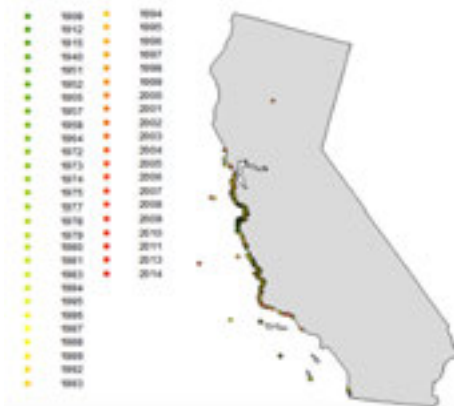


Figure 1 Collection data for each identified individual from 1908-2014. The color scale on the left shows earliest to latest data going from green to red and is generally applicable to all maps



Figure 2 Large-scale maps of areas in California, including Monterey Bay shown here, indicate that more otters have been collected in the late 1990s and the 2000s

Numerical analysis supports this, as Figure 3 shows that the greatest number of sea otters, 87.8% of total collections, was recorded between the thirty-year period of 1980-2010. The first decade of the new millennium, alone, accounted for 35.4% of all historical collections. This seems contrary to the initial hypothesis that parasite-related fatalities would result in fewer collections in more recent years. However, this finding that collections have actually increased could very likely be due to recent interest, both in scientific research and public communities, of California sea otter conservation. Simply, higher death rates could actually be promoting more collections of the species.

Furthermore, a side-by-side look at Monterey and Morro Bay in Figure 4 shows differences in area collections. The Monterey

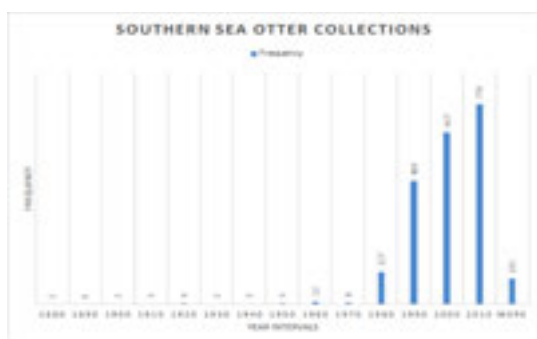


Figure 3 Frequency bar graph on collections showing that 2000-2010 was the decade with the highest number of collections

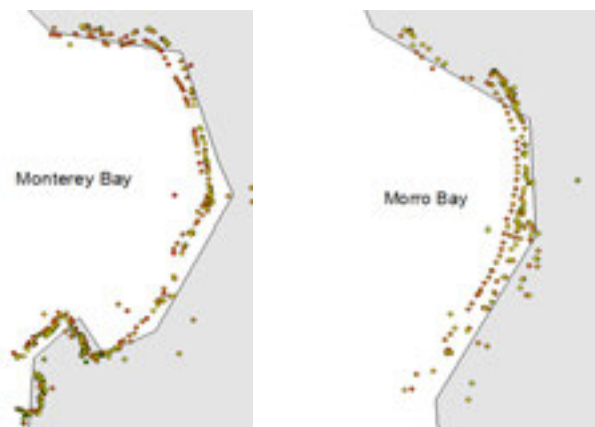


Figure 4 Comparing Monterey Bay (a) and Morro Bay (b). Note that Morro Bay has been enlarged for easier comparison

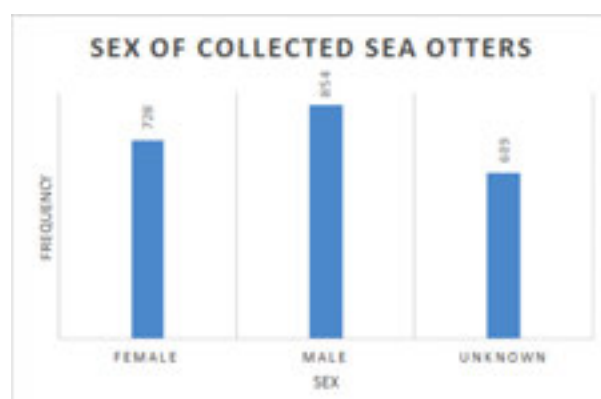


Figure 5 Frequency of collections based on sex



Figure 6 Collections of males (left) and females (right)

Bay data includes 168 females and 215 males (383 total plus 214 unknowns), while Morro Bay had 138 females and 152 males (290 total with 138 unknowns). But because Morro Bay is about a third the size of the Monterey area, the former could very likely have a higher ratio of collections to land size. This is interesting since research has shown that Morro Bay is associated with type x *Toxoplasma gondii* while type II infections are concentrated near Monterey Bay; most importantly, the type x strain of *T. gondii* accounts for 60% of infections (Miller et al. 2004). It could be that the type x strain is more dangerous to marine mammals than type II. This might be a plausible explanation for the high counts of specimen collections in Morro Bay since most museum collections are of deceased individuals. However, it is always possible that spatial frequency patterns are distorted because of the many scientific experiments that have been completed in these specific areas.

Overall, the timespan of male and female collections are very similar. Despite that, it appears like more data was collected for males, supported by the greater number of

male collections in Monterey Bay (Figures 5, 7). From Figure 6, there is a noticeable difference in collections for males and females at the northern and southern ranges of the California coast. This supports the hypothesis that males are more susceptible to parasite disease because of their wider ranges. The mean 90-day migration length was found to be 45 km for males versus only 7 km for females (Johnson et al. 2009). The same study also revealed that otters that had a mean 90-day move rate of ≥ 1 km had a 24 times higher risk than those that traveled less of being infected by *S. neurona*. In addition, males seem to have double the chances of *T. gondii* infection (Miller et al. 2002). This is also probably due to the seasonal migrations of males, meaning they are more likely to come into contact with multiple point sources of polluted freshwater runoff.

While it has been posed that San Simeon and Cambria, areas with little freshwater outlets and human populations, have high rates of parasite infection in California sea otters, the sex ratio of collections is opposite to other findings (Johnson et al. 2009). Males have actually been collected a lot less in that area than females

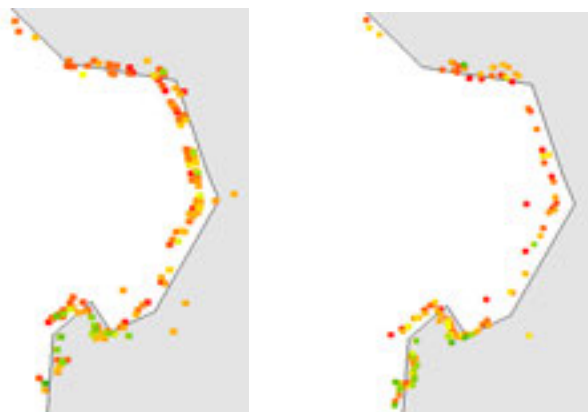


Figure 7 Males (left) versus females (right) in Monterey Bay

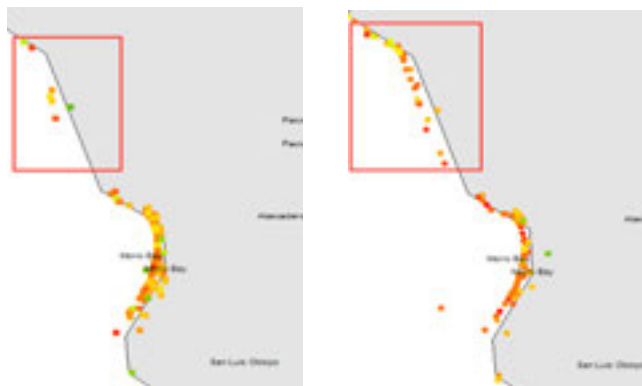


Figure 8 Collection of males (left) and females (right) in San Simeon and Cambria (enclosed in red)

(Figure 8). This incongruity may be due to the fact that a part of the region is included in the Cambria State Marine Conservation Area, and so females might congregate there for safe habitats for reproduction. Although Morro and Monterey Bay both contain protected areas, large human populations could be a large deterrent.

It is also important to note that 27.8% of all collections were of unknown sex, so patterns may very well be skewed. The gap in data is probably due to more relaxed guidelines related to specimen records in the 70s and 80s since most of the unknown data points were from that time (Figure 9).

DISCUSSION

Opposing the original hypothesis, *Enhydra lutris nereis* collections have dramatically increased in the past few decades. This could be attributed to amplified public interest in sea otter conservation. More importantly, since most collections were of tissue or whole specimens, this suggests that the majority of collections were of deceased sea otters and so there is great cause for concern that otters are experiencing some sort of fatal event. Most likely, these deaths are being caused by the parasite *Toxoplasma gondii*,



Figure 9 Collections of unknown sex

along with the less common *Sarcosystis neurona*, both resulting in lethal meningoencephalitis. Infected individuals also have higher chances of shark attacks, possibly because of abnormal movements that attract attention or a lack of evasive abilities, due to neurological damage by *T. gondii* (Conrad et al. 2005). From the findings, males do seem to have a higher risk of fatal infection and Morro Bay also appears to be a location where death rates from type x *T. gondii* are especially high.

California sea otters are integral to the ecology of coastal marine systems, particularly kelp forests. They act as a keystone species by preying upon sea urchins that would otherwise voraciously graze on kelp and sea grass beds (Estes & Palmisano 1974). In the past, oil spills have resulted in massive declines of marine vegetation, so it is reasonable to say that kelp forests and the other species that feed and house within them rely on the continued existence of sea otters.

The study of *Toxoplasma gondii* in otters and other marine mammals is also pertinent to humans because some researchers hypothesize that people could also have increased risks of protozoal infection through seawater ingestion (e.g., swallowing water while swimming) and seafood consumption (Conrad et al. 2005). This reason alone should convince municipalities to increase research on protozoal infections in marine life. More attention should also be given to expanding marine protected areas (MPAs). The Marine Life Protection Act of 1999 put MPAs in place and set up a management system that permitted limited-to-no human disturbance (Owens & Pope 2012). Growing conservation areas, especially in high-infection but less-

inhabited places like San Simeon and Cambria, could give California sea otters a chance to recover from disease without having to contend with other barriers like habitat destruction and boating.

Continuing in the future, more research could be done not just on patterns in sex and timing of collection data, but also other factors such as freshwater versus marine environments, food (abalone, sea snail, etc.) ranges, and trade routes for boats. Additionally, river otters seem to have not been studied to the extent that sea otters have. Looking at parasite disease in freshwater marine mammals is equally important to humans because rivers are much more widespread contact points for people. 🐾

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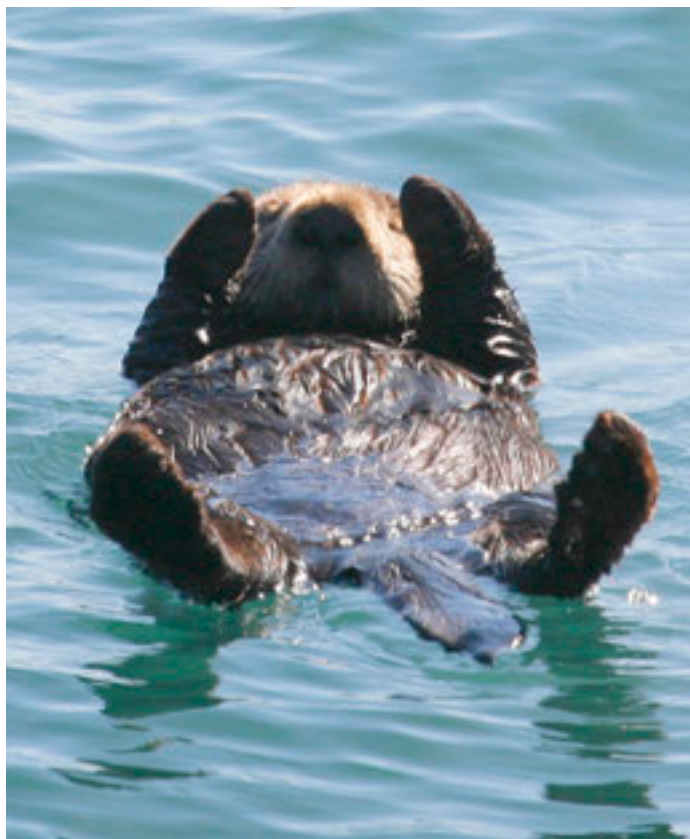


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BATS NEED OUR HELP

BY ABBEY FOUCART

I first became fascinated with bats in my elementary school years, back when my family lived in suburban Virginia. We had a spacious backyard that my brother and I would run around in in the evenings playing made-up games. The one that we played most often was created by my brother and entailed throwing rocks into the air in high arcs. Bats would mistake the rocks for insects and dive after them, sometimes stopping mere feet from the ground (it wasn't until middle school that we understood the cruelty of this game and stopped).

Today, I don't see bats very often. True, my new home is closer to the city, but it still seems wrong to look up at an empty sky at night. Curious, I began researching bats in earnest, taking to a college student's most trusted source: Google. What I found was shocking.

Bats are dying out in massive numbers never seen before. In my state of Virginia, the brown bat population has seen a decline of 95% and tricolored bats 90% in four years. The cause? Primarily, scientists blame White-Nose Syndrome (WNS). The fungal disease causes bats to wake from hibernation more frequently and so use up more of the precious body fat they stored for the winter. The fungus also eats away at the wings' membranes, rendering them useless for flight. White-Nose Syndrome is spread through the caves that bats inhabit in large colonies.

What is really so horrible about bats racing towards future extinction? Many people are afraid of bats, or simply don't like them. Some see them primarily as rabies-carriers (although less than .5% of bats actually have the disease).

Many think bats are dirty, despite the fact that they are known to frequently groom themselves. There are even those that believe the persistent myth that all bats suck blood. Overlooking the fact that bats are fascinating creatures (with their ability to fly and use echolocation still a mystery to scientists), it is easy to see why bat conservation hasn't been popular with the general public.

However, among other environmental issues, bat conservation is much more important than it may seem. First of all, bats are better than bug spray. A bat can eat the equivalent of its body weight in insects every night. With Zika and other mosquito-transmitted diseases in the forefront of global problems today, we could use some more insect control. Beyond that, some species of bats take care of our plants. Some pollinate large numbers of flowers in the deserts and tropics. Others help out by unintentionally dropping seeds as they fly. Without these animals' actions, some plant life would decrease. Losing plant life is a huge problem in a world where the human population is always growing and increasing its demand for food. Already the bee population, another key species in human food production, is declining at alarming rates; can we really afford to lose bats as well?

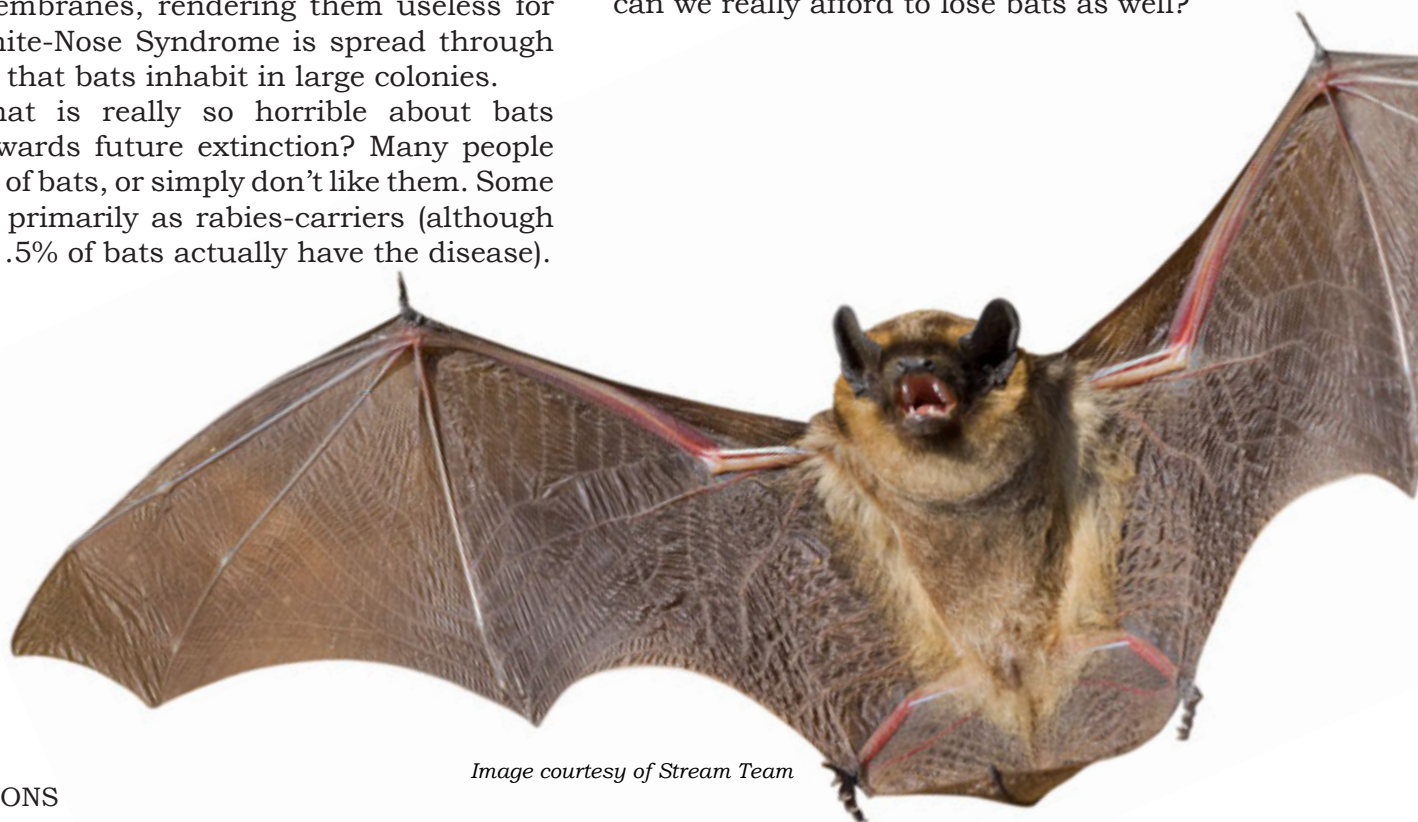


Image courtesy of Stream Team

What bats need are homes free of disease. Many of the habitats bats used to call home are being destroyed by the construction of cities and buildings. This leads many to cluster together in caves, which in turn makes them more likely to contract WNS. To help, consider buying a bat-house for your yard. It will attract bats to start healthy colonies and requires little maintenance. The number of bats able to live in one house ranges; depending on the size of the house you purchase, you could have anywhere from 12 to 300 bats. You can also help by donating to bat conservation organizations such as Fly by Night, Inc. or The Organization for Bat Conservation.

Bats are victims to other human impact besides urbanization. Pesticides negatively affect the ecosystem and infect the insects that bats then eat. To contribute to bat conservation without taking your wallet out, simply stop using pesticides or harmful chemicals in your backyard. Instead, think about using bats as a more natural insect control.

Though the situation is morbid and unfortunate, making the decision to help can make a difference. Together, we can take the world back to a time when children could watch over their heads and know that their friends were there keeping them safe.

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Image courtesy of Craig Stihler / WVDNR



With major professional writing experience, she is using her major writing experience but also hopes to continue her Environmental Studies and Sustainability minor into her future career. Her hobbies include reading, swimming, and generally any outdoor activity.

SEASONAL CHANGES

BY MIRANDA ROMANO

I'm coddled by winter,
with the branches snapping heavy with ice
clinking like enormous wind chimes.
I pull on socks, curl against the body next to me,
press my numbing fingers
into the folds of anything warm.
When the fog tumbles down,
I can feel it crawl into my throat.

Then on the cusp of spring,
I feel myself emerge from the frozen world,
like a newborn
cracking through membranes, through the shell.
I touch my face as if it's new,
feel the slick grass against the balls of my feet.
And I can taste freedom sweet
as the stem pulled from honeysuckle buds
brushing against the window frames.

An oven summer follows
where the ground crunches again,
the way the snow and the leaves did,
but this time with burning grass.
It's a hot so full
that my lungs feel small, inadequate
and I want nothing
but to put every piece of my body under water.
At dusk, I watch the red sun
fall from the sky
as it leaves the world to cool
and I wonder,
when they finally burn my bones to dust,
if I'll feel the heat,
if what's left of me will desire escape.

Miranda Romano '16 is studying Creative Writing and Professional Writing & Rhetoric. Her friends, and probably strangers too, accuse her of wearing too much floral. Her poetry professor and mentor describes her poetry as very rich, playful, passionate, sensory, emotional and powerful. She likes to think that this describes her personality as well. Miranda has been published in The Fem Literary Magazine, Colonnades, and Visions Magazine 2015.

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SUSTAINABLE DEVELOPMENT IN ETHIOPIA: ECONOMIC EMPOWERMENT OF DESTITUTE WOMEN AND EDUCATIONAL SUPPORT FOR THEIR CHILDREN

ARTICLE AND IMAGES BY JOSEPHINE GARDNER
DEDICATED TO DR. HEIDI FRONTANI

African countries are home to many of the world's poorest people, including many in major cities who are homeless and near homeless. Programs exist to support the destitute, but they are generally insufficient. From June to November 2015, interviews were conducted with government officials, staff at five non-governmental organizations (NGOs), and nearly two dozen destitute women in the Nifas Silk-Lafto sub-division of Addis Ababa, Ethiopia to identify inefficiencies in health delivery services for the homeless and near homeless and means to address them. Findings include a disturbing trend: the destitute face daily decision-making in which healthcare or food, or healthcare or safety, are the perceived or actual options. Of the few support programs for the homeless and destitute in Addis Ababa, those most welcomed by the population being served are initiatives that integrate health services with others, such as counseling, general education, vocational training, and most importantly, housing.

INTRODUCTION

Africa has the largest concentration of low-income and highly indebted countries in the world. Foreign aid has done little to change the situation and some scholars argue that aid has heightened the crisis in Africa by creating dependency and supporting corrupt leaders that use the funds to enrich themselves without bringing real benefits to those in the country who most need support (Easterly 2007 and Moyo 2010). Widespread poverty and hunger, the outmigration of trained health professionals, and the general population's limited access to health services have contributed to Africans' high disease burden and poor health (Omaswa and Crisp 2014).

Although Ethiopia has one of the fastest-growing economies in the world, it remains one of the poorest by per capita income. Ethiopia has a population of approximately 94.1 million with a life expectancy of only 59 to 62 years. Many die needlessly from preventable diseases with existing cures due to malnutrition and a lack of access to health care, including vaccinations (WHO 2013). Fully 45 percent of Ethiopia's people live below the poverty line and 82 percent of the population lives on under a dollar a day (Wamai 2009 p. 279). The majority of Ethiopians cannot afford basic necessities such as food or shelter, and three-quarters of them lack access to clean water (Alwan n.d.). Although there have been considerable improvements in several African countries in medical record keeping, drug safety testing, the percentage of the population with health insurance, and the training of medical professionals, Ethiopia generally has not improved (Omaswa and Crisp 2014).



Orphan in Addis Ababa, Ethiopia

Governmental and non-governmental organizations need to work together to handle the problem holistically and provide this population with the tools and resources that are transformative and sustainable. This study seeks to understand the types of programs available to assist homeless and near homeless women and children in Addis Ababa, especially in the Silk-Lafto sub-division to the south and west of the city and to determine which of these programs most effectively help to address their multiple problems, especially within the realm of health. It also seeks to contribute to the extremely limited literature on homelessness in Ethiopia's cities.

BACKGROUND ON THE PROBLEM OF HOMELESSNESS IN ETHIOPIA'S URBAN AREAS

Ethiopia's rapidly growing cities have large populations of poor and homeless. The country's capital city, Addis Ababa, contains an estimated 50,000 homeless (Fekadu et al. 2014). UN Habitat points to the centralization of employment and services in Addis Ababa as a major cause of rural to urban migration. Unable to secure employment, many migrants end up homeless (Sustainable Development 2012 p. 41). People who are homeless in Addis Ababa live in dirty tents, pipes, underpasses, and along roadsides. They become estranged from society, shunned by their communities, isolated, vulnerable, and susceptible to alcoholism, drug use, HIV infection, criminal acts, mental



Homeless women in Addis Ababa, Ethiopia

ill-health, and sexual assault. A study of 217 homeless adults in Addis Ababa found that nearly 30 percent had a physical disability, 41 percent had a mental illness, more than half suffered from alcoholism or alcohol abuse, and nearly 15 percent had attempted suicide within the past month (Fekadu et al. 2014). Most had no formal education and had not seen their family since becoming homeless. Nearly half had never been employed and more than 55 percent of those with mental illness reported not having a home to which they could return. Only 6.6 percent had visited family in the previous 12 months (Fekadu et al. 2014).

Most of the now homeless migrated to Addis Ababa from elsewhere in Ethiopia (76.5 percent) (Fekadu et al. 2014). As migrants predominantly from rural areas, many lack documentation to show proof of residency or identity (Ali 2013). The lack of official documents further increases vulnerability, reduces access to limited employment and social services, and keeps the homeless trapped in poverty (Sustainable Development 2012, 42).

A study by UN Habitat found that only 39 percent of the homeless in Addis Ababa are women and 61 percent men, but that a greater proportion of homeless women were divorced (10 percent of women, 7 percent of men), separated (17 percent of women, 6.5 percent of men), or widowed (25 percent of women, 6 percent of men). These numbers may be somewhat misleading in that narrow definitions of homelessness, based on rough sleeping or pavement dwelling, are more likely to apply to men than women. Women are far more likely than men to be “uncounted” or “invisible” homeless because they find ways not to sleep on the street whenever possible, even if in temporary, inadequate, overcrowded, or insecure accommodations. The UN estimates that if a broader definition of inadequate housing is used, 70 percent of the world's homeless population would consist of female-headed households (Tippel and Speak 2009 p. 123).

METHODOLOGY AND SCOPE OF THE STUDY

This study is based on interviews with two governmental and five non-governmental organization workers in Addis Ababa and nearly two dozen homeless and near homeless women and their children in the Nifas Silk-Lafto sub-division, (technically a “sub-city”) of Addis Ababa, from June to November of 2015. The

author spent several weeks observing destitute women and children daily. The location was selected because the primary author was born and raised there before she was adopted at the age of eleven by a US family from Maine. Interviews were semi-structured and conducted in Amharic, a language in which the author is fluent but out of practice, and with Institutional Review Board (IRB) approval from the USA and with official letters of support from Addis Ababa University and Ethiopia's Federal Immigration Office. To avoid difficulties with authorities, including potential imprisonment, the author also had to obtain a permit from city officials to take photographs and videos. The study was conducted with funds from Elon's University's Ward Family in Action Award, which the author received shortly before departure for Ethiopia.

After several weeks of observing destitute women and children daily from a distance, as recommended by ethnographers Jean Schensul and Margaret LeCompte in *Designing & Conducting Ethnographic Research*, the author approached the women and children that were begging outside of ten churches in the sub-division. The author wore conservative dress, including a headscarf, to request photographs, videos, and interviews. Challenges, which limited the number of interviews conducted and overall scope of the study, included poor transportation services, frequent electrical outages, loss of Internet and phone service, and needing a local person to serve as an escort for directions and security purposes. Although the author is from Ethiopia, she found it took time to gain the trust of the homeless. Several informal encounters took place before the author would ask for an interview.

INTERVIEWING THE DESTITUTE AND HOMELESS IN ADDIS ABABA

Interviews were conducted outside of Ethiopian Orthodox churches in the Nifas Silk-Lafto sub-division of Addis Ababa. Interviews occurred in the morning when church services were going on and the destitute women and their children were begging. By midday the women generally would move elsewhere, either to a small shared rented space to sleep indoors for some hours or to reach another location in the city where larger numbers of pedestrians that might take pity on them would be present. Many of the women put up to half of their daily

earnings toward a pooled fund so that they could obtain access to a small shared rented room to sleep indoors with approximately 20 others. The term "destitute" rather than "homeless" is thus more applicable to most of the population interviewed, although the line between being destitute and being homeless is a fine one. Living in these conditions is horrific; the women cook their food with no ventilation system thus the smoke generated while cooking is a danger to their health. Some of the women are not able to access clean water, thus they drink rainwater or water from a ditch on the side of the road that they collect from thrown away water bottles.

The destitute or "invisible homeless" women have "begging schedules" in which they make use of their knowledge of Ethiopia's frequent religious holidays to attract larger crowds of church goers and generally provide more earnings than non-holidays. The women call God's name when asking people walking by for assistance. Other strategies employed when begging include leaving only one coin in the plastic bag they put out to collect money so that those giving would not ask for change.

The destitute women the author interviewed face greater challenges than some other beggars having visible disabilities. Most Ethiopians who give money to beggars try to find people with a visible disability to give to. If they see an apparently able-bodied person begging, they are hesitant to give them money because able-bodied people that beg are viewed as a disgrace to their extended family and culture. The women the author interviewed were generally lacking formal education and suffering from 'invisible disabilities' including mental illness and HIV/AIDS. The diseases and medications to combat them tended to make the women very tired and unable to lift heavier loads, a requirement for the kinds of jobs, such as construction and housekeeping, for which they otherwise would have qualified without a formal education.

Questions the author asked of the mothers and children included how old they were, where they were from, how long had they been on the streets begging, where they usually begged, how they survived, where they slept at night, how much they made daily from begging, whether they went to school or had a job, where they went for help when they were sick and what kind of governmental and non-governmental organizations, if any, assisted them.

Through the interviews the author learned that the homeless and destitute women looked out for each other, akin to a family, because many had been shunned by their biological kin for their HIV positive status or for turning to begging to survive. The women pooled their funds to have a roof over their heads whenever possible, even though the room that up to 20 women and children slept in was the size of someone's bathroom in the United States.

The women were aged from 23 to 58 years old. Their days were spent begging, looking for food, and engaging in occasional day laborer work. Leftovers from restaurants, people's houses, and garbage dumps were the main food sources and were supplemented with food donations obtained while begging and purchases made with funds obtained from begging. The children worked together and took turns going to restaurants to collect food and bring it back to the group while others slept. Some restaurant owners made the street children work little jobs before giving them any leftover food. The women also did occasional work for individuals or small businesses.

The rainy season (June through August) is an especially difficult time for the homeless and destitute population. They lay plastic and cardboard on the ground and often sleep on top of each other like corpses to maintain body heat and avoid hypothermia. They also smoked cigarettes, inhaled gasoline, drank alcohol or chewed a stimulant drug called khat to keep warm and awake. Many are addicted to nicotine or other stimulants. Due to Ethiopian laws that forbid the destitute from sleeping under tents or in any public places, most of the homeless and destitute children spend their nights roaming the streets in search of safe shelter; if they found none, they would roam until morning and sleep during the day. The homeless and destitute experience abuse by law enforcement and the public. Police may beat children with a bat when they are sleeping on the sidewalk or under railroad overpasses. Drunken citizens spit or even urinate on the homeless.

The harsh conditions of street life make the vulnerable women and children frustrated with the government and the country in general and cause some to wonder whether their lives are worth living. The author was unable to determine the extent to which suicide occurs among the population interviewed.

The homeless and destitute mothers and children generally shared rather similar life stories. Most of them came from poor families in the countryside in search of better job opportunities and had lost one or both of their parents. People generally did not wish to live with their stepparents because they were not treated as equals. The social stigma that came with being HIV positive or having AIDS caused many to leave their families out of shame or due to abuse, rejection, or abandonment by their families.

NON-GOVERNMENTAL SUPPORT FOR DESTITUTE WOMEN AND CHILDREN

The author asked the managers of nonprofit organizations questions such as: when and why did they establish their organization? What was their mission or goal? In what areas did the organization specifically work and offer help? What criteria were used to determine their program beneficiaries? From where did the organization receive its financial support? What was their capacity, and what were their main challenges and success stories?

The first organization the author visited was Sele Enat Mahiber (*In Place of Mother*), which was established in 2002. The organization works with orphans and vulnerable children and assists single mothers to be economically self-sufficient and self-reliant. It has a child sponsorship program and a childcare program that uses a group home to train women in income generating activities to break the cycle of extreme poverty. Sele Enat's vision is to provide daily care and support for orphaned and vulnerable children so that they are free of misery and hunger while being processed for adoption at home or abroad.

At Sele Enat Mahiber the author interviewed the General Manager who explained that cultural misperceptions were a considerable challenge faced by the organization. Ethiopians generally perceive adoption agencies and orphanages quite negatively because they view such organizations as selling innocent children through the international adoption system. The general public generally does not understand why outsiders pay to adopt children because it does not take into account that funds are required for administrative costs, medical expenses, food, education, and clothing for the children. There are "bad adoption stories" of Ethiopians being harmed by those taking legal charge of them

such that the Ethiopian government has created policies that make the adoption process an exceptionally long one. The length of the adoption process in turn creates additional problems because some families grow distressed waiting and turn to other countries to adopt from. On the plus side, the rigorous stance taken by the government helps placement agencies to check all the paperwork and make sure that only the best possible families are allowed to adopt.

The second non-profit organization at which the author conducted an interview was with Executive Director of AHOPE Ethiopia. AHOPE is an organization established in 2004 that offers vocational and anti-retroviral treatment (ART) training programs to HIV positive orphans and vulnerable children to improve their social mobility and assist them with the management of their illness. The comprehensive support also includes general education, counseling, and basic needs including food, shelter, clothing, and standard medical care. AHOPE also offers community education to reduce the stigmatization the children living with HIV/AIDS face from their extended families and teachers and students in the school system.

The third organization, at which the author conducted an interview, was the New Life Teen Challenge Development & Relief Program. New Life has the motto "From Pavement to Prosperity." It is a nonprofit organization that has actively worked for the last 14 years with homeless women, street children, youths and low income families in the areas of reproductive health, HIV/AIDS prevention, care and support. New Life also offers street women and youth opportunities through their small business skill and vocational training, educational support, and rehabilitation and reintegration programming.

To date, New Life's successes include the following: 256 street children & youth that reconciled their relations with their families, 374 street children and youth that received educational supplies and resumed schooling, and 241 families that received support in some form. In addition 481 street youth obtained employment after completing vocational skill training and 612 women were supported to initiate income generating activities or small businesses. New Life uses trained peer educators to send prevention messages about drugs, alcohol, HIV/AIDS and the use of condoms to those still on the streets. As a result, over

14,380 street children and youth have received psychosocial support and 11,883 street children and youth have received information on HIV/AIDS and reproductive health.

The fourth NGO the author visited was the Berhan Family Welfare Foundation. The author was unable to interview the General Director because Ethiopian government officials were checking on the organization. The author spent the day observing the NGO staff-government official interactions. It was clear that not having an organized filing system led to many delays when officials came and asked for the children's international adoption files. Literally hours were spent looking for files because information was kept on paper in folders that were not well organized and no information was available on a computerized system. The author returned on another day and was able to interview the founding members of the Berhan Family Welfare Foundation.

The organization struggles not only to meet the demands for information from the Ethiopian government, but has been struggling financially due to rising food prices, including baby food, milk, and teff, a grain that is central to Ethiopian meals. Renting a facility to house the orphans costs the organization 26,000 birr each month, the equivalent of 1,500 USD, and feeding the orphans costs another \$300 to \$400 each month.

The orphans looked well fed and the weekly meal schedule that was posted appeared to offer a healthy balance of foods. The orphaned



Orphans in Addis Ababa, Ethiopia

children bring packed lunches to the private and public schools that they attend that are located outside of the orphanage grounds. The packed lunches help the orphans realize that even though they do not have parents, they are fortunate relative to some other children who have parents but have little to no food at lunch time.



Homeless woman and her baby in Addis Ababa, Ethiopia

The Foundation seemed to be very well managed and organized overall. It provided some counseling services and had a yard with a garden where the children raised their own vegetables. The Foundation provided a live-in nurse in the house to check on the health of the children and had specialized equipment in the nursery to warm newborns or children found on the streets suffering from hypothermia. The author accompanied a driver, nurse, and social worker from the Foundation to collect a seven-day old infant that had been found buried in a pile of flour. The government official contacted the Foundation when they found the hungry, crying baby on the street.

The experience of witnessing the rescue of an abandoned baby was sobering. The author, together with individuals from the city and the Foundation, helped to choose a name

for the child to put on a birth certificate which was duly signed by the city officials after the baby was checked by the nurse and fed before being officially turned over to the Foundation. Receiving a call to claim a baby from the streets was not something new for Foundation workers. Ethiopian women, when they are unable to care for their newborns, leave them and even older children on the doorsteps of orphanages or on the streets hoping that the police or a Good Samaritan will pick them up and take them to an orphanage or another place that might be able to provide for them. If a younger child is not picked up, a mother might encourage him or her to beg for food or sell small items like gum or lottery tickets after school.

A final NGO interview was with the Sara Cannizzaro Child Minders Association, established in 2004. The family-based organization provides single mothers with one year of vocational training in sewing, embroidery and housekeeping while simultaneously providing daycare services for their children that are at least three years old plus tutoring and afterschool programs for older children. After completion of the program, the organization places the single mothers in groups to start their own small-scale business.

In the program's initial years of activity, the major challenge it faced was that the single mothers dropped out before completing their training. Initially the NGO leaders did not understand why destitute women would turn down assistance. It was easy to jump to false conclusions that the women were insufficiently motivated to change their lives for the better, that they were lazy, or too uneducated to understand the value of the training, or simply unappreciative. In reality, the women were dropping out of the training program that came with free child care services due to the harsh daily decision-making realities that they faced. Those people with no such realities, such as the NGO leaders, did not readily grasp the destitute women's situations.

The women undertaking free training did not see their condition improve during the training period and in the short term, in many ways, their condition worsened. The time that they spent training was not spent begging, and therefore there was little or no income for priority items like food or shelter. In addition, the training required focus that was difficult to achieve when

distracted by hunger. The free child care services that accompanied the women's training did not include meals for their children, so the women also experienced anxiety over their children going hungry.

Too often, those with more education and resources stick to their initial false assumptions about the poor and determine that they are beyond help, when the reality is quite different (Chambers 1997). Fortunately, in the case of Sara Cannizzaro Child Minders Association, although there were years of failures, there was organizational learning after the group's leaders and staff listened to the homeless and destitute women and children they were seeking to assist. The organization adjusted its offerings such that single mothers with children were given 800 birr per month (40 USD) in addition to their training and childcare services. The funds allowed the women to cover basic necessities and some transportation costs. The NGO also began to provide educational materials, information about family planning, and coverage of medical expenses. The organization still faces challenges because most of the single mothers are illiterate, unable to count to 100, or even measure pieces of cloth to make garments and this limits the kinds of vocational training they can receive, but overall progress has been notable in that many more women are now completing the training program.

Post training, there are cultural obstacles to overcome. In Ethiopia, when it comes to business and making money, most people prefer to work individually and some ethnic groups prefer poverty to the shame of taking a loan. Some program graduates can be placed in factory positions for low pay, but these workplaces generally do not provide a living wage, such that the women are driven back onto the streets to beg.

Another challenge the NGO faces comes from the major shifts in their outside funding (from Italy), over which they have no control. Prior to 2008, Sara Cannizzaro Child Minders Association received 90 percent of its operating funds from abroad, but in recent years outsider contributions were barely half of what they had been. As an organization registered under the Ethiopian Residence Agency, Sara Cannizzaro Child Minders Association must obtain at least 10 percent of its funding from Ethiopia. The NGO has used a wide range of approaches to obtain

funds and other support. They have asked that anyone attending a concert or exhibition bring a notebook and a pencil as donations; this approach has had considerable success. They have approached embassies for funds, but the staff worry about relying on outsider support because it is not reliable and it creates dependency. The concept of volunteerism outside of traditional areas (such as agriculture and community projects in rural areas) is quite new in large urban areas in Ethiopia. The organization is looking into youth volunteers to support their efforts. It has shown innovation, flexibility, and a good ability to adapt to the needs of the poor and it continues to improve its services. The same generally cannot be said of government services aimed at supporting Addis Ababa's homeless and destitute women and children.

INTERVIEWS WITH CITY GOVERNMENT OFFICIALS

Although many government officials are sympathetic to the challenges NGOs face in providing services that supplement government ones, there are many government regulations that make Ethiopia a difficult country in which to establish and run a non-profit organization. The single mothers trained at an NGO like the Sara Cannizzaro Child Minders Association cannot legally sell the garments they make through the non-profit because under the Charity & Agency regulation such action would require registration of the NGO as a for-profit business. For-profit businesses, unlike non-profit organizations, must obtain a license from Ethiopia's Ministry of Trade and Industry.

NGOs also are subject to Ethiopian government officials checking up on their organizations and their efficiency at implementing their programs and projects. Due to many NGOs not having their records available electronically, requests from officials to view adoption papers or other documents can prove very time consuming. Such administrative work takes time away from operational work that directly assists homeless and destitute women and children.

Ethiopia lacks shelters, soup kitchens and other basic social services for homeless people. Government officials informed the author that resources for the homeless and destitute are extremely limited, but that each Kebeke (district) of Addis Ababa had a Community Care Coalition

that offered some meals as well as letters of introduction to obtain services from NGOs. Government officials indicated they did the best with the limited funds available, and that often the best they could do was attempt to rally public or outsider support for destitute individuals given the overall low level of the economy. The city does provide some preventative medical services, such as Health Extension programs and awareness education programs. At the district level, Ethiopia gives vaccination and immunization services for free.

Although there are some free services, there are many challenges with the health system. Hospitals and clinics generally do not have electronic databases to hold patient information. The lack of readily accessible patient histories makes it difficult to know how best to treat people and wastes time because each doctor essentially starts from scratch in terms of learning about a patient's health. Doctors need to be very careful when treating unconscious people with injuries from road accidents or otherwise brought to a health facility by people who do not know them personally and in a condition in which they cannot personally share information about blood type, immunizations received, allergies, the medicine they take, and more. One city official that the author spoke with indicated that the Women and the Youth Bureau was the most informed about government activities that assist the populations of interest for this study. Unfortunately, and somewhat ironically, the author was not able to obtain the correct official letter in a timely matter to interview members of that group.

DISCUSSION AND ANALYSIS

A common trend that the author found during the interviews was that most of the homeless people believed that their ill health was associated with forces beyond their control, including the work of the devil. In Ethiopia, some believe that having AIDS is evidence of possession by the devil and it is not culturally appropriate to state out loud that you have been affected by AIDS. One woman, when asked about whether her situation was made more challenging by the disease, changed her facial expression, and everything in her body language suggested that she wanted to drop the conversation and run away. Others reported that she had been living with AIDS for over 10 years, but the woman just

kept saying "you know that disease; I have that disease and no hope."

At the recommendation of the other destitute women, the woman with AIDS had attempted to treat her disease by drinking holy water, believing it would make her HIV negative. Unfortunately, it was a common belief that "treatment" with holy water should not be combined with other treatments, such that HIV positive women often stopped taking antiretroviral medication when self-medicating with holy water.

The health of the destitute mothers and children generally was very poor due to their malnutrition, exposure to the elements, and existing health conditions. One woman the author interviewed was abandoned by a man she had married informally after seven years of being together; he left her the day after she had their baby. Her husband, who she had met while working construction, informed her that he did not want the child and was in love with someone else. She was forced out onto the streets after quickly running out of her savings. She had put most of the money she had saved while working into her husband's bank account because she did not know how to open her own. When her husband left her, he took all the money in the account. The woman was unable to work with a newborn in her arms. She hoped to be able to find minor work cleaning someone's home or preparing and selling food once her baby reached six months old. However, the woman was not sure that her baby would reach six months because she was unable to breastfeed because she did not have enough to eat.

It was very difficult for the author to avoid getting personally involved in such situations. The woman's newborn had only one item of clothing and as little as the equivalent of 40 USD would purchase food, clothing, small cooking appliances, and pay rent for the woman. The author worked with her aunt and a church to financially assist the woman and her newborn. The author saw the mother and baby some months later. They looked healthier and the woman was breastfeeding, but such humanitarian aid is not sustainable or transformative. The woman and her baby will likely return to their malnourished state within a few months.

Another woman the author interviewed lived in a house with no electricity that she rented for 100 birr (around 5 USD) per month,

the typical cost of housing for the destitute women the author interviewed. The woman had seen a doctor for free at a government-supported health clinic, but had run out of the medication for infection in her uterus and kidneys. The infection kept her from being able to do any work that required walking long distances or lifting heavy objects. She had chosen to eat and have a roof over her head rather than pay for the medication that she needed. If she had HIV/AIDS rather than a uterine and kidney infection she could have obtained her medication for free through the anti-retroviral treatment training program.

The woman's neighbor paid 250 birr per month for rent for herself and her five-year-old child, but as a result often went without food. The woman had turned to begging two years before, three years after her husband had died doing construction work. The woman initially earned an income by hauling water in a large container on her back for her community while having her daughter strapped to the front of her body. After three years her body could no longer take such punishing work, but she still needed to pay for her child's school uniform and fees in addition to food and rent. It was at that point that the woman had turned to begging.

She opted for housing over food on the days she earned nothing while begging because she believed that on the street she and her daughter would become sexual playthings for others. On a good day, begging brought in 10 to 20 birr per day or 1 USD. The woman had looked for work and registered at a church to assist them for pay, but she had not heard back from them about potential employment. She experienced anxiety due to the shame associated with begging and not having money for food for her child. Her daughter is in danger of being expelled from school because of the poor condition of her school uniform, but the free school lunch is sometimes her daughter's only food for the day. A replacement school uniform would cost 200 birr or 20 USD, all of the funds the women had for the entire month after paying her rent. The author realized that she could purchase a school uniform for the woman's daughter, but that some medical emergency or other concern might drive the woman to sell the uniform and wind up back in the exact same situation. At one point the woman had nearly died because she could not afford treatment for

a chronic stomach ailment. A friend dropped her near the university where someone took pity and paid her medical expenses for the life-saving surgery she needed.

Another woman attributed her own poor health to the supernatural. She believed that her neighbor had given her medicine that was cursed and caused her to become poor and unhealthy. The woman had been traveling to a church daily to pray and drink holy water to undo the curse and believed that in time God would restore her to good health and that she would be able to get her former life back.

The main income of all of the destitute women interviewed was from begging, but it was not a reliable income source. An excellent day of begging might bring 20 birr (1 USD) while other days brought absolutely no income. Poor weather harmed earnings. Many would not eat in order to save up for a shared place to sleep in a private home or a run-down government-housing establishment. Women and children sleeping in a shared space generally are not exposed to drunk or dangerous people that might physically abuse them, but the living conditions in the shared rooms are horrific. The women cook on small wood or charcoal stoves, much like what someone might use while camping in the USA; with no ventilation system, the smoke generated while cooking is a constant threat to the women's respiratory systems. Some of the women are not able to access clean water and drink rainwater or water collected in discarded plastic bottles from ditches on the side of the road.



School girl in her new uniform

Life is even more challenging for the women and children who are truly homeless. This holds true especially during the rainy season when those living on the streets shelter under plastic bags. Most do not have warm clothing and catch colds or develop pneumonia. Even those with a shared sleeping space suffer disproportionately during the rainy season because much of their day is still spent outdoors and without proper protection from the elements. It was clear from the interviews that the destitute and homeless women and children faced many challenges on a daily basis from physical threats, hunger, and ill health.

FINDINGS

The goal of this research was to document the lives and the stories of homeless and destitute mothers and their children in the Nifas Silk-Lafto sub-division of Addis Ababa in an effort to find some sustainable solutions to alleviate their poverty and suffering. It is an uphill battle, due to the constant flow of people to the city with little to no formal education. Without an education, many end up living on the street and engaging in day labor work that puts their health at risk. This study of homelessness in Addis Ababa was challenging for the author on a personal level. Seeing the plight of street mothers and children was a reminder of her own history of losing her parents and living in dire poverty before being placed in an orphanage and being adopted by a US-based family. Taking photographs at orphanages was an important part of the research and necessary for effectively sharing the life stories of those interviewed with general



Homeless women in Addis Ababa, Ethiopia

audiences, but also was emotionally charged; as a child, the author experienced outsiders coming to the orphanage to take pictures. Although the visitors likely did not intend to cause harm, the author recalls feeling like a caged animal or like someone on display at a museum when being photographed. As a Public Health Studies major, the author also found it difficult to relate to the homeless women's beliefs about devils and evil spirits as the source of their illness, including HIV/AIDS.

Despite the appalling conditions in which they lived, the author found that the homeless and destitute mothers and children generally exhibited remarkable resilience. Many expressed a desire for an education and a chance to create their own income. Based on the interviews conducted, residentially-based support for the homeless and destitute appears to be the most effective means of improving their access to health services. In part this is the case because such programs can provide documentation, including proof of residency and identity, that allows the destitute to access additional services that might otherwise be unavailable to them.

A major gap that remains in the health services available to and used by the homeless and destitute is within the realm of mental health. Although hospitals, clinics, and assistance programs generally provide access to physical exams, vaccines, and some medication, they often either do not offer counseling services or the homeless do not make use of them. This study's findings match those of Fekadu et al. (2014) who found that virtually none of the homeless had clinical records to aid with diagnosis and that only around 10 percent of the homeless in Addis Ababa with mental health issues had received any form of counseling or treatment for their illnesses or traumas, including sexual assault, which approximately half of the women had experienced. Similar to the findings of Fekadu et al. (2014), virtually none of the homeless and destitute women had contact with the family members that had shunned them due to their HIV positive status or mental illness.

This study's findings reinforced what Fedaku et al. (2014) found in terms of the number and kinds of services and support systems available to Ethiopia's urban poor. There are few non-governmental services and many of these are quite informal and unreliable in nature, including the charity of churches, mosques, and

community members. Formal NGO's services in Addis Ababa generally focus on services for children, including adoption and institutional care, because these activities generally attract more donors than programs for adults. Virtually none of the homeless receive any support from family, even though most cited family as causal, at least in part, for their homelessness. Failure of the family unit, including the loss of parents, rejection by kin due to physical disability, invisible disability such as HIV status or mental health issues, divorce, abandonment, and widowhood were among the main reasons that pregnant women and women with children left their rural homes for the city. Additional issues not mentioned by Fedaku et al. (2014) were the extent to which the homeless and destitute believed that their ill health was associated with forces beyond their control, including the work of the devil, and that the way families do their banking tended to make women especially vulnerable to becoming homeless.

An important aspect of this study that was not highlighted by Fedaku et al. (2014), but which has been raised by development experts more generally, is the need to conduct research for more than just a few weeks so as to be able to witness changes in challenges and conditions by season (Chambers 1983 and 2008). Far too much research on development is still undertaken during the times of year that are most convenient for researchers, such as when it is not overly hot or rainy. The author intends to return to Ethiopia to follow up on this research within the next 12 months. Of interest will be to determine what else can be learned from the homeless and destitute of Addis Ababa and to what extent those seeking to assist the population are truly listening to them.

PLANS TO ESTABLISH AN NGO USING WARD FAMILY LEARNING IN ACTION AWARD

During a visit to Ethiopia in the summer of 2014, the author encountered hardship faced by children begging and mothers and children wearing plastic bags to shield them from the rain as they slept on the streets. The Ethiopian government is too poor to provide any support programs and international non-governmental organizations are too inefficient and culturally uninformed to properly deal with the problem. Realizing that she could have been similarly destitute had an orphanage not taken her in, the

author applied to the Ward Family Learning in Action Award, with the intention of establishing a non-profit organization to address the plight of women and children in Ethiopia. The original proposal's goal was to establish a transitional home for homeless mothers and their children, using the house she inherited from her deceased parents and the award money to outfit and staff the house and provide homeless women and children with meals, housing and basic needs. The safe home would offer an atmosphere of care and promote economic independence for women living on the streets of Addis Ababa through the provision of medical care, intensive counseling, and basic literacy education.

Unfortunately, after extensive research and field experiences of eight months in Ethiopia, this method of approach is prone to be problematic and inefficient toward poverty alleviation work; there is a need for sustainable development programs. In interviews with Ethiopian governmental officials and the Federal Democratic Charity Agency, the author learned that they no longer support institutionalized care such as orphanages and homeless shelters in fear that it creates a culture of dependency among the beneficiaries and requires a constant inflow of funding. Thus, the goal of Ethiopian communities was to advocate toward community-based service programs of helping the poor and the destitute within their community without displacing them. In light of this, the author conducted a needs-based assessment for community-based service programs within the Nifas-Silk Lafto sub-cities of Addis Ababa. Through evidence-based research and the involvement of potential beneficiaries, the author was able to determine what was needed if a new non-governmental organization was to be established within their community.

During interviews with homeless women, the author learned that the common problem among uneducated, illiterate women was a lack of employment opportunities. Construction and other menial jobs are only temporary, which poses challenges for mothers without child care. The author learned about the necessity of providing vocational training in areas such as garment making, leatherwork, weaving, and urban agriculture. Financial support such as seed-money will enable these women to start small businesses such as making injera (Ethiopian traditional bread), selling coffee and

tea on the street, and sewing/weaving clothing for local and global markets. The author involved the interviewed women in the design and implementation of a new non-profit organization that is culturally informed, grassroots and community-based.

In 2016, the author established Yenegat Chora, an indigenous non-profit organization and non-governmental organization to do humanitarian and community-based development work. The organization is dedicated to alleviating poverty and improving the lives of vulnerable children and destitute mothers in Addis Ababa, Ethiopia. The direct beneficiaries of the program will be 75 women and children over a period of three years, and the indirect beneficiaries will be the surrounding community. The objectives of the organization are delivering care and support for children and equipping impoverished women with skills and seed money to launch their own small-scale businesses to improve their living conditions and to become economically independent.

The newly established non-profit organization believes that working with community-based care and support are vital instruments toward poverty alleviation efforts. Thus, the non-profit organization plans to help poor single mothers enroll in some capacity-building programs, i.e. vocational training, entrepreneurship training and basic educational programs such as learning about saving and credit, micro financing and other capacity building training relevant for the betterment of

the family life. Then they will be provided with startup capital with which to start their own small-scale business (such as baking “Enjera” flatbread for markets, small scale garment service and other localized businesses), with the final goal being, to gain profits to support their own families. Furthermore, children (approx. 45 beneficiaries) will be provided with nutritional services, access to healthcare, medication and sanitation (including personal hygiene) services, educational material, tutoring services and school uniforms. Overall, the organization will provide awareness programs on life skills, HIV/ AIDs, family planning and reproductive health and access to psychosocial and/or counseling services to 30 destitute women and members of the community. The importance of intervention for this target group is evident, considering the appalling living conditions and poverty in which vulnerable children and destitute single mothers live.

SOCIAL BUSINESS MODEL AND SUSTAINABLE DEVELOPMENT GOALS

Entrepreneurship plays a vital role in the global development work by reducing unemployment and poverty and contributing to the economy. The long-term goal for the newly established Yenegat Chora organization is to become sustainable through fighting poverty with entrepreneurial and social business models to improve traditional practices. This will be done by establishing for-profit businesses as a subsidiary to the non-profit organization. Resulting income-generating activities (IGAs) will provide opportunities for poor single mothers to start their own small businesses, expanding into new markets by selling products at the local and global markets.

To illustrate this, a social business model can use the widespread cell phone usage in Ethiopia to explore a new marketplace that connects the destitute single mothers at Yenegat Chora to directly sell to consumers from around the world such as providing consumers with affordable and eco-friendly shoes from recycled tires, luxury handmade leather bags, and weaving rugs and textile. The profits attained can benefit the beneficiaries as well as be reinvested in the NGO and in the enterprise for expenditure and expansion. The goal of for-profit social business is not to maximize financial returns for stakeholders, but to grow the social



Children at Sele Enat orphanage in Addis Ababa, Ethiopia

ventures while simultaneously doing social good. For-profit businesses look for investors who are interested in combining financial and social returns on their investments by valuing social impacts over profits (Muhammad Yunus and Jolis Alan 1999). This approach follows a sustainable method because in the realm of non-profit organization, the endless pressure to raise funds takes away from the time spent doing the organization's work. Additionally, rather than "placing all one's eggs in one basket" through relying on a sole funder or a single government agency, this method diversifies sources of financial stability. This innovation not only helps Yenegat Chora attain sustainable forms of income but it also provides poor single mothers with increased income and opportunities to grow their business and a chance to create positive changes in their lives and communities. Thus, the social business model has the power of disrupting systematic patterns of poverty and gender-based violence in its exclusion of women in the social and economical spheres.

GOAL OF EXPANDING THE NGO WITH LEADERSHIP PRIZE

Poverty and homelessness are complex, multidimensional challenges to overcome. In order to gain a well-rounded understanding of the problems of poverty and homelessness in Ethiopia and particularly Addis Ababa, Ethiopia, extensive research is critical. In the fall of 2015, the author received the Leadership Prize fund of \$10,000 to be used to specifically further study poverty alleviation efforts to decrease the prevalence of homelessness in urban Addis Ababa. To do so, the author plans to reach out to successful entrepreneur-philanthropists in the Addis Ababa area that have used their businesses as a means to empower difficult-to-employ women and determine some of the strategies that they used to attract and retain their employees. One prospect, Mr. Hailu Tessema, founder of Mama Fresh in Addis Ababa, produces and distributes Ethiopian flat-breads around the world and employs 90 percent women including many that previously had no employment and some who suffer from leprosy. Bethlehem Alemu, another employer in the Addis area, has transformed a workshop on her own property into a successful, multi-national, fair trade company that sells footwear called soleRebels and employs marginalized women.

Additionally, extensive reading and research of leaders in the field of social entrepreneurship and social business, including Nobel Peace prize -winner Muhammad Yunus could form a successful working model for the non-profit organization.

Bangladesh's Muhammad Yunus, who established the Grameen Bank in 1983, is a prime example of a leader whose actions and approach will inform the author. Contrary to what was then the norm, Professor Yunus made small loans to poor individuals, especially women, who did not have access to credit, due to having no collateral (house, car, or other tangible asset) against which to borrow. He proved that impoverished, poorly educated women are worth investing in and that they can be successful small business people if given some financial support (even as little as the equivalent of 40 USD) (Muhammad Yunus and Jolis Ala, 1999). The success of Grameen Bank demonstrates that a new approach to banking, microfinance, could help to alleviate poverty and bring development. Dr. Yunus's approach has created growth and improved conditions for the rural poor, including marginalized poor women, in many developing countries. Therefore, the long-term goal for Yenegate Chora is to create job opportunities for destitute mothers residing in Ethiopia through the participation in small micro enterprises such as learning how to sew leather bags, cotton garments, and create bamboo works that can be marketed locally and internationally. Partnering up with other organizations that work with artisans and vulnerable population with the same mission and vision can also strengthen the non-profit organization. The long-term proposed solution will be evidence and researched based. A similar program, A Ban against Neglect (ABAN, <http://www.aban.org>), which operates in Ghana was co-founded in 2008 by three undergraduate students, one Ghanaian, one from Elon, and one from UNC-Chapel Hill. ABAN sells handicrafts online that are created by the women they have trained. ABAN's form of international sales can be one that the Yenegate Chora organization might also be able to achieve within its first five years. Therefore, ABAN and larger companies (such as Mama Fresh and soleRebels) can be models of social entrepreneurship and craft-creating enterprises at Yenegate Chora. Extensive research into these programs will prepare the author to effectively create and execute an

innovative intervention to sustainably improve the lives of poor single mothers in Ethiopia.

LONG TERM PLANS FOR SUSTAINABILITY USING STUDY ABROAD OPPORTUNITIES

The individual stories illustrate the importance of investing in women's economic empowerment, and establishing a direct path towards gender equality and poverty eradication. A future plan for Yenekat Chora could be a cross-cultural collaboration and partnership between the non-profit organization and Elon University students. Elon University currently offers a narrow list of study abroad and internship opportunities for students interested in international practical problem solving experiences. The Human Service Department at Elon, for example, only offers field experiences in Nicaragua and the Public Health Department only offers practicums in Denmark and India. Consequently, Yenekat Chora could provide opportunities to Elon students interested in study abroad or internship opportunities in Africa. The non-profit organization could also serve as an extension to the Winter Term study abroad course. Dr. Mussa Idris, from the Department of Sociology and Anthropology at Elon and a native of Eritrea (a country that was once part of Ethiopia), discussed the possibility of incorporating the NGO into the relatively new WT Ethiopia and Tanzania study abroad course. This collaboration could lead to opportunities that have a direct impact on global issues, in-depth research into a real world problem, and opportunities to interact with locals and to travel to project sites.

Forming a partnership with Elon University would allow Elon students to come to Ethiopia to provide volunteer opportunities and get their practicum, and satisfy language/culture and religious studies requirements through the non-profit organization. This project could also be an investment for Elon as well since the school values study abroad programs; expanding into Africa means new markets and unforeseen opportunities. Yenekat Chora could serve as a cross-cultural exchange with Elon University in which students and faculty are able to learn the multifaceted issues facing Ethiopia. In the long-term it could also become the basis of a three-year Periclean Scholars class project.

CONCLUSION

Despite the appalling conditions in which they are forced to live in, as well as the bleakness of their future, the homeless mothers and children have not completely given up hope. Many women, during their interviews, expressed their real desire for education and a chance to advocate for their own change. What they need is someone to believe in them and to lend a helping hand, one that teaches them how to fish rather than accept fish and provides them with transformative and sustainable tools and resources.

Through the field research, it has become apparent to the author that there are few services and support systems available to the poor, especially ones that primarily focus on the economic freedom of marginalized women. Most of the non-profit organizations that exist in Ethiopia focus on institutionalized care and adoption agencies because they receive more funding and attract more foreign donors. Working with the homeless and near homeless population in Ethiopia is seen as costly, inefficient and a waste of resources and manpower. To overcome this kind of ideology, governmental and non-governmental organizations need to work together to provide comprehensive research, intervention plans and preventive measures to deal with the problem holistically. On a larger scale, the Ethiopian government needs to have strategies in place to help the poorest of the poor, especially the homeless population. Additionally, the government needs to mobilize resources in Ethiopia's middle-class to support the poor. Also, international communities need to give attention to this dire problem and provide their support in a culturally informed manner.

The problem of homelessness has affected the author on a personal level. Seeing the plight of street mothers and children reminded the author of her own history of losing both parents and living in dire poverty and then at an orphanage before having the opportunity to be adopted by an American family. Every day, the author is reminded of the privileges she has received attending a private liberal arts college like Elon University. Thus, she is able to realize that education is the key she can use to solve and raise awareness of problems such as homelessness in developing parts of the world.

AUTHOR'S NOTE

As educated human beings we need to make a difference in the world. We need to leave the world better than we found it, and making a difference starts within communities before trying to make a difference in the world. Our knowledge and skills learned at universities need to be transferred into practical experiences; otherwise we only learn what is in books and not what really works out in the real world. That is why I moved across the world for eight months to learn more about the country I once called home and established a non-profit organization to help the less fortunate in a sustainable manner. Someone paved the road for me to be at an orphanage and to get adopted; now it is my turn to pave the road for someone else. 🙏

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Street market in Addis Ababa, Ethiopia

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THINK LIKE A COMMONER

A SHORT INTRODUCTION TO LIFE OF THE COMMONS

BY COURTNEY BEAVAN

In *Think Like a Commoner*, David Bollier creates a utopia based on reality. Starting off with the general principles of the commons, Bollier goes on to describe how privatization and departmentalization of the world has left humankind yearning for a more commodity-based society. He argues that people are chiefly governed by the market economy around them, constantly looking to gather more stuff to express their wealth, striving to be “rich” in a capitalist-dominated world. Unfortunately, by giving into these foreboding principles, humans have lost touch with the raw connection they share to Earth and each other.

Bollier revives the idea of the commons as an antidote. The commons is defined as a “resource of defined community protocols, values, and norms devised by the community to manage resources” (p. 175). It includes the farmland that feeds nations to digital spaces online. The commons is meant to be shared, not owned. Bollier acknowledges that the community is the driving force behind any form of social change. Through community action, people come together to fight for what they believe in and excite a passion in the community to improve society as a whole. He urges people to think beyond their wallets and surpass their individualistic mindset so that the community can profit. However, he surmises that in order to profit from any sort of change there must first be a community to create and sustain the change. This serves as the driving principle behind the change that our society needs.

Bollier begins by exploring the “enclosures” that have closed off our society from advancement. He cites numerous environmental crises currently facing the world such as the privatization of everything from water to food production. This privatization has coerced many people to equate price with value. In turn, Bollier argues that “property is a kind of social fiction—an agreed upon system for allocating people’s

rights to use a resource and to exclude access to it” (p. 99). Questioning the idea of private property is provocative. What does it mean to own something? How was that ownership created? Why do so many people believe in the value of ownership? Does the commons represent a better option?

Bollier ends with an optimistic tone, stating that anyone can create a commons: a shared space to promote knowledge, community, and activism. He states that the core values of the commons are “participation, cooperation, inclusiveness, fairness, bottom-up innovation, and accountability” (p. 172). These guiding values lead to a different kind of worldview and intellectual framework. By working together in the commons, more people have a voice to address the concerns facing the planet as they are all personally invested.

Overall, Bollier examines how capitalism prevents people from living freely and sustainably. He challenges his readers to think about what it truly means to be a member of the commons. His dream is an open network full of innovation and discovery powered by individuals who serve the collective interest.

Bollier, David. *Think Like a Commoner: A Short Introduction to the Life of the Commons*. Canada: New Society Publishers, 2014. Print.



Courtney Beavan '16 is a Middle Grades Education Major from Lynbrook, New York. She is an Elon Teaching Fellow who is preparing to teach middle school science and mathematics. Her undergraduate research project studies the practices of ecologically minded teachers in North Carolina.

Image courtesy of worldartsme.com



THINK LIKE A COMMONER

A Short Introduction to
the Life of the Commons

DAVID BOLLIER

Image courtesy of thinklikeacommoner.com

EL NIÑO

BY FRANKIE CAMPISANO

When I was a boy, we would huddle
in the bathroom to brave hurricanes.
Surrounded by candles and the only
flashlight in the house, faulty batteries
included, I was never scared. Storm
was just another member of the X-Men.
Hurricanes were the state hockey team.

When I was a boy, I didn't know
how the wind could peel rooftops like scabs,
or how the dark water could sweep
city streets clear. Lightning was nothing
more than skylight spectacle. I had never looked
death in her hurricane eyes, deceptively
calm, patient, but always hungry for another.

When I have a son, I don't know
how I'll explain away the weathered world
left to a generation of refugees, huddled
in bathrooms, never making eye contact.
I could play *The Saints are Coming*, leave
it at that, but there are no more saints
marching. Maybe there never were.

Frankie Campisano '16 is a true force of nature.

Image courtesy of Lyoha123 via Wikimedia Commons

THE NEIGHBOR'S CHAIN-LINK FENCING

BY ALISSA PARK

golden nectar drops
of winter honeysuckle
blossom vanilla

seducing hummingbirds to
rest upon its rusted base



Image courtesy of Vilmos Vinceze via Flickr.com

