2011 NEHA Sabbatical

“From Then to Now, and Here to There: A Glimpse at Contaminated Lands and Environmental Health Issues in the United Kingdom”

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Shipping on the Clyde by John Atkinson Grimshaw, ca. 1881
PREFACE – NEHA Sabbatical “How To” Guide

The NEHA Sabbatical Award is more than just an award. It is an educational opportunity to study environmental health in another culture.

Steps to be Taken

Step 1. Prepare your proposal: Thoughtfully prepare a sabbatical study proposal. Consider your references, and the relevancy of your study.

Step 2. Attend the NEHA AEC: Meet the Sabbatical Liaison (currently Peter Wright), and former award winner(s). Discuss your project and plans. The Sabbatical Liaison will provide you with contacts. The former Award Winner will provide handy tips from their most recent travel.

Step 3. Identify contacts, including the Sabbatical Liaison:

- Who is the Sabbatical Liaison?
- Who are the former award winners?
- Who has the Sabbatical Liaison suggested?
- Who else may be able to assist?

Step 4. Plan your itinerary: Where will you find the best possible experiences related to your proposal? Send this through to the Sabbatical Liaison.

Step 5. Contact and confirm: Contact all the professionals you have identified through the Sabbatical Liaison or on your own and set up appointments. Coordinate with the Sabbatical Liaison first so as not to double book.

Step 6. Prepare for travel: Price out all your travel expenses, plan for business meetings, but also be sure to plan for the weather.

a) Price your travel expenses: Lodging, meals, transportation, fees
b) Plan for business: Plan to wear what would be suitable for a business meeting as well as in the field, depending on your itinerary (i.e. what you would bring to a NEHA AEC)
c) Plan for the weather: Will it be cold, rainy, or blustery? How long will there be daylight?

Step 7. Conduct your travel: Take notes and pictures, bring your paperwork, and Have Fun!!! Remember that when you need to go through customs, it is important to let them know this is an education program, and not employment. You may find yourself delayed at Customs and Immigration. Be sure to have:

- Passport
- Sabbatical Award Letter
- Itinerary
- Note taking necessities (HINT: Start your draft of your report right away)
- Electric plug converters
- Determine if you will have internet access/laptop
Step 8. After return, complete draft report and presentation: Now it is time to prepare the report. Write it all down! Tell us about what you did and why.

Review your proposal, and prepare to report your activities abroad. Consider including:

- Proposal summary
- Travel Summary
- Specific details about activities
- Final Discussion and conclusion

Step 9. Attend the next years’ NEHA AEC: Remember, you have to get yourself to the NEHA AEC to present.

If your department won’t assist, there are ways to do it inexpensively, but you will have to budget for it. You may want to set money aside after your return to prepare. If you can spare the time, bus or train is often cheaper than a flight, and safer than driving.

10. Give your presentation: Share the details of your trip with the rest of us!

Now you are the immediate former Sabbatical Award winner. After your presentation, you can meet the current years’ award winner and share your tips and tricks. And don’t forget to update your résumé!
TABLE OF CONTENTS

EXECUTIVE SUMMARY .............................................................................................................. 5
INTRODUCTION ............................................................................................................................. 7
   Topic of Interest ......................................................................................................................... 7
   Sabbatical Travel .................................................................................................................... 8
SABBATICAL ACTIVITIES .......................................................................................................... 10
   Contaminated Lands, Regeneration, and Revitalization ....................................................... 10
      Brownfields Redevelopment ............................................................................................... 10
      2014 Commonwealth Olympic Games ............................................................................... 10
      Health Disparities and Regeneration ................................................................................. 13
      Rural Contaminated Lands Legacy .................................................................................... 15
      Blackburn Borough Waste Management Woes ................................................................. 17
      Landfill Prevention is worth Two Times the Cure: Lancashire’s Recycling Centers ........... 19
   Home Health and Safety Rating System (HHSRS) ............................................................... 21
      Council Housing HHSRS Inspection .................................................................................. 21
   Legislation and Environmental Law for Contaminated Lands and Housing ....................... 23
      Chartered Institute for Environmental Health ................................................................... 23
      Contaminated Lands Legislation ....................................................................................... 23
      Houses of Parliament ........................................................................................................ 24
      London’s Olympic Games Redevelopment Plans ............................................................ 25
   Environmental Health Legislation in Scotland ....................................................................... 29
      Royal Environmental Health Institute of Scotland ............................................................. 29
SABBATICAL PROJECT ............................................................................................................... 32
   Discussion .............................................................................................................................. 32
      Physical Factors .................................................................................................................. 32
      Socio-Cultural Factors ....................................................................................................... 33
      Environmental Justice ....................................................................................................... 34
   Conclusions ............................................................................................................................ 35
      Lessons Learned and Implications for U.S. Environmental Health Specialists ................. 35
EXECUTIVE SUMMARY

I was selected as the National Environmental Health Association (NEHA) Sabbatical Exchange Award recipient for 2011. The NEHA Sabbatical Exchange is a prestigious two to four week professional development opportunity to observe international environmental health practices, policies, and methods, and to share American expertise with professionals in Canada or Britain. Each year, one Environmental Health professional is selected from a nationwide pool of applicants. NEHA provides funding to cover travel. I chose to conduct my sabbatical for three weeks in Britain to study landfills and brownfields in a high precipitation, high groundwater table, island environment.

In Georgia, as in many areas of the United States, many environmental health issues arise as populations expand and contract (or vacate). Public Health is impacted by these population shifts as land use changes, and the potential for exposure to environmental contamination is evaluated. In Georgia, the state Environmental Protection Division (GEPD) reports that the number of closed, unlined, leaking municipal waste landfills with known groundwater contamination increased from 42 in 1995, to 126 in 2009. Also, the amount of waste being disposed of in lined, regulated landfills has increased from 45% (1994) to 98% (2002), and in coastal Georgia and other regions where hydrogeology is complex, land use is heavily regulated and waste is commonly shipped inland, with limited locations available for landfills.

Similarly, the GEPD Brownfields Program reports that land acreage enrolled in the program has increased since 2002 from 17 acres to 564 acres, and that contaminated land which has been cleaned up increased from 7 acres to 196 acres. As populations expand from cities into suburbs, water quality is at risk when the numbers of new septic systems increase additional pavement and road construction changes the natural surface water patterns, and additional sewage and solid waste is created.

As populations contract and move back into cities, the number of people living near brownfields increases, and there is a potential for residents to be exposed to chemicals in soil, groundwater, and indoor air.

What expected challenges await us as old landfills leak or brownfields are not remediated, and what preventative measures can help assure the protection of human health from environmental contamination or vector born disease? Promoting health and quality of life in relation to the environment become a primary concern.

By studying well established communities in highly populated regions tempered by ocean currents and constant precipitation, much can be learned about the changes in environmental dynamics landfill or brownfield, health risks, and community involvement. By investigating the culture and actions of British communities, land (re)use engineering and technology, and health outcome information, we can gain insight to better address similar issues in America.
Environmental Factors

Several environmental factors can maximize or minimize exposure to environmental contamination. Factors such as soils, climate and temperature, remediation techniques, and passive attenuation can all affect how chemicals migrate in the soil, water, and air. Given a high-precipitation island environment, what are the differences between American and British approaches to protecting Public Health?

Socio-cultural Factors and Community Involvement

Both Britain and America struggle with increased waste production from an increase in consumption, and an increase of environmentally persistent chemicals and bioaccumulation. As population size, consumption, and waste production continues to increase, both countries must consider dumping of the “majority” into the backyards of the “minority”. Environmental health professionals are responsible for enforcing protective measures, investigating human health hazards, and conducting community education; therefore, addressing community concerns and involvement will be core functions of the environmental health profession.

Messages to Other Environmental Health Professionals

Through this sabbatical, I will provide information about historic and current landfill design and brownfields management, lessons learned, remediation technology applied to prevent negative health impacts, and successful community involvement strategies implemented for land re-use. This experience can help environmental health professionals in Georgia to better address community concerns and protect public health.
INTRODUCTION

As program consultant for the Environmental Health Branch at the Georgia Department of Public Health, I was selected for the by the National Environmental Health Association (NEHA) Sabbatical Exchange Award recipient for 2011. I chose to conduct sabbatical in the United Kingdom of Great Britain and Northern Ireland (a.k.a. United Kingdom, or Great Britain, or Britain), known for large amounts of precipitation; plentiful rivers, lakes, and streams; and where groundwater is shallow and geographical land space is limited. There I spent three weeks in October and November exploring public health issues of contaminated lands in Scotland and England.

Topic of Interest

I sought to learn how the United Kingdom approached population density changes and contaminated land. In Georgia and the United States, many environmental health issues arise as populations expand and contract (or vacate). Historically, Environmental Health began with quarantine, increased worldwide trade between ports, and sanitation in cities (remember “garde l’eaux”?). We have come a long way since the days of shouting out the window “gard-ay loo” at passersby to warn them of water to come from full chamber pots. Public Health has always been impacted as populations contract into cities, or expand from cities into suburbs.

For example, familiar environmental health issues with suburban expansion include the numbers of new septic systems increase putting water quality is at risk, additional sewage and solid waste created and disposed of in landfills, or additional pavement and road construction changing the natural surface water patterns. Similarly, as populations contract and move back into cities, the number of people living near industrial sites or brownfields increases, and there is a potential for residents to be exposed to chemical pollution in soil, water, or indoor air.

The Atlanta Metro area of Georgia saw rapid population growth from 1995 to 2005 increasing the need for environmental health land use expertise. Sprawling suburban populations increasingly find themselves living adjacent to landfills, and residents often express concern about chemical pollution where they live. The Georgia Environmental Protection Division (GEPD) reports that the number of closed, unlined, leaking municipal waste landfills with known groundwater contamination increased from 42 in 1995, to 126 in 2009. Also, the amount of waste being disposed of in lined, regulated landfills has increased from 45% (1994) to 98% (2002), and in coastal Georgia and other regions where hydrogeology is complex, land use is heavily regulated and waste is commonly shipped inland, with limited locations available for landfills. Since that time the Georgia Department of Public Health, Environmental Health Branch, Chemical Hazards Program provided many health assessments and health education projects for residents living near landfill sites throughout Georgia.

Residents are now looking for walkable communities in locations that provide quick, easy, and pollution reduced access to needed goods and services. Real estate trends in 2010 show more couples and families moving back in-town from the burbs. Moving back in-town often means living near brownfields sites. For example, in Georgia, the GEPD Brownfields Program reports that land acreage enrolled in the program has increased since its implementation from 17 acres to 564 acres. However, this has enabled the removal of chemical hazards and the improvement of land quality from 7 acres cleaned up to 196 acres. As residents become more environmentally aware and information becomes more easily available, health questions about these and other industrial sites become more frequent.
What expected challenges await us as old landfills leak or brownfields are not remediated, and what preventative measures can help assure the protection of human health from environmental contamination or vector born disease? Promoting health and quality of life in relation to the environment become a primary concern, and Britain was an excellent place to study the history, successes, and lessons learned in a densely populated island environment.

**Sabbatical Travel**

For my introduction to the British approaches to contaminated lands and environmental health practice, I was especially pleased to explore the industrial hubs of Glasgow and London, to learn from the legislative sessions in Edinburgh and London, and to discuss common practices in Lancashire (near Manchester).

Upon arrival, I received a warm welcome in Glasgow, Scotland. I shadowed the Glasgow Council Environmental Health Officers for the week as they reviewed an inner-city residential site to be redeveloped as the Athlete’s Village for the Commonwealth Games in 2014. Scotland is well known for its inventors and innovators, including John McAdam (famous for Tarmac- or asphalt as it is known in the USA), James Watt (himself Glaswegian known for the steam engine), and Alexander Fleming, (known for the discovery of penicillin). Glasgow is the third largest city in the United Kingdom, and is the historically industrial hub for Scotland known as the “Britain’s second city.” The 2014 Commonwealth Games Athlete’s Village site is located in a formally industrial, blighted area of Glasgow along the River Clyde. The Athlete’s Village site is sandwiched between dilapidated public housing complexes, an electrical substation, and a local landfill site, and is home to James Watt’s first ever steam powered water works.

The site for the 2014 Commonwealth Games Athlete’s Village has known contamination in soil, surface water and groundwater, which made adjacent public housing residents vulnerable to known contamination. Prior to redevelopment, the Glasgow City Council used this opportunity to upgrade the affordable housing available to current low-income residents. After the games, the rebuilt public housing units will be compliant with Healthy Housing regulations, and the Commonwealth Games site will become cleaned-up recreation space. Although surface water and groundwater cannot be treated, the removal of contaminated source soil from the surface and infill of clean soils is expected to alleviate exposure, eliminate further chemical contamination of groundwater, and reduce contamination of surface water. Considering the Commonwealth Games as a model, the Glasgow City Council is conducting a review of potentially contaminated property (based on industrial history) to try to clean up and correct contamination hazards throughout the city.

From Glasgow, I traveled to Lancashire, a rural county in northwest England. There I met with Environmental Health lands and waste regulation professionals from Blackburn and Preston. In Blackburn, the cotton and textiles industrial history has left a contamination imprint in the soils and groundwater from both industrial and residential sources.

Since the 1700s, the textile mills of Blackburn attracted laborers, and coal-derived fuels were used to heat the mills, businesses, and homes, leaving a blanket of polycyclic aeroematic hydrocarbons (PAHs) in surface soil throughout the city, especially Benzo-a-pyrene (BAP). Chemical and gasworks plants refined coal into other useable fuels, such as coke and coal gas, to provide energy to the city in the late 1700s. These plants still pockmark the landscape leaving residual contamination sludge deep in
the soil and groundwater. Over time, industrial operations became cleaner and these energy plants closed down, however by the end of the 20th century, the textile industry was no longer the primary industry. Now the Borough of Blackburn with Darwen is assessing the extent of contamination, and determining how to best protect residents. For the 21st century, Blackburn is reinventing itself as a modern, successful, multi-cultural community through regeneration, re-use, and economic diversification. For more information, see www.cottontown.org

In the Borough of Pendle, I observed the local Housing Council conducting inspections using the Healthy Home and Safety Rating System (HHSRS), and learned how the HHSRS is interpreted and applied. A complex system of hazard assessment calculating likelihood or risk of harm, the HHSRS governs housing safety, establishes landlord liability, and ensures landlord responsibility for healthy and safe housing.

In Preston, I was privileged to learn about an innovative new facility which reduces municipal solid waste in landfills, and where recyclable materials are reclaimed and distributed for re-use. This facility uses alternative energy from a combination of its own biogas from its compost operations, solar panels, and on-site wind turbines. All waste is sorted to remove all known recyclable materials that residents did not pre-sort themselves (glass, aluminum, plastic, electronics, yard waste, etc.), separated by size, separated by organic food waste or non-organic rubbish waste, and finally composted. Biogases produced through the composting processes are recycled back into the electricity grid, offsetting the energy the plant uses.

From Lancashire, I traveled to London, the largest city in the United Kingdom with history dating back thousands of years and with Roman contribution from 43 A.D. Borne of politics and industrial legacy, London claims internationally famous public health landmarks; for example, the landmark of the John Snow water pump in which Dr. Snow removed the handle to prevent further mortality from cholera. Once there, I was introduced to staff from the Chartered Institute of Environmental Health, visited the Houses of Parliament, met with the UK Member of Parliament over housing issues, met with the Joint Local Authorities Regulatory Services about redevelopment for the upcoming 2012 Olympic Games, and toured the Olympic Games’ site.

For my first stop, I met many of the friendly and hard-working professionals at the Chartered Institute of Environmental Health (CIEH). The CIEH is a non-profit organization that sets standards, accredits courses and qualifications for the education of members and other environmental health practitioners. It provides information, evidence, and policy advice to all levels of government, and to environmental and public health practitioners in the public and private sectors. I had the distinct privilege of meeting with Howard Price, standing in for David Kidney who is the head of Policy at CIEH, to discuss contaminated lands issues. CIEH published several guidance books on contaminated lands regeneration and safe development of housing on contaminated lands.

My second stop was the Houses of Parliament. I was truly taken by the Palace of Westminster and the statues of 14th century Kings who watched all that occurred. During my visit, I met with Jake Berry, MP, Member for Rossendale and Darwen in the Parliament House of Commons for housing issues, and discussed housing safety and lead poisoning in America.

My third stop was a visit to the Joint Local Authorities Regulatory Services in Stratford to discuss the challenges and successes of contaminated lands redevelopment for the 2012 Olympics.
There I met with Steve Miller and Steward Monk, the contaminated lands planning professionals regulating the regeneration of the neighborhood in Stratford in Newham Borough of London for the 2012 Olympics. First we discussed the complications of removing contamination hazards in soil, and in surface water and groundwater. The site for the 2012 Olympics in London was originally agrarian, but developed a longstanding industrial history since before 1860 with railroad, chemical industries, and manufacturing.

Finally, as a bonus and to complete a well balanced experience, I visited the Royal Environmental Health Institute of Scotland (REHIS), met with a Member of Scottish Parliament who oversees Urban Regeneration, and observed a parliamentary session.

My visit with REHIS was interesting. The REHIS organization was very similar to our state Environmental Health Association in scope and purpose, however my meeting and observation of the Scottish Parliament was a real treat! In contrast to the parliamentary building in London, the Scottish Parliament building as well as Parliament itself is new. The building itself is designed to resemble a large ship, but its contemporary architecture reflects sustainable features, and in my opinion, a splash of Charles Rennie McIntosh.

SABBATICAL ACTIVITIES

Contaminated Lands, Regeneration, and Revitalization

Brownfields Redevelopment

To study various aspects of brownfields redevelopment in the U.K., I visited three locations and observed at least as many projects, specifically:

- Commonwealth Olympic Games Site, Glasgow, Scotland
- Equally Well Project Site, Glasgow, Scotland
- Former Gasworks Facility, Blackburn, England
- 2012 Olympics Site, London, England

2014 Commonwealth Olympic Games
Glasgow, Scotland

As previously mentioned, I shadowed Glasgow City Council regulators and their geology contractors for their latest redevelopment for the 2014 Commonwealth Olympic Games (Commonwealth Games). The site is a historically industrial, low-income neighborhood with primarily rented public housing. In the 1800s through the mid-1900s, the area was home to municipal utilities: a chemical works, waterworks, and gasworks. During site remediation, a significant archeological find was uncovered: the first ever steam-powered waterworks designed by James Watt, who refined the design of the steam engine. This historically significant find delayed the remediation and development progress, but was carefully studied, recorded, and catalogued for the future.
Figure 1. James Watt’s Glasgow City Steam-powered Waterworks
Figure 2: Athlete’s Village Site Post-remediation

Figure 3: GCC’s Environmental Contractors Meet to Discuss Installing Infrastructure and Proper Asbestos Removal
The Commonwealth Olympic Games are providing the opportunity and necessary stimulus to rebuild the neighborhood. Once all facilities are built, there will be a new swimming center, track and field, cycling arena, updated soccer stadium, and housing units for each athlete. After the games are over, the competition facilities will become recreation facilities for the local population, and housing will become a mix of private, social, and affordable housing options. Although the new developments are to provide competition facilities and housing for the Commonwealth Games, the lasting legacy will be to increase recreation and improve living conditions for the community.

I also had the chance to learn about Health Protection Scotland (HPS) under the U.K. National Health Service (NHS), the Environmental Health services they provide, and the structure of environmental health in Scotland. Much like our state Department of Public Health, HPS provide epidemiological surveillance, surveillance of environmental health activities, and technical assistance to the health districts throughout Scotland. HPS environmental health professionals conduct health education, professional training, and upstream reports or recommendations for needed legislation changes. HPS also provide risk communication for all health concerns and conditions to equip Scottish residents with information they need to improve quality of life, and to make informed decisions so as to live with optimum health.

**Health Disparities and Regeneration**

Another fascinating project at the Glasgow City Council (GCC) was a health disparities and built environment Health Impact Assessment (HIA) project called “Equally Well Glasgow.” This study looked at housing and neighborhood design quality partnering social work and planning professionals to assess the impacts of housing density, quality, and neighborhood amenities on the public health of a low-income community with low health status (high prevalence of chronic diseases such as heart
disease respiratory conditions, and high mortality rates at younger than expected ages). Guided by Dr. Etive Curry, GCC planners, social workers, and community liaisons worked together to identify planning and design problems, and to determine the community’s needs. Dr. Curry used the PhotoVoice tool to engage community members and allow them to more easily provide feedback about built environment concerns in their neighborhood that impact their health and daily lives. During the HIA and neighborhood needs assessment process, Dr. Curry identified mental and social health as a primary concern among residents that is integrated with the built environment and housing. Below is a diagram that residents developed during Equally Well public meetings identifying social and physical health concerns in their communities.

Figure 6: GCC Housing HIA

One example of a built environment problem that a resident submitted through the PhotoVoice exercise, known locally as Govanhill Community Scrapbook, was of a recently renovated park. The park was a project of the Glasgow City Council which replaced all gates, fencing, and play equipment. The photo was a picture of the only entrance gate just after a typical Glasgow rain. The photo and the photo’s description presented that the park entrance became a barrier to the park for residents with the renovation. The renovation included replacing the fence and gate, and re-grading and pouring new cement at the entrance which collected water after the frequent rains in Glasgow. (The term frequent referring to climate statistics over hundreds of years that have averaged 47 inches per year, and from 160 to 265 days of rain per year). The entrance gate was often submerged in a large puddle which made crossing with a baby in a stroller almost impossible, and became a barrier to options for physical activity. This and other photo examples shared important feedback about GCC’s planning efforts.

Professionals and residents alike began to understand the connection between the built environment, planning and design, and public health. Through the HIA and PhotoVoice project, the Glasgow planning professionals came to understand the disconnected nature of the planning process from the neighborhood function and practical use. Specifically, the “it was a great idea on paper” problem. Glasgow planning began to understand the resident’s needs, and was inspired to design with health in mind. Dr. Curry identified social, mental, and physical health problems that were related to built environment issues, and engaged residents throughout the process. By engaging them, Dr. Curry was able to help residents realize and understand the connection between their built environment and health, and was able to illicit their feedback in a meaningful way. More information about Equally Well can be found at: http://equallywell.ning.com
Rural Contaminated Lands Legacy

Blackburn, Lancashire, England

Contaminated Lands in Blackburn were less about industries polluting, but rather the pollution from industrialization process and previous fuels used in factories and in homes. A rural city, Blackburn’s legacy was its cotton mills and textiles industry. In the 1700s and 1800s, cotton from the colonies (specifically Georgia) was shipped from Savannah back to Manchester, England. Later, other raw textile materials from Pakistan, China, and India were shipped in as well. The raw material was refined and woven into textiles in north England cities such as Manchester and Blackburn. As a result, a thick coating of benzo-a-pyrene has left an imprint in the soils of the city and in the Borough of Blackburn with Darwen. More information is available at www.cottontown.org.

Figure 7. The Borough of Blackburn with Darwen

Blackburn also hosts a legacy of industrial contamination from defunct chemical plants and gasworks facilities. Coal tar and coke sludge still contaminate groundwater and prevent redevelopment and watershed restoration projects (see Figures 8-12).

Figure 8. A Former Gasworks Plant Uphill in Blackburn
Figure 9. Stream between the Old Gasworks Plant, and a Currently Operating Facility

Figure 10. (left) Resurfaced Sludge from Coal Tar and Coke at the Old Gasworks Plant, and (right) Soil Sample Cores

Figure 11. Soil Sample Cores with Clear Signs of Contamination from the Gasworks Plant
Blackburn Borough Waste Management Woes

In addition to the industrial pollution footprint, the borough’s countryside also suffered from illegal dumping activity. The waste management company hired to properly dispose of the waste piles pictured here did not utilize proper registration, engineering technology, or permitting protocol. This waste management handler dumped the piles in the countryside in a spot that would be difficult for regulators to detect from the road. The waste management company did not use proper engineering to carefully prepare a legal landfill, but instead dug holes or pits into the ground, dumped the waste, and covered the piles with the remaining excavated soil. Pictured below are the piles, and the spring and stream at the surface that they surround. This property is located within 50 feet of a family run farm.

Figure 12. Improper Waste Management in the Borough Countryside; (left) Waste Piles and (right) Proximity of Piles to Natural Spring

However, even carefully planned, engineered, and properly permitted landfills can pose problems in the long-run. A current issue that many municipalities face is what to do about landfill gases in the ground (such as methane, carbon dioxide, nitrogen, and hydrogen sulfide) migrating off-site from the landfill, and occasionally into neighborhoods. Pictured below (Figure 13-14) is a properly regulated landfill site that at the time of my visit had been closed for many years. The local neighborhood adjacent to the landfill have coordinated a Community Advisory Committee for the landfill, and despite its being a landfill, prefer to keep it intact for the green space. While the borough’s Contaminated Lands Section is trying to determine how to resolve the potential for fire or explosion (ideally by releasing the gas), the community want to leave the area relatively untouched for aesthetic and visual appeal.
After visiting contaminated lands and problematic waste management sites in Blackburn, Lancashire, I was fortunate to tour one of Lancashire’s most innovative and sustainable waste management solutions for that area of Northwest England: The Farington Waste Recovery Park and Environmental Education Centre. Here I was given a brief “Waste as Resource” educational tour of the facility, and learned much about old and new technologies assisting with recovering reusable materials from household waste, and breaking down all leftover waste into compost. Since its completion, the Waste Recovery Park has generated 210 jobs, and diverts 45% (305,000 British Tonnes) of Lancashire’s waste from landfills, of which nearly one third is reclaimed as renewable material (glass, plastics, metals, etc).

In addition, the facility uses its own energy created onsite by various technologies including solar panels, wind turbines, and biogas/methane recovery from the waste treatment process, resulting in zero greenhouse gas emissions. It creates 12,700 mega-Watt hours (or 1000 times the kilo-Watt hour) of energy annually. To give this better context, one lightbulb uses 60-100 Watts per hour, and an average U.S. household uses about 10,000 kilowatt-hours (kWh) of electricity each year. The Farington Facility generates enough power annually to provide energy to 127 million U.S. homes annually. The Farington Facility, however, undoubtedly uses the majority of the energy it creates. More information can be found at:

- www3.lancashire.gov.uk/corporate/atoz/a_to_z/service.asp?u_id=658&tab=1
- www.globalrenewables.co.uk/content/townInfo.asp?pgID=1&townID=1&countyID=1
- www.mnpower.com/about_electricity/index.htm

The facility’s Environmental Education Centre provides education programs for children, and offers tours for teachers, school administrators, elected officials, and others among the general public interested in this unique waste treatment facility, however there was even more to be discovered.
Landfill Prevention is worth Two Times the Cure: Lancashire’s Recycling Centers
Preston, Lancashire, England

Benjamin Franklin once said, “An ounce of prevention is worth a pound of cure.” In reflecting on this, reclaiming materials to divert waste from being landfilled is a progressive treatment (the cure), but Lancashire also handles household waste by broadening residential recycling centers, not only geographically, but also with regard to type of waste (prevention). Figures 15-19 show the various types of household waste collected and recycled, and diverted from the treatment facilities.

Figure 15. Lancashire County Council’s Motto, “Helping You Recycle”

The full list of types of household waste that can be recycled at the 15 recycling centers includes:

- Asbestos
- Books
- Cans
- Cardboard
- Electronic Equipment
- Fluorescent Tubes
- Fridges/Freezers
- Gas Bottles
- Glass Bottles and Jars
- Green Garden Waste
- Hard plastics
- Household and Car Batteries
- Household Chemicals
- Newspapers, Magazines and Paper
- Paint
- Plastic Bags
- Plastic Bottles
- Plaster and Plasterboard
- Printer Cartridges
- Rubble and Hardcore
- Scrap Metal
- Textiles, Clothes and Shoes
- TV's and Monitors
- Tires

Growing up eco-conscious in Madison, Wisconsin, graduating with a bachelor’s degree in conservation, and now living in Georgia where recycling is not always an option, I was impressed by my visit to one of these recycling centers. I was (and still am) in awe of their established and replicated system across the county. There is a lesson in this to Americans.
Figure 16. Common Materials Recycled: Paper, Aluminum Cans, Glass, Plastic Bottles, Plastic Carrier Bags

Figure 17. Additional Materials Recycled: Metals, Large and Small Appliances, and Tires

Figure 18. Unusual Recyclables: Used Cooking and Engine Oils, Florescent Bulbs, Batteries, and Asbestos
Figure 19. Last Month’s Stats, but Still Recyclable Materials Found at Farington

Although Farington Waste Recovery Park prevented 45% of household waste it collected from going to landfills, Lancashire residents” efforts prevented a whopping 77% of household waste from getting to the facility in the first place (Figure 19)! Despite residents” efforts, however, more education is still needed by the Farington Recovery Park Environmental Education Centre.

Home Health and Safety Rating System (HHSRS)

Council Housing HHSRS Inspection

Pendle Hill, Lancashire, England

In Scotland and England, all housing must meet basic standards to be considered “fit” or “unfit” to live in. In England, the housing standards go a bit further to determine the level of fitness. Britain uses an inspection regime to ensure housing fitness called the Home Health and Safety Rating System (HHSRS). This system combines scientific methodology and inspector observation to determine the likelihood and level of potential risk to health from a home. The inspection tools used were developed from hospital, public health, and other scientific data as standards to make comparisons against. In Pendle Hill, I observed Housing Environmental Health Officers using the HHSRS while shadowing housing inspections, and met with the director to discuss details about the HHSRS calculation and process.

Figure 20. Finding Moisture Hazards around a Council Owned Home
Figure 21. Can you Spot All the Hazards?

Figure 22. Trip Hazards on Stairs of Turn of the Centuries Housing (> 20 cm)
Legislation and Environmental Law for Contaminated Lands and Housing

Chartered Institute for Environmental Health

London, England

Once in London, I was pleased to meet all staff at the Chartered Institute for Environmental Health, tour the Houses of Parliament, and visit the 2012 Olympics brownfield site. While at the CIEH, I met with Howard Price to discuss contaminated lands legislation, and the role of the CIEH and of Environmental Health Officers in Britain. The CIEH is a non-profit professional organization founded in 1841 that is dedicated to the advancement of Environmental Health Practice throughout Britain and the Commonwealth, and internationally throughout the world. Specifically, much like our own National Environmental Health Association (NEHA) the CIEH:

“provides information, evidence, and policy advice to local and national government, and to environmental and public health practitioners in both the public and private sectors. As an awarding body, the CIEH provides qualifications, events, and support materials on topics relevant to health, wellbeing and safety to develop workplace skills and best practice.”

With regard to contaminated lands and urban regeneration, the CIEH offers professional development and publications for public health and medical professionals to assist in responding to resident’s concerns about contaminated lands, redevelopment, and exposure to chemicals. The CIEH offers guidance for risk communication, and assists to inform legislation about public health aspects and needs from contaminated lands.

With regard to British legislation, contaminated lands are approached much the same as in America, although America’s current legislation is dated from the 1970s and 1980s, (except for the Brownfield Act of 2002) whereas Britain’s current environmental policies are dated from the 1990s. Britain’s approach is very similar to that of the United States in that in determining remediation or re-use of contaminated lands, Britain uses a risk based approach and conducts exposure assessments to provide risk communication to concerned residents about the contaminated site. During my discussion, I learned many things about legislation relevant to redeveloping contaminated lands.

Contaminated Lands Legislation

Several environmental laws are applied when permits are being considered for contaminated lands re-use. I am not entirely familiar with the operating facilities legislation, however with brownfields sites the approach is much the same. In Britain, the Environmental Protection Act (1990), specifically Part 2A, is the primary policy requiring characterization and assessment of contaminated lands (such as brownfields) prior to approval of redevelopment plans and reuse of a site.

In England, United Kingdom Department for Environment, Food, and Rural Affairs (DEFRA) develops the contaminated lands and public health legislation, and in Scotland, it is the Scottish Environmental Protection Agency (SEPA). Environmental Health Officers regulate contaminated lands unless the site is deemed a special circumstance requiring expertise and regulatory assistance from the English Environment Agency, or Scottish EPA. Environmental Health Officers (EHOs) are the
equivalent to U.S. state Environmental Health Specialists who are also qualified as environmental protection professionals. Although typically employed with the local authority, some EHOs may work for the national government of England, Scotland, Wales, or Northern Ireland.

While I did not explore in depth how things work legislatively in Wales, the concept is similar to Scotland in which the regulations are slightly modified by the national government to better reflect the local environment and laws. (The comparison is difficult to make between the U.K. nations and the U.S. states. As an American, it makes perfect sense to me that U.K. is the nation, and the individual countries are more like states, but then the British do not view it that way. The U.K. is made up of four nations, united by a single legislative body for all in London. The U.K. is a “nation of nations”.)

The British Environmental Protection Act (1990) Part 2A refers to permitting requirements for the reuse and redevelopment of contaminated lands, and defines “contaminated lands” as lands that may do significant harm, or that may have the “significant possibility of significant harm”, known locally as SPOSH. SPOSH is the basis for which lands are deemed contaminated enough to fall under British environmental protection regulation. Primarily the SPOSH definition is used in England, however Scottish and Welsh legislation is only slightly different, and is based on the same principle. SPOSH is identified through risk assessment and exposure models to determine the “significance” and “possibility” of significant harm.

The entire process is much like U.S. state environment department risk assessment combined with a public health assessment from Agency for Toxic Substance and Disease Registry. If the state environment departments were to communicate and collaborate regularly with public health officials in the U.S., that would be a rough equivalent. Again in Scotland, procedural concepts are much the same, but priorities and application varies slightly. Scotland, similar to the U.S., places priority on highly contaminated problem sites (like the U.S. Environmental Protection Agency’s Comprehensive Environmental Response, Compensation, and Liability Act, or “Superfund”) but without the funding; and like the U.S. Brownfields Programs, Scotland’s local authorities approach their brownfields with similar rationale, i.e. removing the contamination source with resolve future exposure issues, therefore remediation of contaminated groundwater is often not necessary unless there is special circumstance that requires it.

Houses of Parliament

I had an excellent visit to Westminster Palace, a.k.a. the U.K. Houses of Parliament, where I toured Westminster Hall, the House of Lords, and the House of Commons. Westminster Hall is the oldest part of the Houses of Parliament dating back to the 11th century Middle Ages when it was the Royal Palace of Westminster, and where Kings carried out their idea of law and justice; consequently, it is also the place where Scotland’s William Wallace (think “Braveheart”) was decapitated and quartered. The physical House of Lords and House of Commons were not added until the 1800s, however both house assemblies took place in the Royal Palace of Westminster from the 13th century. I admit I was most impressed, and moved, by the statues of Kings dating back to the 14th century watching over Westminster Hall. Unlike the Middle Ages, however, the Houses of Parliament today are no longer ruled by the Monarchy. Although still the place of legislative session like our U.S. Congress in Washington D.C., the Royal Family are no longer permitted inside while Parliament is in session and laws are being proposed, debated, and passed.
During the tour, I stood at Lord Sugar’s seat in the House of Lords (Lord Sugar is the British equivalent of Donald Trump, and has a similar television show.) After the tour, I was privileged to meet with Jake Berry, Member of Parliament for Rossendale and Parliamentary Secretary to the Housing Minister, and shared insights from America about childhood lead poisoning from housing. In the U.K., lead in paint was banned in 1992 and childhood exposure to lead-based paint is still a housing health issue. I then had the great privilege to observe the House of Commons in session. Seeing how it reflected a similarity to our legislative process was absolutely fascinating! The components, however, are vastly different.

The House of Commons is first part of the British legislative process, and housed at the Houses of Parliament. It is a democratically elected body like the U.S. Congress, and is comprised of Members of Parliament (U.S. Representatives), and develops/revises, and passes the bills (similar to our House of Representatives). So far, the similarities to our own legislative process are remarkable.

The House of Lords is parallel to the Senate, however this is where similarities to U.S. legislative systems ends. The House of Lords is made up of the two branches, the Lords Spiritual appointed from the Church of England, and the Lords Temporal, appointed by the Queen as advised by the Prime Minister. Lords are appointed, not elected by the people, and are still considered nobility. The Lords’ specific function is to review the proposed bills passed by the House of Commons (like our Senate). Once laws for contaminated lands are passed, such as the Environmental Protection Act (1990), it is the responsibility of the Department of Environment, Food, and Rural Affairs and the Scottish Environmental Protection Agency in England and Scotland to ensure its implementation by the Environmental Health Officers in Britain. Although the Scottish Parliament may modify or enact additional laws, all laws passed by the Houses of Parliament in London are adopted for the whole U.K.

In all, it was an entirely fascinating visit to the CIEH and Houses of Parliament to review legislative aspects of contaminated lands and housing development. I can now understand why some parts of legislation take the time that they do. More information about the Houses of Parliament is available at [www.parliament.uk](http://www.parliament.uk).

**London’s Olympic Games Redevelopment Plans**

My last visits in London were to meet with the team of the Joint Local Authority Regulatory Services (JLARS) to discuss challenges and plans for the 2012 Olympic Games’ site. JLARS is “a body formed by the Olympic Park Host Boroughs (Hackney, Newham, Tower Hamlets and Waltham Forest Councils) and the Olympic Delivery Authority to co-ordinate and standardise local authority regulatory service delivery.” It was the redevelopment solution needed to cross boundaries, and to unite or work with the borough and neighborhood governments of this greater London area. It was also
the local authority that oversaw remediation and redevelopment activities on the Olympics site, and employed the lead Environmental Health Officers who regulated these activities.

**Figure 24. Countdown to the Olympic Games, Trafalgar Square**

The 2012 Olympic Games site is a large swatch of formerly industrial and residential land that covers 500 acres, and crosses four local authorities’ jurisdictions. It encompasses a buffer around the Lea River and marshy wetlands, and former heavy industry had contaminated the soil, groundwater, and surface water all throughout the site. On-site contamination created a very large-scale, complicated project for the Olympic Delivery Authority (ODA) to follow through with that required public-private partnership to complete. JLARS and the Olympic site are located in east London near a neighborhood known as Stratford. British and European Union regulations required remediation to residential level of the Olympic site, and the ODA required that all activity for the site be sustainable. Therefore, all buildings, remediation activity, and redevelopment must be completed using sustainable materials, renewable energies, and energy reducing design tricks. One of the greatest hurdles can often be gaining access to or ownership of abandoned land.

The ODA have made several commitments to sustainability and community throughout the redevelopment process. The initial 500 acres was blighted land from heavy industry used for chemical works, watch and time piece manufacturers (with radioactive paint to assist with visibility at night), animal rendering, railway, chemical storage, and a landfill. Solvents and metals contamination including lead and arsenic were detected in onsite soil up to 120 feet below ground surface at bedrock, and vinyl chloride was detected in groundwater.

Soil up to 10 feet deep across the entire area, approximately 1.5 million cubic meters of soil, was excavated, decontaminated on site, and reused for grading and landscaping. The areas of greatest contamination were around the Aquatics Centre, and the Broxburn Whitewater Canoe Centre in the Wetlands Walk area.

Three on-site “soil cleaning” machines wash, sieve, and shake pollutants out of the excavated soil to remove petroleum, oil, tar, and heavy metals from about 200 British tones, equivalent to 220.5 U.S. tons or 440,000 lbs, in an hour. Cleaned soil from one end of the park is then moved to another part to prepare it for building structures and accessibility; 96% of soil was reused onsite and only 4% required proper disposal. In addition, a 38.5 ton sorting machine was temporarily installed to help sort or remove 70,000 cubic meters of industrial and household waste from a century old on-site landfill located beneath the Velodrome Cycling Centre. Over 550 tons of waste was sorted every day and material was reclaimed. Reclaimed material was either re-used on site, or recycled; a total of 90% of materials from demolition were reused on site.
Groundwater on site was also contaminated with solvents including vinyl chloride. It posed its own set of complications with a high groundwater table (at river level), and tidal effects to contend with. Contamination was extensive enough to require pump and treat remediation in addition to soil source remediation. Groundwater remediation has been ongoing since 2008, and will continue for the next 30 years. The cost for clean-up of both soil and groundwater was estimated at £12.7 million in 2010, (about $20 million), and not all of the contamination was possible to clean up to a 95% standard.

To reduce carbon emissions and reliance on fossil fuel energy, 57% of material transport was accomplished by river or rail, and the Kings Yard and Energy Centre being installed will use water and other alternative energies to power up to 20% from renewable and sustainable energy sources. Buildings are designed and constructed to be optimally energy efficient from sustainable materials. A wonderful example of the success of this approach is the Velodrome. Electric golf carts and hydrogen vehicles will be used during the Olympic Games to further reduce vehicle emissions, and golf carts may be the village trend, like in Peachtree City, Georgia (in the Metro Atlanta area).

Of the existing buildings and structures, 220 buildings could not be re-purposed and required demolition. Only buildings with new steel frame structure were re-purposed, and they were deconstructed carefully by hand. All permanent construction for the Games will be left in place to revitalize and create a live, work, play community.
Although not to this scale, the Atlantic Station redevelopment in Atlanta, Georgia mimics this redevelopment in scope and long-term design. The games’ structures were designed to be expandable to increase capacity for the Olympic Games, but afterward to be able to reduce capacity for daily life and recreation. Athletes’ housing will be converted to luxury high-density residential housing, the cafeteria to become an education academy, the stadium for local sporting events, the Velodrome, Aquatics Centre, and Water Park for recreational use. Other structures will provide retail and office space for live, work, play utility, and the entire site is being designed for active local transport, and expanded rail public transport. The Games committee is not designing an Olympic Games facility, they are designing a revitalized neighborhood to accommodate all cultures and abilities within the community that, coincidentally, will host the Olympic Games in 2012. In addition to safety and care for the local community hosting the site, great care was taken for existing wildlife, for example 2000 newts that were relocated from the Olympic Park construction site to the Wetlands Walk, and the scarce Black Redstart bird population is starting to flourish.

Additional information is available in PDF from the ODA’s “The Big Build” series, available at www.london2012.com/about-us/publications/olympic-park. A map of the park is available at www.london2012.com/mm%5CDocument%5Cspectators%5CVenue%5C01%5C45%5C NEWMAP_Neutral.pdf

During the different phases of remediation and construction, the ODA and JLARS provided several ways to engage the surrounding community, and to respond to community concerns. JLARS established a complaints hotline and held several public meetings to address community concerns about contamination, construction activities, and to follow-up with noise, dust, or tremor complaints in the earliest phases of the redevelopment project. This approach was highly successful - most complaints were received when the project began in 2005, and the hotline has been fairly quiet since.

In addition to community education, the redevelopment project enjoyed the success of not requiring heavy handed regulation because of extensive worker environmental and occupational health education. Regulators educated the workers from the earliest phases, and remained available throughout the project; therefore, they were not required to “lay down the law” as often - a strategy that many of us as Environmental Health Specialists can be reminded of. By approaching workers as partners and providing training and education about why the environmental health regulations were necessary proved highly effective in creating informal but well educated professional work atmosphere. There were fewer injuries, fewer problems, and fewer accidents on-site as a result. It allowed all problems to be resolved quickly, efficiently, and effectively. This practice was recognized among U.K. professional organizations as having raised the bar of standard practice, and is being hailed as the new practice standard for regulators throughout Environmental Health. More information about JLARS and the Olympics in London is available at: www.jlars.co.uk and www.london2012.com.
Admittedly, my visit to London could not be complete without a visit to “Environmental Health Mecca”, the water pump made famous by Dr. John Snow, and the pub just behind it begun in his name. Many of us enjoyed a pint and raised our glass to the father of epidemiology, Dr. John Snow!

Environmental Health Legislation in Scotland

Royal Environmental Health Institute of Scotland
Edinburgh, Scotland

My final stop on my whistle stop tour of Environmental Health for contaminated lands in the U.K. was to Edinburgh, Scotland, where I visited the Royal Environmental Health Institute of Scotland (REHIS) and the Scottish Parliament. REHIS is an independent non-profit professional organization founded 1875 whose main objectives are to promote the advancement of Environmental Health through education, training, examination, production and distribution of professional publications, and maintenance of high standards of practice and conduct for Environmental Health Officers in Scotland. There I met the Director, Tom Bell, and all of the dedicated REHIS staff. REHIS is a smaller organization than the CIEH covering a more specified area (Scotland); however, REHIS parallels the role and function of the CIEH for Scotland.

Scottish Parliament (Pàrlaimaid na h-Alba)

At this time in history, Scotland is ruled by Parliament in London; however it has established its own local parliamentary governance, and is again working toward political independence – like the Republic of Ireland. Currently, the role of the Scottish Parliament is much like state governance in America. Scottish Parliament makes laws specific and practical to Scotland, but must adopt national U.K. and European Union laws from the Houses of Parliament in London. This is where America’s origins start to come alive for me. I can see the Scottish influence in our established American governing system.

The idea of separate governance independent from the U.K. Monarchy and Parliament in London is not new. However, there is record that the initial desire was established in 1235 A.D. In 1632, the Scottish Parliament House was built where meetings were held and legislation passed. The union of Scottish and English Parliaments was not realized until 1707, in which Scotland and England became what we know as the United Kingdom of Great Britain of today with active Representatives for Scotland in the Houses of Parliament at Westminster, and which has endured since.
During the mid-16th century (circa 1540), at the time of Henry VIII, England also declared rule over Ireland, however resistance from the Irish led to civil war, and divided the island into Northern Ireland (U.K.) and southern Ireland (Republic of Ireland). Those whom remained loyal to the U.K. monarchy were known as Unionists, and eventually retreated to Northern Ireland, which officially became a part of the U.K. in the 20th century ruled by Parliament in London. Again, political sentiments in Scotland today are returning to a desire for an independent and free state (or republic). Devolution for Scotland was initially proposed in 1979, furthered in 1989, and finalized in 1999, and the building was completed and opened in 2004.

During my visit to Edinburgh, I passed by the Edinburgh Castle (old Scottish Parliament) and was very excited to visit the new Scottish Parliament. While the old Parliament of the 13th through 18th centuries was held in Edinburgh Castle, known locally as “the big hoose on the hill” at the end of the Royal Mile, the new Parliament is located nearby in a brand new building. The design is very modern, and is based on the maritime history and ancient but enduring culture of Scotland with specific architectural detail mimicking ships in the harbor.

I was very excited to learn that Scotland’s new Parliament building was built on a brownfield site to avoid using green space, and a brewery site at that! The Parliament building is on the site of the old Scottish and Newcastle brewery. In addition, rare grasses native to the area are used for the landscaping. Additionally, Scottish Parliament is dedicated to preserving and sustaining its ancestral heritage in that all literature and various forms of public access to parliament and Members of Scottish Parliament (MSP) are provided in both English and Scots Gaelic, the original language of Scotland before it was Anglicized – cultural and environmental sustainability. The national language of Scotland is English and is spoken universally, but Scots Gaelic is only spoken in some regions of Scotland, such as in the Highlands in the northern half of Scotland, and on the islands.

I was also excited to learn about the features of the building that showed some careful thought to energy efficiency and sustainability. The overall architecture and interior of the Parliament building reflect Scotland’s dedication to sustainability and reducing environmental impact. The interior is bright
with natural sunlight from large windows and skylights, which light and heat the building during the day. The building uses 100% renewable energy sources such as wind turbines, hydro power, and biomass, and in winter some electricity is generated by a combined heat and power plant which burns natural gas. The building reserves air conditioning use in the summer for the Information Technology section of the building (i.e. computer rooms) to reduce energy use and greenhouse gas emissions. It instead relies on open space, high ceilings, and open windows to cool the building.

In winter, spare heat generated from using electricity is used for heating. Toilet water uses on site water wells tapping the groundwater beneath the site. This reduces water used from the public water supply. Overall, the building is rated a “B” in energy efficiency by the Scottish Building Standards, based on building construction and design. The building was also awarded the Building Research Establishment Environmental Assessment Method (BREEAM) Environmental Award, similar to a Leadership in Energy and Environmental Design (LEED) Gold or Platinum, for excellence in a design that is considerate of the health & well-being, energy, ecology, transport, material selection, and water usage. An impressive and contemporary building!

While there, I was again privileged to observe the parliament in session. Unlike the U.K. Parliament in London, the Scottish Parliament debate session was very passionate and lively. The session in London was quite formal and civil, and while the representatives clearly felt strongly about their views, I didn’t see the same kind of animated expressiveness there. The debate room design is similar to that of the American debate rooms, but no group or representative on the floor is seated at a higher elevation than the others, a bit like the knights of the round table. U.K. Parliament in London is designed a bit differently with members of the two houses facing each other on opposite sides of the hall, and the clerks and prime minister seated on the floor in the middle.

After observing Scottish Parliament in session, I was honored to meet Stewart Maxwell, the Member of Scottish Parliament (MSP) for West Scotland affiliated with the Scottish National Party. MSP Maxwell is the Convener on the Committee Member of Education and Culture Committee, and is interested in Land Regeneration. MSP Maxwell holds keen interest in public health issues and matters related to contaminated lands and regeneration, and we spoke very openly about the public health issues of contaminated lands.
SABBATICAL PROJECT

Discussion

I chose to study how contaminated lands are managed in an environment that has high water table, high precipitation, and limited land area; and how public health concerns related to contaminated lands are addressed. I wanted to study the physical, socio-cultural, and environmental justice factors that influence the British approach to redevelopment and exposure, and to perceptions of illness.

Physical Factors

The United Kingdom is precipitous and densely populated. The total geographic area of England, Scotland, and Wales is 90,526 square miles, and England is slightly smaller than the state of Georgia at 50,337 square miles. Rainfall throughout the U.K., as within the U.S. is dependent on location and elevation. For example, the West Highlands of Scotland average 180” of rain per year.

Precipitation in England and Scotland varies. England averages 33 inches per year and 133 rainy days, and Scotland averages 60 inches per year and 200 rain days. While there, I was put in mind of Seattle, Washington, however the U.K. has more inches of rainfall. America’s precipitation is very difficult to summarize because of our vast area and variety of formations, however, the amount of rain and rainy days can influences remediation methods. More likely though, is these countries’ water needs and uses. Table 1 (page 33) shows geographic area, precipitation, and population statistics for England, Scotland, and America.

In Scotland and Wales, only 3-4% of drinking water relies on groundwater sources- about 97% is taken from upland rivers. In England, however, groundwater accounts for 33% of their drinking water sources (www.groundwateruk.org). This may influence regulations for contaminated land sites. For example, on average 82% of Britain’s water comes from surface water sources, making the streams’ preservation a first consideration. Britain’s streams also supply one of its greatest exported commodities: salmon. Without immaculate streams, salmon will not return to their original stream to spawn. The salmon’s sensitivity to freshwater chemistry has drastically decreased its populations in Britain until recently when tighter controls, restoration, and conservation efforts have cleaned many of Britain’s streams. In time, one of Britain’s greatest traditions may again be exported sustainably.

Britain’s groundwater, however, is less often used for direct potable consumption. It is an important resource that is more heavily regulated if deemed “important waters of the state.” Not all groundwater is required to be remediated onsite, however groundwater that feeds artesian wells, springs, drinking water wells, and streams are considered more sensitive. Therefore, contaminated lands impacting sensitive aquifers undergo greater scrutiny in terms of remediation and reuse. As I learned in Blackburn, even the best of intentions such as projects trying to restore streams to their original nature can cause great harm by releasing contamination from historic land use into the stream.
Table 1. Population, Area, and Precipitation Comparison between Britain and America

<table>
<thead>
<tr>
<th>Political Area</th>
<th>Population (millions)</th>
<th>Geographic Area (square miles)</th>
<th>Population Density</th>
<th>Ave. Rainfall (inches/year)</th>
<th>Rainfall (range)</th>
<th>Rain Days (average)</th>
<th>Rain Days (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>62</td>
<td>90,526</td>
<td>685</td>
<td>52</td>
<td>23-180</td>
<td>145</td>
<td>107-265</td>
</tr>
<tr>
<td>Scotland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glasgow</td>
<td>5</td>
<td>30,420</td>
<td>164</td>
<td>60</td>
<td>22-180</td>
<td>200</td>
<td>170-265</td>
</tr>
<tr>
<td>England</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lancashire</td>
<td>1.5</td>
<td>50,337</td>
<td>1,013</td>
<td>33</td>
<td>23-36</td>
<td>133</td>
<td>107-170</td>
</tr>
<tr>
<td>Manchester</td>
<td></td>
<td>798</td>
<td>33</td>
<td></td>
<td>30-60</td>
<td>45</td>
<td>31-142</td>
</tr>
<tr>
<td>London</td>
<td>8</td>
<td>13,179</td>
<td>24</td>
<td></td>
<td>18-28</td>
<td>106.5</td>
<td>84-120</td>
</tr>
<tr>
<td>America</td>
<td></td>
<td>3,531,905</td>
<td>85</td>
<td>26</td>
<td>5-200</td>
<td>100</td>
<td>n/d</td>
</tr>
<tr>
<td>Georgia</td>
<td>10</td>
<td>57,513</td>
<td>174</td>
<td>51</td>
<td>40-75</td>
<td>105</td>
<td>40-140</td>
</tr>
<tr>
<td>Metro Atlanta</td>
<td>0.4</td>
<td>133</td>
<td>3,154</td>
<td>50</td>
<td>30-70</td>
<td>96</td>
<td>n/d</td>
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<tr>
<td>Seattle</td>
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<td>85</td>
<td>7,251</td>
<td>37</td>
<td>n/d</td>
<td>150</td>
<td>n/d</td>
</tr>
</tbody>
</table>

Precipitation source: National Oceanic and Atmospheric Administration [www.noaa.gov](http://www.noaa.gov) and Met Office [www.metoffice.gov.uk](http://www.metoffice.gov.uk)

Therefore, Britain’s high precipitation amounts bring mixed blessings. It can increase soil contamination run-off to surface waters and infiltration to groundwater, but too it further dilutes contamination being naturally attenuated. Having such plentiful precipitation does not absolve us of land contamination, but it certainly changes the mindset when engineering its remediation.

**Socio-Cultural Factors**

America is known as a “melting pot,” where all are given a fair chance to pursue health, wealth, and happiness, enriching our population with many cultural traditions. Britain, too, is a democratic country and a popular place to settle for many people from other cultures. East Asian, Eastern European, and African cultural influences have been woven into the fabric of Britain’s culture. Britain’s long history beginning before Christ gives it solidarity, but hands down it is reputed to be home to the most authentic (and delicious) curry outside of India. As of the 2001 census, Britain is 92% White (including Irish, Scottish, and Welsh descent), and 8% Indian, Black Caribbean, Black African, Bangladeshi, and Other.

Sociocultural factors can greatly influence industrial practice and remediation technology, but as importantly it influences community involvement. The influences of the many cultures in Britain may itself play a part in developing regulatory practice. Using cultural beliefs to help explain why something should be done, or adopting the approach of the integration of education into the regulatory process can be greatly influenced by culture. Socio-cultural factors are obvious in food service when there are restaurants with authentic cuisine, and cultural competence can be a cornerstone to regulatory success; however, socio-cultural factors may not be as obvious for contaminated lands regulation, and more influential for community involvement.

From my own experience before and after the sabbatical, I can say that the British people I have known and met do not use chemicals around the home or in the garden. Farmers rarely use pesticides, and the cattle are strictly regulated and don’t have excess hormones. The concept of “organic farming” doesn't make sense- in Britain it is standard practice not to use the pesticides and hormones to begin with; however, Britain also doesn’t have cockroaches. They practice the integrated
pest management principles, but call it basic good hygiene. Considering these ideas about chemical use among individuals, I wanted to explore the attitudes and beliefs from within the context of contaminated lands.

Interestingly, although chemical use around the home is not as widely accepted, chemical use for industry was accepted in Britain as it was in the U.S. during those times. Environmental laws passed and conscientious industrial operations since the 1960s have helped to reduce the impact of chemical pollution on air, water, and soil in Britain. This came from necessity as well as a change in social culture.

Industrial chemicals are necessary, but do not choose to use them around the home. In my experience with the British friends I have made, one thing is consistent—the idea of “organic farming” as Americans define it is silly because they do not use pesticides anyway. Of course, in Britain they don’t need to. The distance of travel for crops is much smaller than in America, and Britain is feeding a smaller population. In the home, British people do not even think to use pesticides. They are not battling cockroaches or fire ants; however rodents and magpies often make their homes in and around homes.

With the implementation of the U.K. Registration, Evaluation, Authorization, and restriction of Chemicals (REACH) in 2007, chemicals in Britain became more strictly regulated. REACH requires the registration of chemicals being manufactured or imported for use in Britain. It requires an evaluation to be conducted by the European Chemicals Agency (ECA), and particularly harsh substances require authorization and restriction (www.hse.gov.uk/reach). This demonstrates a change in attitude, and recognition of the importance of health and use of caution with chemicals we may take for granted.

Environmental Justice

As cities age, old and often abandoned contaminated lands sites are left scattered throughout. During the industrial revolution, there wasn’t much thought, and there weren’t any protective laws, to govern industry location in relation to residential neighborhoods—employees lived right next to where they worked (within a few miles). Over time, these industries cease operations, sometimes abandoning the site, or else keeping it on their records for tax purposes. As populations settle in, contaminated lands frequently go unremediated, and the surrounding neighborhoods are left hosting the site. Contaminated lands are often disproportionally located in low-income and minority neighborhoods.

Environmental Justice is the fair treatment and respect for people's use of land, and pursuit of well-being. On my sabbatical, I noticed that in Britain, the contaminated lands sites were often located in low-income white communities, but also in racial and ethnic minority communities. The implication is that income is the greatest basis for environmental justice in Britain. In America, minority status is more often associated with contaminated lands, however regardless of where you are, socioeconomic status is a determining factor.

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1 Lee, S. and Mohai, P., Environmental Justice Implications of Brownfield Redevelopment in the United States, Society and natural Resources, 0:1-8 http://umich.academia.edu/SangyunLee/Papers/864154/Environmental_Justice_Implications_of_Brownfield_Redevelopment_in_the_United_States
2 IBID
Conclusions

So, what does this all mean? Basically, contaminated lands regulation in a high precipitation, small geographic area environment is not much different than in America. The population density and socio-cultural factors, however, make the British approach to contaminated lands redevelopment an exciting resource for review. Higher population density increases the likelihood for a resident to be exposed to contaminated lands in their neighborhood, the small geographic area increases proximity of these contaminated lands to residential areas, and the industrial legacy increases the likelihood of contamination being present. High precipitation may influence remediation method, technology, and expected project duration. In contrast, areas in the western U.S. might not find British remediation methods as applicable in their arid areas, however there are other aspects of British brownfields reuse and waste reduction initiatives that the U.S. western states may find very useful.

While exploring environmental aspects of contaminated lands in Britain, I learned that Britain and America use similar approaches to identifying and remediating known contamination. Both conduct Phase 1 and Phase 2 investigations, (where Phase 1 is the property history and potential versus known contamination, and Phase 2 is actual environmental sampling and lab analysis for common contaminants consistent with known historical property use.) Both most commonly use source removal “dig and dump” or “pump and treat” technologies to remediate contamination from a property. One of Britain’s large projects is to review historical records for contaminated land sites, and a determination of whether or not these sites may be likely to be contaminated (Phase I). These sites will remain on a registry and receive a contaminated lands designation. Further development projects will require additional site characterization for all sites identified as likely contaminated.

Social and cultural factors are similar to America, but there are larger populations of low-income whites who are affected by contaminated lands sites. Racial minorities in Britain include primarily Pakistani, Indian, Caribbean, African, and Bangladeshi, and often include ethnicities such as Irish or Scottish descent. Despite subtle cultural differences, Britain is a resource for working with West Asian communities. Therefore, culture is a major factor when redeveloping brownfields in these communities.

There are some distinct differences between American and British approaches. In Britain, those who regulate contaminated lands are public health officers employed by municipalities or districts, unlike our state level regulatory structure for contaminated lands in America. The greatest differences between our countries, however, are the national approach to community involvement, and the efforts made toward alternative energy and climate change. In Britain, community involvement activities for environmental contamination and health concerns are most often conducted by Environmental Health Officers at the local councils. Also, with already very wet and often extreme weather over limited land space, as a nation Britain is very conscientious about climate change, pollution prevention, and sustainability.

Lessons Learned and Implications for U.S. Environmental Health Specialists

Overall, the primary lesson learned is that despite our differences, the public health issues remain the same, and that both Britain and America have similar approaches to redevelopment and health. Education from regulators throughout the site remediation process proved to be a highly effective practice for protecting the health of workers and residents adjacent to the site, and has set a
new standard in Britain for contaminated lands regulation. Collaboration with communities also proves effective in Britain when trying to answer residents' health questions about a contaminated land site. The National Health Service does offer small programs for residents to get more information when they have health concerns about contaminated lands sites.

Environmental Health Specialists in America can rest assured that contaminated lands information and lessons learned from Britain is valuable to use here. Finding information about British approaches to land redevelopment are applicable, and can be useful. The greatest differences between our countries are the approach to community involvement, and the efforts made toward alternative energy and climate change. In Britain, community involvement activities for environmental contamination and health concerns are most often conducted by EHOs at the local councils. Also, with already very wet and often extreme weather over limited land space, Britain is very conscientious about climate change, pollution prevention, and sustainability.

Environmentalists in America have an opportunity to further establish our role in waste prevention, and promote recycling or reclamation programs. We can add Health Impact Assessment as another tool to use for communities concerned about redevelopment, and we can consider Britain’s creative land reuse and sustainability efforts as model approaches, learning from each others' experience. Regardless of which country we call home, we all have expertise that we benefit from sharing.