Activist Tips for Change Makers

Kayhla Cornell

Science and Environmental Health Network
Women's Congress for Future Generations

"Disaster doesn't sort us out by preferences; it drags us into emergencies that require we act, and act altruistically, bravely, and with initiative in order to survive or save the neighbors, no matter how we vote or what we do for a living."
- Rebecca Solnit.

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Read this guide and prepare your household, share with your neighbors in a study group, take it to your local government and ask where things stand in your community planning and disaster preparedness agency, & use it with local media.

Activist Tip Volume 2: Planning and Disaster Preparedness Introduction

Planning, of all kinds, is a universal experience and is already widely understood as important. So, why, are we so invested in planning and preparedness at SEHN?

We see planning and preparedness, especially in the face of climate change and climate-induced disasters, as a fundamental manifestation of both the Precautionary Principle and the Public Trust Doctrine. The Public Trust Doctrine dictates that government has a *fiduciary* responsibility to care for common assets such as our atmosphere, by reducing greenhouse gases and stabilizing the climate-- thus protecting our right, as community members and beneficiaries, to the air, the water, the commonwealth, and public health-- all the things we share that have come to be considered as the commons. The best way to fulfill that responsibility is by implementing the Precautionary Principle, which was literally *designed* for thinking ahead for a difficult and uncertain future. The Precautionary Principle urges that we actively think about the impact of our actions on the health and well-being of future generations and use that as a guiding standard for all of our decisions. How we live together, govern ourselves, and plan for an uncertain and difficult future will shift as we anticipate how climate change and potential disasters will affect us.

We already know that human activity can make things better or worse. In a recent radio interview Rebecca Altman, environmental sociologist and SEHN board member, urged listeners to really consider our place and our role in environmental issues. She said, "We can be more than just anti-litterbugs, more than just great recyclers, and more than better consumers. We can be *citizens* and we can have a say..." This call to action resonates through every aspect of current environmental concerns. We can be *citizens* in the sense that Aldo Leopold used it—members of the larger ecological and biotic community. And we can *have a say*, especially on how our communities, and all the things we share, are prepared to deal with climate induced-disasters.

This booklet will start out with tips on how we can prepare for the effects of climate change and climate-induced disasters on an individual level. This is a great way to begin thinking about and implementing the Precautionary Principle on your own. However, this is just the starting off point. In order to truly have a say, we will need to act as citizens, as neighbors, and as partners for each other in our own communities, working as concentric circles on every level to establish a coordinated response. As mentioned earlier, how to live together is one of the greatest indicators of how we will literally weather the storm(s) together, and how we will survive and build our capacity for resilience as a collective group.

Rebecca Solnit writes in her book *A Paradise Built in Hell: The Extraordinary Communities that Arise from Disaster*, "Disasters are, most basically, terrible, tragic, grievous, and no matter that positive side effects and possibilities they produce, they are not to be desired. But by the same measure, those side effects should not be ignored because they arise amid devastation. The desires and possibilities awakened are so powerful they shine even from wreckage, carnage, and ashes."

We care about planning and preparedness because we care about the commonwealth and the public health of current and future generations; we care because it is a way of fulfilling our responsibility to environmental justice. We know that we have a fundamental right, as beneficiaries to the Public Trust, that everything we share be protected through planning and preparedness and the subsequent resilience that brings. We know that, even in the face of disaster, we can have a say. If you think you couldn't possibly be the one to start disaster planning in your community, we hope this booklet makes you think again. Hazardous events and disasters are powerful, life altering forces—so are you.

Climate Change & Hazardous Events

Climate change has been discussed in such a confusing way for such a long time. For something that is scientific fact, we have done a really great job at burying the lead. It's important for you to understand what climate change is and for you to know that it is real, it is happening, and its effects are here.

Before we talk about disaster planning and preparedness, we wanted to let you know that, at the end of this booklet, there is a section explaining some of our key concepts in a bit more depth including: climate change, global warming, greenhouse gases, hazardous events, disasters, and public health emergencies.

Climate change and global warming aren't just making the planet hotter, they are also causing more extremes—particularly with weather patterns. Some areas of the globe are experiencing less rain, some are experiencing more rain than in the past, and some areas are not only experiencing more rain, but *heavier* rain. This change is manifesting itself as increasing occurrences of intense, even single-day, events.

You might think that doesn't sound too bad—heavy rain isn't bad if it's only for one day, right? That actually isn't the case. When we experience heavy rain, we don't experience a normal amount of rain, only quicker. Rather, we have an extreme amount of rain in a shorter amount of time—such as in 2014 in Detroit when 6 weeks of rain fell during one afternoon rush hour. Not only is that a lot of rain—but it causes flash floods. Flash floods occur when rain falls too quickly and overwhelms infrastructure. Highways quickly come to resemble rivers, drainage systems become overly full and shut down, people get trapped, cars are swallowed by the swift current, sidewalks crumble under the weight of the onslaught of water—this is considered a hazardous event.

In the past two years a town in my home state of Maryland has flooded twice-- so severely that entire streets of businesses have been washed away and completely destroyed, incurring millions of dollars in damages. This area is a "1 in 1,000 years" floodplain. Which really just means that there is a 1 in 1,000 chance of occurring in any given year (or 0.1% for those who prefer percentages). And yet, it has happened twice in two years.

And it isn't just because of the rain. Yes, the intensity of the rain is bad enough, but the state of our overdevelopment only makes it worse. We destroy natural buffers and barriers in floodplains and replace it with more concrete and wait for the water to claim it.

The consequences of more rain don't stop at floods—in January of 2018 heavy rains in Montecito, California left the town entrenched in mud. While Montecito was lucky to have missed the majority of the California wildfires in the season previous, vegetation in the hills above the town was burned away during the fires. Lots of mud with less vegetation to hold it back creates the potential for mudslides—which is exactly what happened.

Back to the wildfires—yet another adverse effect of climate change and global warming. As I mentioned earlier, some areas are experiencing less rain than normal, even to the point of increased droughts. Increasing global temperatures certainly have created drier vegetation—which is an ideal condition for a wildfire. The scientific research into climate change's effects on droughts and fire seasons across the

globe are still developing, but, in the meantime, we can be 100% certain that it isn't *helping* (or decreasing) the potential for hazardous events during fire season. Here is what we do know:

- Hotter temperatures = drier vegetation (better fuel for fire)
- Fire is started by humans or by lightning. And lightning is more likely to occur in warm weather than it is in cold weather.
    - A 2017 Scientific American article reported, "Generally, lightning occurs more frequently in hot weather than cold weather. A 2014 study in the journal *Science* anticipates that the number of lightning strikes in the United States could increase by about 12 percent for every degree Celsius of warming. Other research has suggested that lightning-driven fires are already becoming more frequent in some places. A study published earlier this year in *Nature Climate Change* found that lightning ignitions in North America's northern boreal forests have increased since 1975. And the researchers say that future warming may cause more storms, more lightning and potentially more fires in the northern regions" (Harvey 2017).
- Earlier springs mean an extended fire season—Earlier springs, which a recent study, published in Ecosphere in 2016, has informed us is happening in ¾ of the parks in the United States National Park system.
- Climate change can affect the Diablo and Santa Ana winds—making them more intense and increasing their potential to fan the flames of fire season longer and farther than ever before.

What does climate change have to do with *disaster* planning?

Climate change and global warming increase the potential of a hazardous event such as floods, droughts, fires, more severe hurricanes, etc. Floods in and of themselves are not disasters— disasters are not natural occurrences, but are actually the consequential aftermath of a hazardous event. The flood is not the disaster, the damage to the local infrastructure, the loss of lives, and livelihood is what constitutes a disaster.

This means that, to an extent, we have the ability to prevent disasters, or to at least mitigate the effects of hazardous events and lessen the severity of the consequences. Armed with the right tools, knowledge, and preparation, humans have the ability to mitigate disaster.

One thing everyone has the ability to do is plan and prepare themselves and their families/social networks for hazardous events.

I find that preparing for the consequences of hazardous events is not only realistic and logical, but it is also extremely empowering. It's also necessary. Not only do we have sufficient knowledge of climate change's impacts on our hometowns to know what our biggest risks are—we also have a responsibility to prepare ourselves and our neighbors.

Disaster planning and preparedness is, at its very core, doing what you can to anticipate and prevent the preventable harm—preventing harm is the core idea in the precautionary principle. We might not be able to stop a category 4 tropical storm in its tracks, but we can prepare for it and give ourselves a fighting chance by mitigating its effects.

Disaster planning is also not something you can do just one time. In order to be prepared, you not only have to have the supplies, but you have to run through your plan with your family multiple times. As a kid, I thought my Mom was insane for making us train to use the fire escape ladders under our beds. We

certainly *looked* insane—I never saw anyone else doing it. But, as I got older, it made sense to me that she wanted us to be able to do it in the middle of the night, in limited visibility, and to be able to do it quickly and efficiently. The same thing happens with kids and practicing evacuation drills from a school or school bus in case of emergency. It's not because kids are stupid—it's because we need to train our brains and neural networks to respond appropriately in an emergency.

I am part of a Community Emergency Response Team (CERT) and one of the first things we learn and teach to others is to look for multiple points of entry and exits when going into a building. You need to establish these connections so that they are familiar to you when your fight or flight response kicks in. If you don't practice beforehand, it will be extremely difficult to do it when your life depends on it. In an emergency situation, our bodies enter into the fight or flight mode, which is actually a physiological response: your brain sends signals to the rest of your body, your heart starts beating faster than normal—pushing more blood to your muscles, heart, and vital organs, your lungs start taking in more oxygen in order to send more to your brain and make you more alert, and fats and sugar are released from their temporary storage sites to your blood stream, increasing your energy.

When in fight or flight mode, humans are operating out of their "Lizard Brain" which is really just referring to the limbic system (referred to as the Lizard Brain because it's basically all lizards have for brain function- the reptilian brain does not even include the entire limbic system of mammals, which evolved later). So, when danger is perceived, our body physiologically changes into Lizard mode—we aren't thinking very rationally, we are only thinking about survival. This is problematic and has caused emergency situations like a fire in a concert hall to turn into a mass casualty—everyone tries to get out of the same door they used to enter, people are trampled, people suffocate from smoke inhalation waiting their turn to get out—even though there were actually 10 other points of exit. These things are preventable.

Disaster planning and preparedness also is not about doomsday mentality—it's about empowering yourself and your community to be prepared in all situations. It gives you agency and control in even the most uncontrollable situations. There is incredible power in that. As someone who experiences a ridiculous sense of heightened anxiety on a daily basis, planning and preparedness for emergency situations makes me feel powerful and far more in control. I know what to do to help myself and someone else in a variety of situations. The possibility of me having to use my skills seems to be increasing with each passing day, so I urge you to begin this process with yourself and your family/friends. It's also about more than empowerment, it's about survival. Preparedness is about being ready and confident in the event of an emergency situation and doing everything you can to prevent the worst-case scenario from unfolding.

If you live in California, you are undoubtedly being advised to prepare for the fire season—stocking your emergency supplies, clearing the perimeters of your homes, your gutters, and underneath your decking for brush and ignitable debris. To prepare for the hurricane season, I will be checking to make sure our gutters and outside drainage are clear, that I have a back-up generator to keep the sump pump working, trim the trees in our yard, and make sure that all outside furniture is secure and not an airborne flight risk. I will have my go-bag packed and re-stocked and a communications plan with my family. To pack your own go-bag, we have provided a comprehensive checklist.

Emergency Packing Checklist

MEDICATION

- ☐ Prescription medications (at the very least a 3-day supply).
  - ☐ Epi-pen if you have one!
  - ☐ Copies of prescriptions (and copies of prescription bottles)
  - ☐ Extra set of contact lenses, eye glasses, etc.
  - ☐ Pet medications

WATER

- ☐ One gallon of water per person per day.

  - This is the suggested bare minimum for an average person.
  - Note that the ill, young children, and nursing mothers require more water than the average person.
  - It is also suggested that you pack your own water sanitization method.
  - If possible, a jet boil or camp stove system so that you do not need to rely on supplies to build a fire.
  - You must heat water to a roiling boil for one minute for potable water.
  - You can also purify large quantities of water with household bleach or water purification tablets.
  - Potable Aqua water purification tablets (germicidal tablets).
  - Potable Aqua Water Purification Treatment Tablets from Amazon.com
  - You can also use a LifeStraw
    - Filters out 99.9999% of waterborne bacteria and 99.9% of waterborne protozoa. However, heavy metals, chemicals, salt water, and viruses are not removed in this filtration system.

FOOD:

- ☐ 3-day perishable food supply for each person in your group.
  - Infant formula (& diapers).
  - Pet food & extra water for pets.
  - If your rations contain canned food, do not forget a can opener!
  - Suggested: stainless steel (reusable and easy to sanitize) mess kits with reusable utensils.

IMPORTANT DOCUMENTS:

- Important documents (originals) in a waterproof and airtight container.
  - Emergency contact list, phone numbers of places you can go for shelter, etc.
  - Insurance cards
  - Passports
  - Drivers licenses
  - Bank account records
  - Birth certificates
  - Marriage certificate
  - Social security cards
  - Wills
  - Deeds
  - Immunization records

Also recommended:

- Stocks
- Bonds
- Inventory of household goods
- Extra set of car keys and house keys
- Pet ownership documentation
  - Current photos of pets
  - Adoption records
  - Immunization records
  - Chip information for pets

SAFETY & FIRST AID KIT

- Respirator (N95 and above)*
  - Dust masks at the very least—reusable if possible.

***More information about face masks and respirators on page 8.**

PERSONAL SANITIZATION

- Personal sanitization
  - If clean water and antibacterial soap are not a possibility or are not available:
    - Biodegradable moist towelettes
    - Hand sanitizer
    - First aid kit

REMEMBER:

- In addition to your credit cards and checkbooks, it is extremely important to have cash in your go bag.
- You should also carry change.
- You also need to establish, with a trusted family or friend (who lives out of town), a method of communication with them to verify your safety.

IMPORTANT

- Battery-powered or hand-crank radios
- Sleeping bag for each person in your party.
- Emergency blankets
- One extra pair of clothes (and closed-toe shoes)
- Flashlights and/or headlamps with extra batteries.
- Copies of maps for the surrounding tri-state area.
  - Do not rely on cell phones, laptops, or the Internet.
- Garbage bags with ties.
- Duct tape
- Feminine hygiene supplies.
- Nonprescription drugs
- Pain reliever
- Antidiarrheal medication
- Antacid
- Allergy medication
- Laxative
- Vitamins
- Activated charcoal (in case of ingestion of toxic chemical, if advised by the Poison Control Center)

USEFUL:

- Fire extinguisher: small, ABC canister.
- Tent
- Paper, pencil
- Compass
- Non-hybrid, heirloom seed kit. You can buy this pre-packaged, but you can also create your own kit based on the seeds best suited in your geographic region.

Not Necessary, but Certainly Helpful:

- Entertainment, especially for young children.
- Books, puzzles, games.
- Pet beds, blankets, toys for pets.

Face Mask/Respirators

Let's revisit face masks/respirators for a few moments as these are absolutely critical for you to have in your go-bag.

1. Have a mask for each member of your party.
2. Look for NIOSH-approved N95 masks and above.

You have to be careful when selecting your face mask or respirator because you can't just grab anything off of the shelf at your local store or put just anything into your online shopping cart. You want to actually do some homework on this. Luckily, I have done a lot of this homework, so I can share with you what I know, what I would recommend, and what I, personally, have in my go-bag.

What is N95, what does it mean, do I need it?

Great question. N95 denotes the grade of the mask, meaning N95 masks filter out about 95% of particles down to 0.3 microns in size. Very small particles are considered the "most penetrating particle size" (or MPPS) and are the most difficult to filter. For comparison, bacteria are usually around .35-60 microns, household dust around 0.05 microns-100 microns, and smoke from synthetic materials is around 1-50 microns. Generally speaking, the human eye starts to see particles that are larger than 40 microns.
(For more contaminant and particle size information: https://www.engineeringtoolbox.com/particle-sizes-d_934.html)

N95 masks are NIOSH certified—which is something you want to look for before buying a mask of any brand. NIOSH (National Institute for Occupational Safety and Health) certified N95 masks have passed the performance standards of the government—proving at least 95% filtration efficiency solid and liquid particles of more than 0.3 microns in diameter (not containing oil).

N95 masks are recommended and popularly used to protect against smoke inhalation from fires, pollution, allergens, and may protect against viruses such as the H1N1 influenza.

What do I recommend?

I think N95 masks are generally fine but I would NOT go any lower. I personally use the NIOSH certified N99 mask. They aren't exorbitantly more expensive, and you are getting a higher rate of filtration, about

99% filtration of pollution (including smoke), bacteria, and some viruses. Also? They are reusable, so long as they do not sustain damage.

What do I have?

I have a few N99 masks in my go-bag and I also have a P100 mask for myself. A NIOSH certified P100 mask is actually not a mask, it's a facepiece respirator filter. Mine will filter out at least 99.97% of all airborne particles and it is fairly resistant to oil. It is also what is suggested for use around mold—which is something you want to consider in any kind of disaster, but especially with hurricane season and heavy rains in your area. My respirator is reusable and I keep the filtration pad replacements on hand.

Facepiece respirators also provide a much better seal around your nose and mouth to provide for better protection. Everyone, but especially those with facial hair, want to consider how their facial hair might affect the fit of their mask or respirator. This is important—if the mask or respirator is not fitting directly against your face, it is not going to work and you will not be protected. Maybe even keep a kit for a quick shave in your go-bag in order to make sure your mask is going to protect you.

Honestly, I purchased mine at Home Depot, but here is a resource to find NIOSH-approved P100 particulate filtering facepiece respirators:
https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/p100list1.html

Additional Tips/Resources

- Remember to replace your water store every six months.
- That being said, make sure the batteries you have in your go-bag are properly stored and replaced regularly.
- Reassess your family needs every year, update your go-bags accordingly.
- It is recommended that you keep your go-bag where you spend the most time. I spend a lot of my time between different offices, so I actually keep my go-bag in my car. However, it is a good idea to have a basic kit at all of your heavily frequented locations so that you always have access to your emergency essentials no matter where you are.
- Here is what FEMA recommends you have in your go-bag: https://www.fema.gov/media-library-data/1390846764394-dc08e309debe561d866b05ac84daf1ee/checklist_2014.pdf
- FEMA Community Preparedness: https://training.fema.gov/emiweb/is/is909/preparedness_handoutsmaster.pdf
- Ready.gov's Make a Plan resource: https://www.ready.gov/make-a-plan

Emergency Planning and Disaster Preparedness at the Community Level

It is important that individual households are prepared for emergency situations, but it is more important that entire communities are prepared for hazardous events in the event of disastrous aftermath. It doesn't do much good to be prepared as individuals if your surrounding community is not prepared. In a disaster situation, entire community networks can be severely disrupted, access to critical resources are prevented, lives are endangered, and the process of rebuilding can be seriously delayed, creating innumerable complications for community members, especially the more vulnerable and at-risk portions of the population. You can flood-proof your home, but it doesn't do much good if you need medical attention and can't get there because of road damage, a shortage of supplies, etc. from that same flood.

Now, this is not to say that you, as an individual, are solely responsible for getting your community prepared. When they say, "it takes a village", they mean it. However, you can be the one to *start* the conversation in your community. One of the startling realizations I had when I worked for a college was that every single department had their own emergency plan—but no one knew what that plan actually was. Therefore, in a real emergency, it would have been completely useless.

I think what you will find this is a common state of affairs across most places of employment. Choose to see this for what it is—an opportunity. Asking questions is one of the easiest points of intervention—start asking what the preparedness plans are in your community. What is the preparedness plan of local government? What does the chain of command in an emergency look like where you live? Once you have the chance to look at some plans, you can see where the weak spots are, what needs improvement or complete change. Work with your neighbors to keep each other safe – who has back-up generators in case of a blackout? Recruit your neighbors into study groups or neighborhood associations to go through your city's plans and make recommendations to your city/county council. Hold your local elected officials accountable in including this as part of their long-range plans while in office and prevent bad planning that will exacerbate the effects of hazardous events.

As outlined in our last Activist Tip issue (available here) we at SEHN and the Women's Congress for Future Generations advocate for the use of the Public Trust Doctrine in evaluating the role of government. As Carolyn Raffensperger writes, "it is actually an elegant approach to the role of government. The Public Trust is an expression of the most fundamental responsibilities of government: to care for all the things we share, the things that are part of the commonwealth and the public health." Disaster planning and preparedness falls under both of these categories.

Working as a Community

As mentioned earlier, what you, as a community, will need to prepare for can be region-specific. In order to prepare yourself and your community effectively, you will need to perform a risks and vulnerability assessment by inviting all of the local stakeholders- including community members and members of local departments, chapters, and organizations such as the following:

- Fire departments
- Police departments
- Local chapters of organizations like the Red Cross
- Paramedics
- EMTs
- Local nursing programs
- Local schools of public health
- Mental and behavioral health organizations

- Veterinarians
- Park Rangers
- Local and state-level members of government
- Local Park & Recreation Centers
- Local libraries
- Local farmers, ranchers, and agricultural experts

Get as many of these local groups to meet together in order to discuss the risks of your area, discuss the roles and responsibilities of different departments in the event of multiple types of disasters, and input/solutions from the community to potential problems. Hold a town-hall style meeting and bring all of the voices to the table as equal stakeholders and co-managers.

Once these partnerships have been established, trainings and outreach need to be offered to the greater community in order to increase awareness, especially of the public health concerns caused by climate-induced hazardous events.

Community Public Health Preparation and Preparedness

In the case of a hazardous event, weathering the immediate impact of a storm is only the beginning. The first concern is, of course, safety and survival. The other concerns are more impactful in a long-term sense; potentially affecting public health of the community in a number of detrimental ways.

Public health preparedness is a huge part of community emergency planning and disaster preparedness. Understanding the hazardous risks of your community's geographical locations of your community is the first step to understanding how the health of your community can be negatively impacted. For example:

1. States in the Northeast are at-risk of increased flooding.
    a. Possible effect of too much rain? Wastewater treatment plants can become easily overwhelmed, send sewage and untreated water directly into the water supply, thus making water unsafe to drink.
        i. Public health impacts: limited access to potable water, and increased risk of waterborne diseases due to increased presence of bacteria in the water supply such as cryptosporidium and cholera.

2. States in the Southwest are at increased risk and severity of droughts.
    a. Possible effect of too little rain? Not only is the supply of potable water vs. the demand for potable water a concern for human survival, but it is a concern for the survival of crops, livestock, shellfish and seafood. We not only need it for the survival of these food systems, but we also need it to prevent diseases. When there is less water flow (due to drought) and increased temperatures (due to climate change), shellfish and marine life are forced to move and, often, cohabitate closer together, compete more intensely for food, and they are also exposed to much higher concentrations of bacteria in water (due to decrease in water flow), absorbing it, and passing it along to the next member of the food chain—possibly us (resulting in foodborne illnesses). Yes, even less water can mean an increase in waterborne illnesses.

3. Climate change is causing an increase in vector-borne diseases across the United States and the increase in the overall global disease burden.

In an ideal world, we could turn to the government and organizations to assist communities and intervene in a crisis—but that can be problematic. Access to communities can be limited in emergency events and funding for emergency management and public health organizations can be limited, preventing the deployment of necessary resources. Our best bet is to be prepared locally and to depend on the networks we build together. While we might not be able to rely solely on the federal government, we *can* utilize resources from organizations like the CDC, ASTDR, FEMA, and the EPA in order to educate our communities and apply these tactics to local organizations in our own communities.

Community Emergency Response & Disaster Preparedness Planning Toolkit

The functional equivalent of the personal toolkit at the community level? What does every community need to have?

Basic supplies:

- Access to clean water and soap are not only the most cost-effective solutions to preventing public health crises, they are the most effective.
- Community education and workshop trainings for community members.

Risk and Vulnerability Assessment:

- Local environmental and public health groups need to partner in order to assess the risk of hazardous events and effects on public health.
    - Engage local organizations and create interdisciplinary partnerships with local police departments, fire departments, mental and behavioral health providers, community and faith-based partners, and private and community-based public health and healthcare organizations.

- Once risks are analyzed, there needs to be significant public health outreach and education to members of the community. For example, communities located in areas at risk of heavy rains and flash floods should examine local infrastructure such as wastewater treatment plants. Older wastewater treatment plants are at greater risk for shutting down during heavy rainfall, overwhelming the system and causing untreated water to be released into the local water supply. This means that everyone in the community needs to know how to sanitize their own water supply for potable water in the long-term.

- Identify populations of the community that are at higher risk for adverse health outcomes such as the elderly, the immunocompromised and chronically ill, pregnant women, and young children.
    - Access to medical and mental health providers need to address the actual needs of the community, taking into account the cultural dimensions, demographics and socioeconomic status of the community.
        - This means that transportation systems might need to be implemented to assist community members have access to medical care after hazardous events.
        - Communication, education, and outreach/awareness strategies need to be inclusive.

Establishing Partnerships and Assigning Roles

- After convening all local organizations to assess risks and vulnerabilities, groups of community volunteers and local organizations will be assigned their own roles and responsibilities and undergo group training exercises and ensure sustained community engagement in these efforts.
- Roles of volunteers and local organizations will be communicated to state and federal agencies (where applicable) and any contracted organizations.
    - Any contracted organization a community establishes a relationship should be issued a Memoranda of Understanding (MOU) prior to a disastrous event.

Ecological Restoration & Long-Term Mitigation Efforts for Communities

While we have included a community toolkit checklist in this booklet, I would actually like to take us one step further—disaster mitigation and ecological restoration for long-term community resilience. Preparing to respond to an emergency situation is a good first step, but it is a band-aid solution. In order to increase community resilience and mitigate the effects of hazardous events, communities need to also implement forethought and ecological restoration planning. "In well-managed and healthy ecosystems, 1.3 million trees are able to catch 7 billion m^3 of rainwater per year, drastically reducing storm water drainage in an ecosystem" (USGCRP 2016:18).

There are a lot of possibilities for ecological restoration and, like hazardous event risk assessment, can be geographically specific.

Some examples of ecological restoration:

- In order to reduce rainwater runoff in urban areas, the use of natural and constructed wetlands can be employed.
- Prevention of development on floodplains.
- Re-vegetation/re-forestation to prevent further soil erosion.
- Wildlife corridors—improve genetic diversity and promote the integration of re-vegetation areas.
- Reintroduction of native species.
- Areas that experience fire seasons can actually plant fire-resistant vegetation and implement fire-resistant landscaping. http://www.readyforwildfire.org/Fire-Safe-Landscaping/.

Community Resilience Building

- Community gardens—build local food sources, stock a local food pantry.
- Seed saving & seed propagation workshops
- Rain barrel installations and sustainable farming and land management techniques.

SAMPLE FACT SHEET, FOR PUBLIC USE

Public Health Benefits of Ecological Restoration

In order to mitigate the negative public health effects of climate change and hazard events in communities it is necessary to give back to the Earth and restore the ecology of the land. As climate and weather patterns continue to change, increasing the frequency and severity of storms and hazard events, communities are exposed to the destruction and negative public health consequences. Restoring the land is the most cost effective and efficient way to protect communities.

Methods of Ecological Restoration:

- Improve biodiversity conservation by re-planting and conserving native sea grasses and coastal vegetation to control sediment.
    - Coral reefs, sand dunes, sea grasses, peatlands, wet grasslands, mangroves, and saltmarshes (National Climate Assessment 2015:19).
- Natural and constructed wetlands to aid in storm surge relief and reducing the volume of rainwater runoff.
- Restore floodplains to increase flood retention capacity.
- In drier land areas, maintain vegetation cover with nutrient-enriching plants and shadow crops to conserve soil and retain moisture.
- Utilize shelterbelts and greenbelts to protect communities from wind erosion and potential sandstorms.

Public Health Benefits of Ecological Restoration

- Natural barriers and buffers will decrease the severity of floods in coastal communities.
    - Protects damage to infrastructure such as wastewater treatment plants, decreasing the possibility of contaminated water entering public water supply.
    - Limits exposure of community to waterborne diseases such as cryptosporidiosis and cholera.
- Efforts limit exposure to polluted and contaminated water.
- Decreases disease burden due to evacuations and emergency shelters.
- Less free-standing water = less vectors.

Further Discussion & Key Terms

Weather vs. Climate Change

In the beginning sections of this booklet, we promised a section explaining some of our key concepts in a bit more depth including: climate change, global warming, greenhouse gases, hazardous events, disasters, and public health emergencies. And here it is! This section is designed less to discuss each of the specific mechanics of greenhouse gases, climate change, and global warming, but more to cover the basics to get you started. Or, as a quick refresher on some key terms.

First thing to know is that climate and weather are not one and the same. The easiest way to understand the difference is to know that weather can change in a matter of minutes, but climate is long-term. We're talking periods of time from ten to 100 years. Weather? It's raining today. Climate? On average it rains _(insert amount here)__ inches every year in my area. (https://www.epa.gov/climate-indicators/weather-climate)

So what about climate *change*?
Climate change refers to changes in climate patterns, regionally and globally. Climate patterns, by the way, are things like precipitation rates, average temperatures, wind, ocean current patterns etc. These changes, caused by greenhouse gases, result in a long-term increase of the Earth's average recorded temperatures and regional weather extremes. If someone on Facebook shows you data from one year to the next and claims that climate change can't be real because it looks basically the same, feel free to call this person out for being wrong. They have no understanding of climate change and you can direct them straight to their Internet browser. You can't glean how the earth's temperature is changing on a long-term scale by pulling two years' worth of data. That's not how it works.

So what about global warming, then?
Think of the effects of global warming as a heat trapping blanket. The FrameWorks Institute came up with this metaphor to explain climate change and global warming, because that is essentially what it is. If we think about the Earth's atmosphere as a gigantic blanket that covers the Earth, we can then see how adding certain chemicals and air pollutants, which reflect heat back to the earth rather than allowing it to escape to outer space, is like adding more material to the blanket, making the Earth warmer and warmer.

You might have seen the phrase "anthropogenic climate change" before and wondered what the heck that is. Essentially, it means human-caused climate change. Earth's average temperatures are increasing because of us. We haven't been good stewards. Instead, we are pumping pollution and chemicals into the air, and when we pump air pollutants like carbon dioxide into the air and the atmosphere, it gets stuck there. It stays there, and traps heat inside of the Earth's atmosphere (our metaphorical blanket), which makes the planet hotter. That feeling you have when you wake up in the middle of the night smothered underneath the overly warm weight of your own blankets? That's how the Earth feels. That is what we are doing. The blanket is too warm-- and we're all about to wake up sweaty and nauseous without the option of kicking off the covers.

Infectious Disease and Climate Change

There are several ways in which climate change negatively interacts with public health. Climate change

brings with it changes in temperature and weather, thus impacting air quality and living conditions. Increased temperatures cause a myriad of health issues such as stroke as well as increasing complications of chronic respiratory illnesses such as asthma. Additionally, climate change and increasing emergence, frequency, and virulence of infectious disease are directly correlated. In 2015 and 2016, the United States population, alone, has been introduced to emerging infectious diseases (EID) such as Ebola and Zika Virus. These diseases are part of a global pattern of increasing EIDs; increasing at a rate of 5 emergent events per year and, according to USAID, this is only the beginning (USAID Predict 114).

Infectious disease is delicately intertwined with human behavior. Disease transmission relies on increased human interaction in populations, especially in densely populated areas such as urban cities. This is further compounded through the facilitation of modern advancements in transportation, such as travel by air. Diseases can be spread from small communities to larger cities through population movements such as forced migration or any type of travel or mass-transit system (DeSalle 1999:53-54).

The risk of disease emergence and exposure to these diseases is directly tied to the frequency in which a population comes into contact with certain pathogens. These pathogens are then given a greater chance of environmental survival through factors of temperature and relative humidity (USAID Predict 109). As the annual temperature and rates of precipitation in the United States are projected to increase rapidly, meeting the requirements of both these factors, increasing the possibilities of infectious disease transmission. The three main infectious disease categories are water-borne diseases, food-borne diseases, and vector-borne diseases.

The most common water-borne diseases, globally, are Cholera and Cryptosporidiosis. These diseases are most commonly found in areas lacking adequate public health infrastructure and abundant in unsanitary living conditions. Communities can experience significant increases in transmission of Cholera in times of disaster. For example, large flood events can threaten the integrity of the public water supply and cause damage to infrastructure such as wastewater treatment plants. When wastewater treatment plants shut down or experience damage, it becomes very likely that untreated waste will be released into the public water supply, causing widespread illness. The link between waterborne diseases and climate change is seen through the increase of severity and frequency of hazard events such as storms as well as in times of drought.

Foodborne diseases are also extremely common in times of disaster. Salmonella and Norovirus are common foodborne diseases in the United States. Foodborne diseases, caused by chemicals, parasites, chemicals, and toxins, are linked to climate change as they are similarly linked to an increase in hazard events. If adequate access to clean water and soap is not present in a community, the likelihood of foodborne diseases occurring increases, as food is handled in unsanitary conditions. Foodborne diseases such as the Norovirus are easily transmissible and run rampant in highly populated, closed environments such as camps and cruise ships.

Exposure to vector-borne diseases increases as the earth's temperatures become warmer, precipitation increases, and natural forest buffers are removed. Warmer temperatures provide longer life cycles and new habitats for vectors such as ticks and mosquitoes. Increased precipitation provides stagnant pools of water which also attract mosquitoes, providing them with more suitable habitats, especially in urban areas. The removal of natural forest land also removes the protective barrier between vectors and humans, therefore increasing human exposure during the warm summer months, which is one of the main explanations for Lyme disease becoming the most common vector-borne disease in the U.S.