Ecological Mapping
Exploring Operational Complexities in Cartographic Practices

Borders&Territories
Graduation Studio

Contaminated Ecologies

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Contaminated Ecologies

Alongside *Borders & Migration* and *Infrastructure & Congestion*, our research on *Contaminated Ecologies* is a cartographic inquiry into various processes in the context of the Panamanian isthmus, with focus on the Panama Canal.

The central inextricable issue stemming from the very nature of this assignment is that of complexity. The issue of ecologies - which in recent years has expanded in its broad understanding from the realm of the "natural" to encompass any possible relations between any kind of entities - poses an obvious challenge to anyone who tries to speak, show or let alone attempts to explain it. While in the modernist tradition this issue was often dealt with in a violently reductionist way (A causes B causes C causes D), with the expansion of ecological thinking in contemporary scholarship, scholars and researchers find themselves challenged with increasing inoperability of their attempts to trace and describe ecological systems when trying to be scientifically and morally truthful to the issues at stake. Just as it was with the revolution in quantum physics a century ago; the closer you look, the less you know.

Thus facing the same ontological and epistemological challenge taking on the task of mapping Contaminated Ecologies, the central question and problem for us was:

How does one map ecologically, without either falling into reductionism - stripping entities of their agency and violently pushing them into taxonomical confinements; nor allowing the complexities to get out of hand - compromising the research by letting everything become illegible, incomprehensible and inoperable?

Terminology and Area of Research

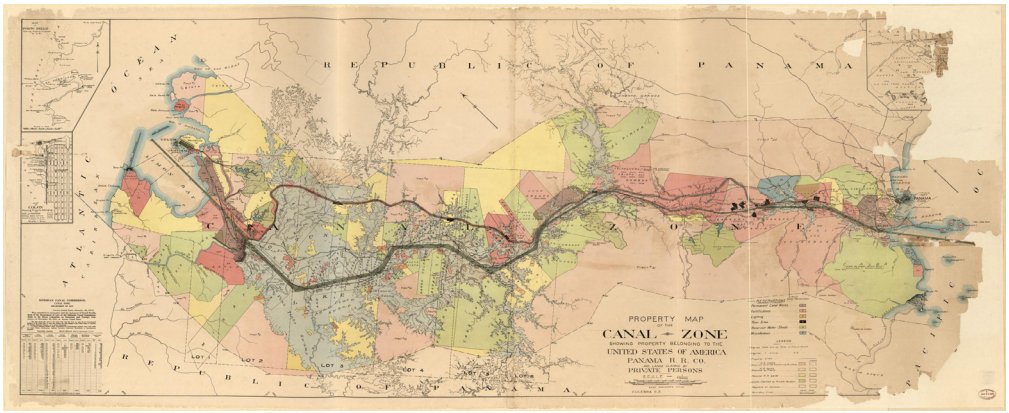
As our central hurdle revolved around the exceptionally intricate and perplexing complexity of the subject, to address this, we made the deliberate choice to first establish a comprehensive vocabulary and set forth explicit definitions that would form a solid ontological foundation for the project.

Contaminated Ecologies

The term *contaminated ecologies* is, in essence, a compound of two words: *contamination* and *ecology*. We establish the term *ecology* as *the relationships of various actors with and within a territory.* We believe there is no entity without its territory, but it's not its territory exclusively - different entities coexist on a territory and operate through them. Hence, we define contamination as *a new type and/or intensity of those relationships, which drastically alters certain previously existing context-specific conditions.* Subsequently, our mapping process is a process of tracing these alterations and interrelationships between them through different scales of space and time. And our process, as of that moment, became nothing else than: first, tracing the alterations through space and time and uncovering the relationships between them, in order to comprehend the overall interconnectedness. The expected result of such a process is a *map of altered relationships*, which, according to our definition, equals a *map of contaminated ecologies.*

The Line

Still, the environment is teeming with innumerable connections and their ever-changing dynamics. Attempting to map them all would be both impractical and yield limited benefits. Given that the Panamanian isthmus is where an anthropogenic intervention of a great ecological impact - the Panama Canal - occurred, we decided to focus on contaminations (read: altered relations) caused by it. To be more precise, we narrowed our focus to the conceptual and projective *Line* drawn by humans on a map across the isthmus. This simplicity of *the Line* - a basic two-dimensional Cartesian element - embodies the straight-forward, violent and reductionist idea of crossing a territory by all means.



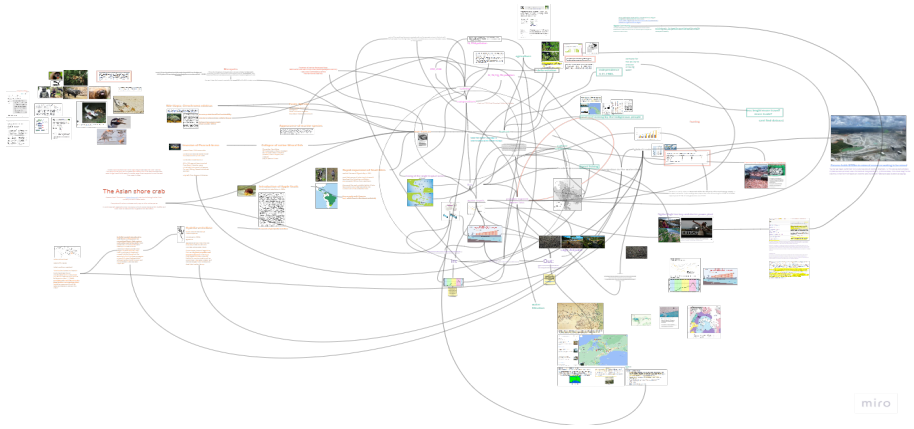
Property map of the Canal Zone showing property belonging to the United States of America, Panama R. R. Co., and lands claimed by private persons
Ancon, Canal Zone : Isthmian Canal Commission, Canal Zone, Dept. of Law, 1912.

Source:
Library of Congress Geography and Map Division Washington, D.C.

Methodology

Starting point

The initial engagement with the topic of Contaminated Ecologies began with individual research into all kinds of *things* happening, acting, changing, influencing each other within the given context. No distinction has been made between subject/object, human/non-human or natural/cultural. The only principle in outlining this ontology has been the ability of one thing to affect another, following in that sense the model of *flat ontology.* Having no restrictions or thematic constraints, we started investigations from a common point of departure into various different directions, which eventually produced a web of complex entanglements.



Starting Point
Initial research and thematic entanglements

Authors:
Contaminated Ecologoies Group

Matters of Concern

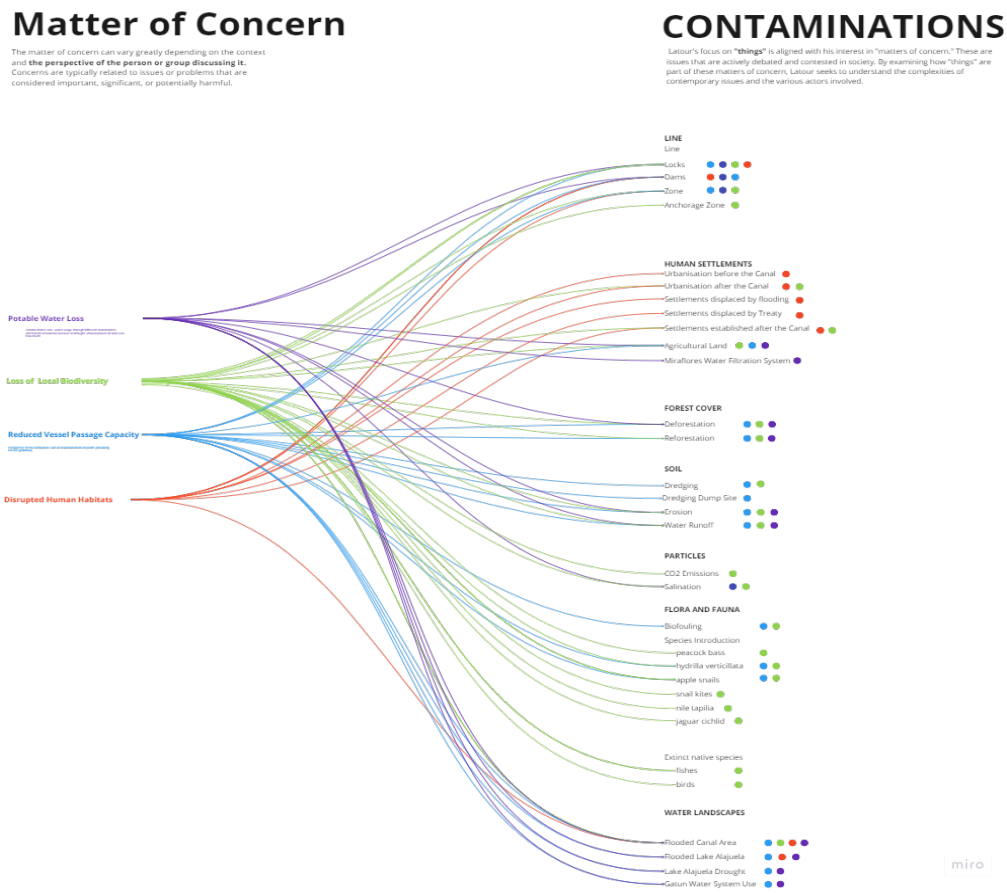
Yet even restraining ourselves to common point of departure leaves endless possible contaminations to map. While expected and outlined above, it nevertheless constituted the central challenge in our work. Faced with an innumerable and ever-growing amount of things at stake and the even more overwhelming complexity of relationships between them, it was clear to us that a tool will have to be devised that would allow us to retain and represent these levels of complexity while at the same time sustaining a level of operability.

Therefore, we have decided to address and focus on issues that produce unusual and unexpected, but also urgent results. When assessing the relevance of different contaminations, we have employed the Latourian concept of *matters of concern* (Latour, 2004). According to Latour, these are issues that are actively debated and contested in society and which, in contrast to the modern's *matters of fact*, don't attempt to superimpose one 'objective' reality over all other possible ones, denying them a voice in ontological politics. By examining how *things* are part of these *matters of concern*, Latour seeks to understand the complexities of contemporary issues and the various actors involved. *Matters of concern* can vary greatly depending on the context and the perspective of the person, group or entity concernned by it, meaning that they do not attempt to write a grand narrative, but instead produce situated, political, oligoptic knowledge.

Data and Information

In his text *Are Some Things Unrepresentable?*, by tracing the etymologies of data and information, Alexander Galloway (Galloway, 2011) gives significant insight into the distinction and relation between the two terms. Data (Lat. 'the things have been given' - 'the givens'), according to Galloway, is to be understood as ontologically raw, thrown into the world empirical proffering (something given for acceptance) of measurable or otherwise observable facts that have been given forth. Information, on the other hand, in its Latin etymology relates to an act of taking or being put into form.

According to this distinction, data bears no inherent information, but rather is instrumentalised, put into form to convey information or ultimately meaning. Thus visualisation of data must invent an artificial set of translation rules that convert abstract numbers to semiotic signs. This insight is of great significance for our work and our thoughts, as we seeked to develop a cartographic method that would not only show data, but ultimately produce meaning and knowledge about the ecologies at stake.



Matters of Concern
Overview of relevance of contaminations for various matters of concern

Authors:
Contaminated Ecologoies Group

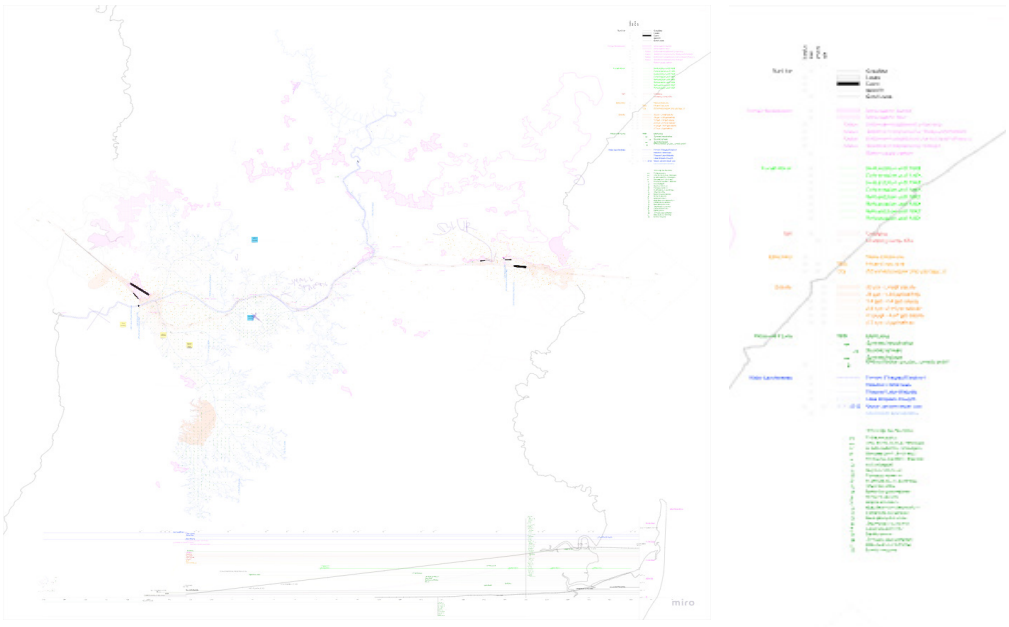
Data/Disentanglement/Territorialisation

Thus the next step in our research project was aimed at producing the ontologically raw - disentangle, extract data and territorialise it within a spatial context.

The *contaminations* we investigated and the data we gathered vary significantly in terms of their intensity, data types, distribution, and occurrence patterns. To be able to territorialise this wide array of data types, it was imperative to standardise them into a common format, a uniform language of representation. This standardisation process was achieved by subjecting the data to a precisely defined matrix. The collected data on each contamination was categorised based on data type and assigned an according representation method. The four data categories devised were location (if a specific location was known and relevant), area (when a contamination extended itself over a specified part of the territory), rate (when numerical information on the rate at which a specific relation had changed was available) and amount (in case of a known total numerical values at stake). On the map itself, the matrix was translated into a legend.

This approach enabled us to disentangle the intricate web of interrelated processes within *contaminated ecologies* into the raw data that underpins these processes and translate them onto a cartographic dimension, making them representable.

This mapping produces a representation of complexity, intensity, reactivity, and potential. It depicts each *contamination* and its associated data, superimposed with other *contaminations*. While it reveals complexity, it does not capture exact conditions or relationships. In reality, all of these data elements influence and interact with one another, connection onto a connection, reaction onto a reaction, resulting in numerous anticipated and unanticipated outcomes. This we then address in our next step.



Data/Disentanglement/Territorialisation
Initial data collection and taxonomic division

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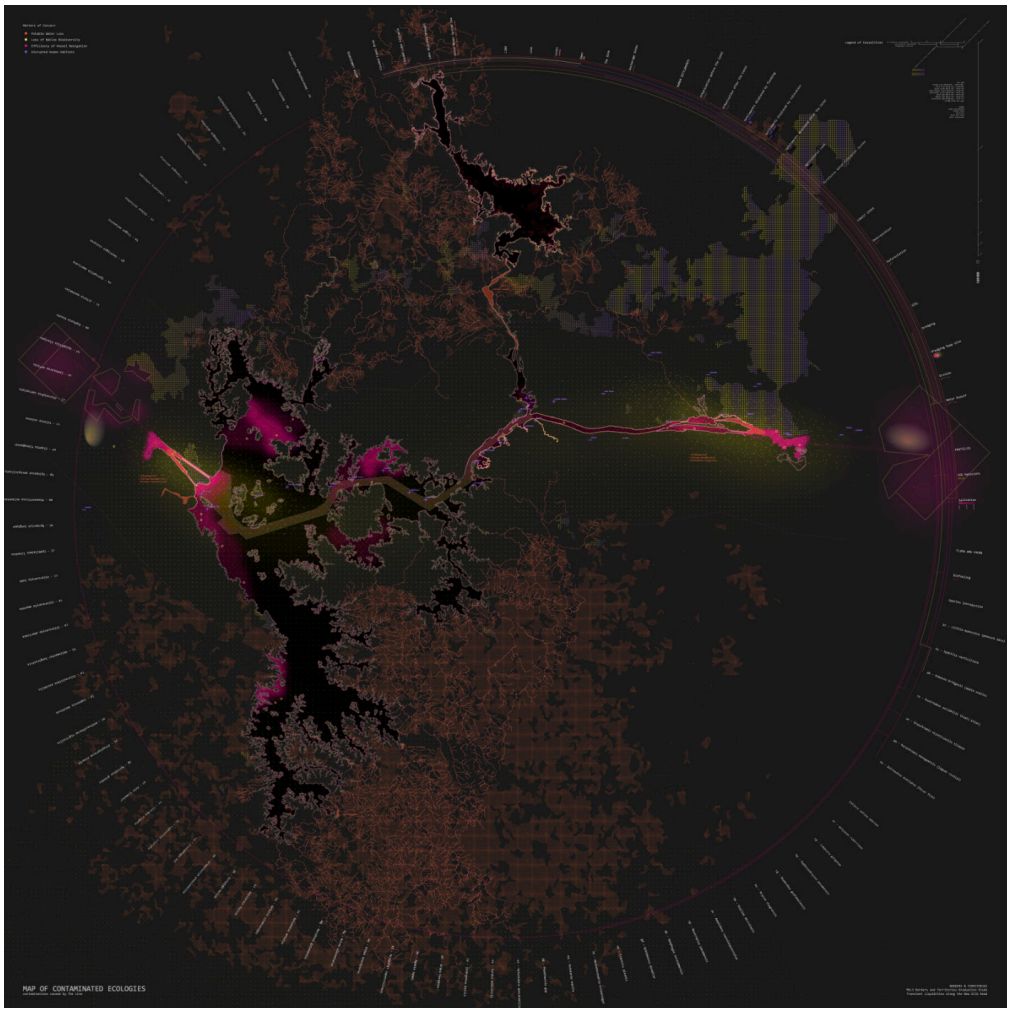
Contaminated Ecologoies Group

Information/Re-entanglement/De-territorialisation

Having initially divided the contaminations into ontological categories (ie. Soil, Flora and Fauna, Human Settlements) and drawn them in corresponding colours, we have found ourselves running into the same old trap of modernist thinking - sacrificing interrelationalities for the sake of legibility. While a legend containing all contaminations displayed on the map proved useful in the diagrammatic and literal tracing of relations (lines) between the different elements, its cartographic counterpart was nevertheless missing the point.

The subdivided rational and colour-coded strict representation was showing things (contaminations) as alienated interchangeable entities. The cartographic suspension of all ecological relations felt eerily reminiscent with a colonial way of thinking and the concept of slavery, which at its core stripped enslaved people of their social relations (Graeber, Wengrow, 2021). It can be argued that among others it is this aspect of 'objective' modern cartographic practice that has paved the way for the 'enslavement of nature by man' - conceptualising entities in 'nature' as separable and exploitable objects - and its resulting destructive dispositions we now learn to be parts of the Anthropocene.

To challenge this and devise a direction for a potentially alternative cartographic representation, we have worked with two techniques.

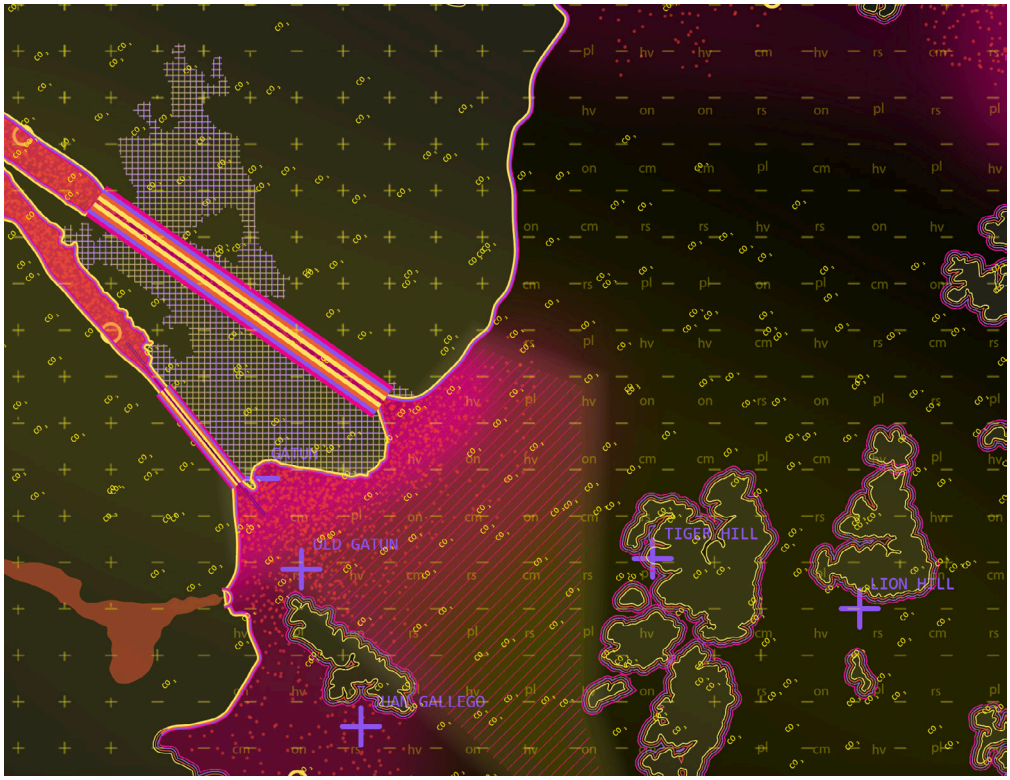


Map of Contaminated Ecologies Overview

Authors:
Contaminated Ecologoies Group

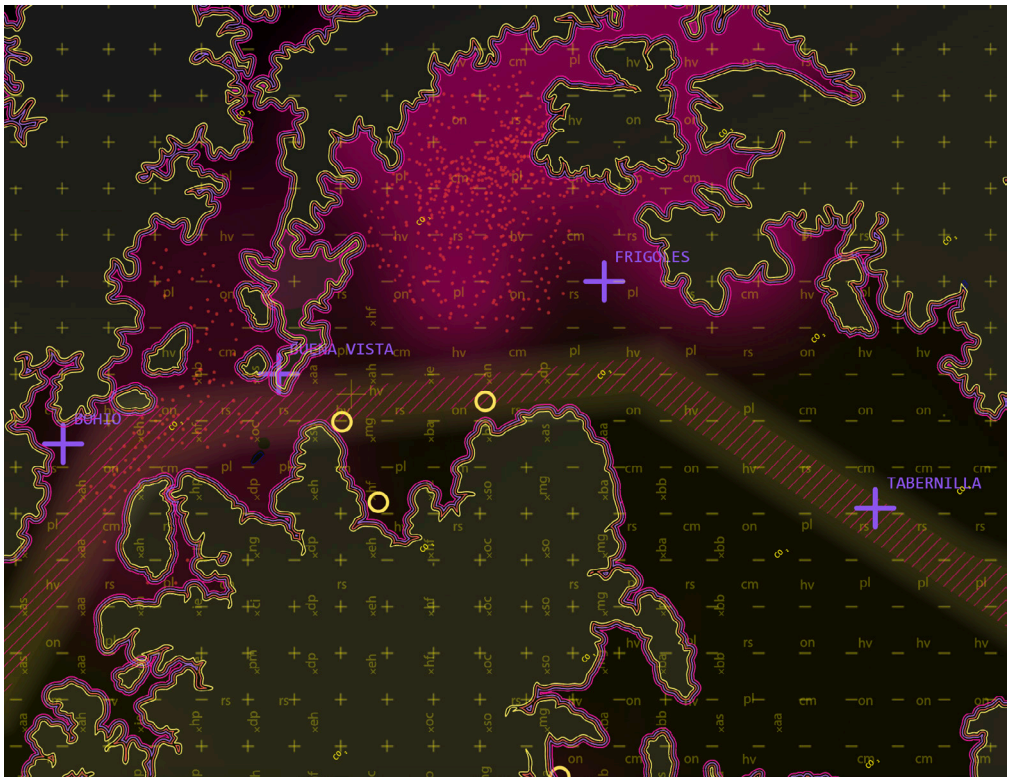
First, we have attempted to develop a system of graphic representation that would shift away from a taxonomic (what things are) to an agential understanding (what things do). For instance, engineering devices (ie. dams) are drawn as massive elements whose clear-cut barriers violently intervene into their surroundings, marking their instrumentalisation as elements of anthropogenic control. Streams whose banks facilitate erosion, are drawn with a clear middle and soft edges.

Second, and most important, we took the decision to represent contaminations on the map in colours not related to what would have been their scientific taxonomical division (soil, water landscapes, particles), but rather in relation to the matter of concern which they are part of. This shift from an allows for a representation that abandons the superstructures of 'objective' knowledge production and instead places those contaminatons within a system of overlapping, intersectional, situated fields of knowledge. Another effect, which was also surprising for us, is that now the map is not only showing different domains of situated matters of concern, but through the use of multiple colours for one and the same contamination (if ie. erosion concerns both the loss of potable water as well as the reduced vessel navigation capacity) also the shared Uexküllian *Umwelten* (Frichot, 2018; Bridle, 2022). The appearance of multiple colours on one and the same element also points to the intensity of its *mattering*, its significance for the shared territory and environment it is located in and ultimately unveils intersection and interrelation between those matters of concern.



Map of Contaminated Ecologies
Conceptual Cartographic Representation Techniques

Authors:
Contaminated Ecologoies Group



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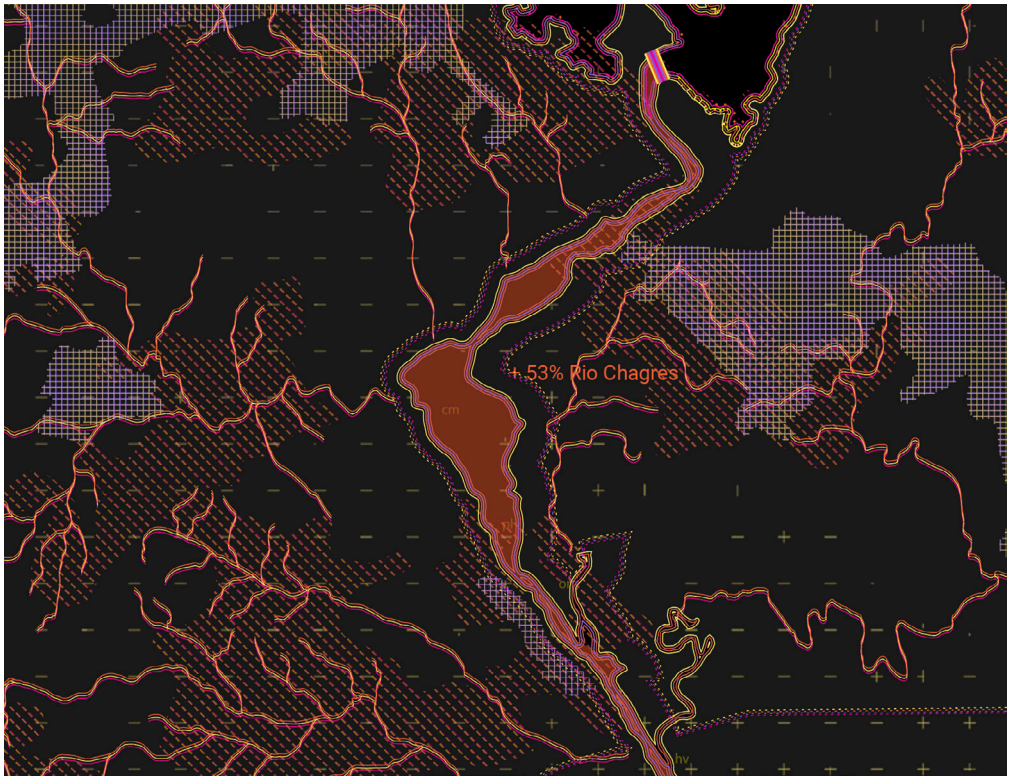

Map of Contaminated Ecologies
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Reflections and Outlook

This map serves as a guide and test ground for exploring and representing complex entangled issues. The concept of entanglement itself remains elusive until it undergoes some level of disentangling, yet once fully unraveled, its essence is lost. Some topics, such as ecology and contamination, can never be fully disentangled. What we understand about complex, intertwined subjects is that they cannot be comprehended by either completely untangling them or merely observing them in their entangled state. Instead, ecological mapping should be a continuous oscillation between these two poles.

We perpetually find ourselves in the middle ground, influenced both by individual elements and the data composing the entanglement, as well as by the multitude of relationships and connections that surround these elements, shaping their reactions and actions. Our map encapsulates this dynamic, this exchange and this intensity. It resides between two extremes, offering both data and visual representations of things, as well as interpretations and narratives referred to as *matters of concern*. By engaging with both aspects of the map, we gain insight into the prevailing conditions and discern the crises at hand. The mapping process ultimately evolved into a quest for unexpected consequences, significant for different people and perspectives, stemming from the chain reactions initiated by the Canal's conception, construction, its presence and the daily passage of ships - the Line - whose simplicity and abstraction nevertheless display a complex entangled material presence within the territory.

Following the concept of *Umwelt* as coined by the biologist Jakob von Uexküll, which denotes a particular perspective of a specific organism composed of its knowledge and perceptions, in our ontology where 'organism' can be replaced with any more-than-human group or entity one can argue that what the map ultimately does is to show the shared umwelt between the various perspectives concerned with the territory of the Panama Canal area.

Ultimately, we believe that this research can make a contribution to developments in cartographic practices and understandings that would be able to operate ecologically, within and across various disciplines and contexts, offering a viable alternative between dangerous reductionism and overwhelming complexity. In a time where it is inviable and even harmful to not think and work in ecological terms while complexities continue to expand, this methodology could be a crucial tool to operate meaningfully, as architects and beyond.

Bibliography

Bridle, J, (2022). *Ways of Being.* Penguin Books.

Frichot, H. (2018). *Creative Ecologies : Theorizing the Practice of Architecture.* Retrieved from https://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-253022

Galloway, A. (2011). Are Some Things Unrepresentable? *Theory, Culture & Society,* 28(7-8), 85-102. https://doi.org/10.1177/0263276411423038

Graeber D. & Wengrow D. (2021). *The Dawn of Everything a New History of Humanity*. Farrar Straus and Giroux.

Latour, Bruno (2004). Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern. *Critical Inquiry 30* (2):225-248.