Health Impact Assessment of the Environmental Restoration of Caño Martín Peña (May 2014)

Background
The Caño Martín Peña (CMP) is a waterway in San Juan, Puerto Rico - surrounded by a community of over 25,000 people - that has become clogged with sediment and debris. The community is one of Puerto Rico’s poorest and most disenfranchised, composed largely of migrants from rural Puerto Rico and the Dominican Republic. The densely populated area has homes tightly clustered around the channel. Low housing quality and high rates of both acute and chronic disease burden the CMP community. Families in this community, already at an economic disadvantage, are further burdened by unsanitary and unsafe environmental conditions. The Puerto Rican Legislature is considering the decision to finance the implementation of a Comprehensive Development Plan (CDP) for the area. While the plan involves many aspects including economic development in addition to the environmental and infrastructure components, three pivotal aspects of the Plan are 1) the dredging of 2.2 miles of the CMP; 2) improvements to the sewer system, storm water drainage, and roadway infrastructure; and 3) the housing changes from demolition of almost 400 residential structures and relocation of those community members.

What is a Health Impact Assessment (HIA)?
Health Impact Assessment (HIA) is a tool to inform decision makers about the potential health impacts of a specific policy or plan. HIA uses community and academic research to uncover health and equity impacts that a plan might have on people, and makes recommendations to ensure that the plan can contribute to healthier communities. This HIA in CMP was the first to take place in Puerto Rico.

What did the HIA find?
This Health Impact Assessment has revealed that the CMP community is characterized by residents with a variety of meaningful social support networks, with strong desires to see their community have improved access to outdoor spaces for both adults and children, and with an understanding that the poor health of the channel ecosystem is linked to many of the human health problems that they are experiencing. The community has rates of chronic and infectious disease as high as or higher than other Puerto Rican communities, and the health studies that have been conducted previously in the community identify the degraded environmental conditions as a key factor in many of these diseases. There is a strong base of literature that demonstrates the existing conditions in the CMP – deteriorating housing, frequent flooding, inadequate sewage and storm water drainage systems, frequent school and work disruptions due to the flooding, and exposures to sewage contaminated flood waters – are linked to infectious, allergic, and mental health problems as well as negative economic and school performance effects, which also influence health. Specifically, diarrheal illnesses are higher in persons living closer to the channel; asthma rates for children under 5 years of age are twice that for the same age group elsewhere in Puerto Rico; and dengue infections are clustered around flood areas and illegal dumpsites in the CMP community.

Key Findings and Impacts
1) Health disparities can be explained - The higher rates of chronic disease, such as asthma, and acute illness, such as diarrhea, in adults and children of CMP compared to elsewhere in Puerto Rico can be largely attributed to deteriorating environmental conditions that limit physical activity, increase stress, and lead to elevated toxic exposures.
2) Exposure reduction - Chemical, bacterial, and pest exposures will overall be decreased for the majority of the residents when the CDP is implemented.
3) **Time is of the essence** – Flooding and negative environmental exposures, such as mold, are worsening. Thus, delayed implementation of the CDP is making the population sicker.

4) **Disease burden improvement** – The prevalence of diseases that negatively affect many CMP residents, such as asthma, diarrhea, and lack of physical activity, will likely be reduced when the CDP is implemented.

5) **Community involvement** – The projected health benefits and the overall successful implementation of the CDP depends on continued CMP resident acceptance and participation in all aspects of the CDP, particularly the relocation process and the Community Land Trust.

### Predicted impacts

<table>
<thead>
<tr>
<th>Health Determinant</th>
<th>Health Indicator*</th>
<th>Direction of Impact</th>
<th>Magnitude (how many)</th>
<th>Severity (how much)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicant Exposures</td>
<td>Blood lead level, skin problems</td>
<td>Short Term: ↑</td>
<td>Low</td>
<td>Low</td>
<td>Contaminated sediment disturbed during dredging</td>
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<tr>
<td></td>
<td></td>
<td>Long Term: ↓</td>
<td>High</td>
<td>Medium</td>
<td>Dredging, infrastructure, and housing quality improvements</td>
</tr>
<tr>
<td>Bacteria exposure</td>
<td>diarrheal disease</td>
<td></td>
<td>High</td>
<td>Medium</td>
<td></td>
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<tr>
<td>Mosquito habitat</td>
<td>cases of dengue</td>
<td></td>
<td>High</td>
<td>High</td>
<td></td>
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<tr>
<td>Pesticide use</td>
<td>pesticide body burden</td>
<td></td>
<td>Moderate</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Lack of physical activity</td>
<td>Obesity, heart disease, diabetes</td>
<td></td>
<td>High</td>
<td>High</td>
<td>Wider streets and sidewalks increase walking and biking</td>
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<tr>
<td>Property damage and mobility</td>
<td>Stress, anxiety and depression</td>
<td></td>
<td>High</td>
<td>Medium</td>
<td></td>
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<tr>
<td>impairment from flood</td>
<td></td>
<td></td>
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<tr>
<td>Allergen exposure</td>
<td>rates of asthma and allergies</td>
<td></td>
<td>High</td>
<td>Medium</td>
<td>Reduced damp conditions caused by flooding and relocation to higher quality homes</td>
</tr>
<tr>
<td>Educational Attainment</td>
<td>no. of missed school days</td>
<td></td>
<td>High</td>
<td>Medium</td>
<td>Greater continuity of education</td>
</tr>
<tr>
<td>Resident relocation</td>
<td>Stress, anxiety and depression</td>
<td>Short Term: ↑</td>
<td>High</td>
<td>Medium</td>
<td>Stress associated with lifestyle change and changes in the social support system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long Term: ↓</td>
<td>High</td>
<td>High</td>
<td>Relocated residents would be placed in higher quality homes</td>
</tr>
<tr>
<td>Economic insecurity due to</td>
<td>Stress</td>
<td></td>
<td>Low</td>
<td>High</td>
<td>Increased land values may lead to homelessness or overcrowding for some residents</td>
</tr>
<tr>
<td>higher land values; higher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>housing costs</td>
<td></td>
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</tr>
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</table>

*Health indicators cited here are examples, not a comprehensive list

Explanations:

- **Direction of Impact** refers to whether the proposed project will increase (↑) the burden of disease or decrease (↓) the burden of disease
- **Magnitude** reflects a qualitative judgment of the size of the anticipated change in health effect (e.g. the number of people affected) - low, moderate, or high
- **Severity** reflects the nature of the effect on function and life expectancy and/or its permanence – low, medium, or high
Proposed dredging and debris removal

The dredging and debris removal will result in less standing water, improved storm water drainage, and a reduction in mosquito habitats. Exposure to unsanitary water would be reduced, and in turn, rates of illnesses - such as diarrheal illness and skin conditions like eczema - that are associated with contaminated water exposure would be expected to decrease. Habitats for vectors such as mosquitoes would be reduced, leading to a reduction in the risk of disease transmitted by these vectors and a reduction in the need for pesticide use to control vectors. Thus, there would be less potentially toxic exposures to pesticides, especially for children.

However, the debris removal could displace animals such as iguanas, rats, or even caimans. The displaced animals could flee to nearby residents’ homes causing physical harm or stress. The dredging could liberate toxic materials in the sediment and excess hydrogen sulfide gas that could potentially increase exposures to heavy metals or worsen respiratory problems such as asthma. Air quality and noise pollution could also be worsened by construction equipment and demolition.

Proposed road, sewer, and storm water improvements

The current infrastructure of CMP includes dense mixed-use residential and commercial structures in close proximity to the channel edge and in some cases on top of the former location of the waterway. Parking occurs along street edges, leaving such a narrow space available for passage that sometimes emergency vehicles have not been able to pass. Sewage from an estimated 3,000 of the CMP residences flows untreated into the channel. It is estimated that over half of the community has flooding in their homes each year and the number of flooding incidents has increased over the last decade. The sewer changes will reduce the amount of untreated sewage flowing into the channel. The road changes will widen the street adjacent the channel and create a buffer between the channel edge and buildings.

Proposed housing changes from demolition and relocation

The CMP area has the highest population density in metropolitan San Juan. Almost 400 residential structures still need to be demolished and the residents relocated for the CDP implementation. To date, approximately 500 families have been successfully relocated through the combined efforts of ENLACE and other community and governmental organizations. The relocation process is expensive and logistically difficult, and it is an absolute prerequisite for the other work to proceed. The focus groups conducted for this HIA revealed that the idea of relocation is a significant source of stress that is alleviated by having a transparent process, significant support, and involvement of a trusted organization overseeing the process. Mitigating elements include a closely regulated relocation process governed by specifically designed bylaws. These bylaws mandate that the families being relocated receive safe and clean alternative housing and that they have the choice to stay within the community. Additionally, a Community Land Trust has been created to prevent speculating on real estate and preserve affordable housing options for low to middle income community members.

Primary Recommendation

The Government of the Commonwealth of Puerto Rico, with federal support, should finance the implementation of the Comprehensive Development Plan in its entirety, including dredging with careful safeguards to minimize harmful exposures to residents and workers; infrastructure improvements to roadways, sewer and storm water drainage systems; and the demolition of structures and relocation of households according to the ENLACE bylaws.
Additional Recommendations

Dredging

- The CDP should include provisions to: secure the work site to minimize trespassing into the dredging area, especially for children; remove debris and prune mangroves prior to beginning dredging to minimize the scattering of animals and insects that currently reside there; non-toxically reduce migration of pests from the area being cleared; and construct sound barriers, especially in critical areas, to minimize construction noise.
- The Departments of Health of the Commonwealth of Puerto Rico and the Municipality of San Juan should plan for targeted fumigation when key vector habitat is being disturbed to reduce vector-borne disease risk to the community.
- The Community Health Committee of CMP should develop specific environmental health training of community health workers so those workers can best educate residents about reducing toxic exposures and identifying early signs of health effects from elevated exposures.
- ENLACE should partner with local clinics and/or the community health worker program to implement health surveillance – such as asthma and/or injury rates before, during, and following CDP implementation both to address problems if they arise and to contribute health data to future projects.
- Conduct outreach about the CDP to the larger community of San Juan, particularly those to the east in Laguna San Jose, to raise awareness about the potential health benefits of increased access to recreational water space that will extend to other communities.
- Enforce anti-dumping policies to keep the area around the CMP free of debris in the future.

Road and Sewer changes

- Storm water drainage capacity improvements should be considered urgent particularly in light of extreme rainfall predictions for the coming decades associated with climate change to adequately prevent flooding events.
- Infrastructure changes should create a pedestrian and bike friendly streetscape, additional green and open space, and public waterfront access to maximize safety, social interaction, and physical activity.

Housing changes

- Maintain an equitable, sensitive, and well-organized approach to relocation by having ENLACE lead the relocation process. ENLACE is well integrated, works in close collaboration, and has a long-standing trusting relationship with the communities of the CMP.
- Assign a social worker to assist the families being relocated and provide support groups to help all families cope with the stress of the transition, including those who may be losing their neighbors to relocation.
- Promote the role of the Community Land Trust by conducting outreach to the community to educate residents about its role in serving the needs of the community by preventing displacement, homelessness, overcrowding, poor conditions and maintaining affordability.

Full report available at: http://???

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