

THE VIEW FROM ABOVE AND ITS COUNTER-APPROPRIATION

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ABSTRACT

The term “view from above” does not merely describe an aerial perspective using digital technologies. According to Macarena Gómez-Barris, it is an extractive and neoliberal tool for transforming territories into areas to be exploited. In contrast, she introduces “submerged perspectives,” which can always be found in these territories and are characterized by relations on the ground. An argument based on opposites should always make one suspicious, especially when considering contemporary artistic practices. This article demonstrates that contemporary works of art can unleash the critical potential of the view from above. Two works, one by Carolina Caycedo and the other by Forensic Architecture, are analyzed to demonstrate a substantial expansion of the view from above. Contemporary art has the capability to counter-appropriate a supposedly hegemonic instrument and, thus, offers the possibility of rejecting constructed and abstract dichotomies.

KEYWORDS

View from Above, Submerged Perspectives, Macarena Gómez-Barris, Extractive Zone, Extractivism, Satellite Images, Remote Sensing, Counter-Appropriation, Contemporary Art

Let us consider two works of art that are characterized by the counter-appropriation of the view from above. As a theory, the view from above is often simplified and presented in contrast to perspectives on the ground; this is not possible when contemporary works of art are analyzed, and their own theory production is taken seriously. The first work of art is Carolina Caycedo's *YUMA, or The Land of Friends* from 2014. It is a digital print on glass, part of her long-term project, *Be Dammed*, in which she has explored the intensive use of hydropower in Colombia since 2012. Caycedo nested three satellite images in her 580 × 473 cm mural; the result is an unclear perspective that contradicts the viewer's expectations (Fig. 1). The second is a video by the British artistic research collective, Forensic Architecture, called *Oil and Gas Pollution in Vaca Muerta*. Released in 2019, it addresses the effects of fracking in Argentina. Forensic Architecture uses a variety of techniques, including 3-D modeling, geolocation, image complexes, such as mobile phone videos taken by workers, activists, and environmental organizations, and remote sensing to create the video.

What these two works of art have in common is that they are based partly on techniques that are used to construct the view from above. Moreover, both works, in their own way, blur the boundaries between digital representation from afar and relations on the ground. I argue that analyzing these two works of art, which critically engage with airborne representation in South America, challenges the abstract dichotomy between the technical infrastructures of extractive industries and the local perspectives of human and non-human entities embedded in the ecology of the respective regions.

This dichotomy was defined by Macarena Gómez-Barris in her widely discussed book, *The Extractive Zone. Social Ecologies and Decolonial Perspectives*, published in 2017. For her, the sterile and abstract "view from above" is a counterpart to "submerged perspectives." She describes the view from above as "grand scale": technically mediated and beyond all the relations on the ground. It follows the cold logic of neoliberal capitalism and transforms territories into "extractive zones."¹ In contrast, submerged perspectives are embedded and embodied. They include forms of "local knowledge" and can always be found in "extractive zones" as they resist appropriation and only emerge through "situated site work."²

I will focus here on several interrelated points that challenge Gómez-Barris's dichotomy. I examine whether the various aspects of the



Fig. 1
Carolina Caycedo. *Yuma, or the Land of Friends*, 2014. Satellite photo collage. Courtesy of Carolina Caycedo.

view from above can contrast the submerged perspectives, or whether these works of art provide methods of counter-appropriation of the view from above to develop a non-extractive mode using digital imagery. To achieve this, it is necessary to critically analyze the two works and consider their political, economic, and societal context. It becomes evident that the view from above is represented by some institutions that are simultaneously active at the sites. Therefore, it is not always distant from the ground, and, indeed, aspects of the view from above actually support the realization of submerged perspectives.

Both works reflect on theories of (new or neo) extractivism in their own way. These theories describe the massive appropriation and exploitation of natural resources. In *YUMA, or The Land of Friends*, the devastating social and ecological effects of the extraction of hydropower on the region is shown. The same is true for *Oil and Gas Pollution in Vaca Muerta*. However, in the second artwork, the extracted resource is not free-flowing water but shale oil and gas. Extractivism has a long history. It describes a mindset that causes ecological and social degeneration to accumulate capital.³ While imperial states and their trade organizations have pursued extractivism for centuries, the connection between transnational companies and rent-seeking states was established more recently, especially with globalization.⁴ The term “extractivism” was originally used by banks and oil companies to describe their business practices. Later, it was developed into a critical theory by South American researchers such as Alberto Acosta, Maristella Svampa, and Eduardo Gudynas.⁵ In contrast, neo- or new-extractivism is a special case in South America; progressive, left-wing governments seek international trading partners and promote resource extraction in their countries to finance social programs.⁶

This extractivist mindset is the primary object of critique in Gómez-Barris’s book. She analyzes extractivist violence in various forms and develops the two categories of the view from above and submerged perspectives based on case studies.⁷ A decisive part of the extractivist view from above is the technical products of digital infrastructures, especially the use of satellites and other devices for aerial photography, which can be used to scout the ground and the subsoil.⁸ Transnational corporations and government authorities use remote sensing, geospatial modeling, satellite imagery, and algorithm-based artificial intelligence to build a geographical information system to maximize profits from the exploitation of raw

materials. The different phases of mining, from scouting to the finished product, including the logistical chain, are now in direct communication with each other, minimizing loss of time and risk to capital.⁹ As a result, even “low-grade mineral deposits” can be mined profitably today; this has increased the material footprint of the extractive industry by a factor of approximately 1,000.¹⁰ In this context, it seems ironic that the digital infrastructures of extractivism are dependent on mining of raw materials as their components must first be extracted from the earth, and as the resource frontier shifts with every technological advancement, it opens up new mining opportunities.¹¹ These digital infrastructures are also used to find the most profitable location for a large-scale project, such as a hydroelectric power plant. In her artwork, Caycedo uses the same technical tools that are used to construct this extractivist view. She also shows the perspectives that remain unnoticed as a result. In contrast, Forensic Architecture appropriates the technical infrastructures to provide counter-evidence and represent the interests of local communities.

Artists inquiring into this assemblage of image-making techniques and ideologies for critical analysis is not an isolated phenomenon or a recent development. The works of artists, such as Allan Sekula, Harun Farocki, and Hito Steyerl, could also be included in this trend. Techniques, such as mapping and the constructed but supposedly rational representation of a view from above, are deeply intertwined in the history of Western art;¹² both Caycedo and Forensic Architecture need to be seen in this line of tradition.

HYDROPOWER AND SATELLITE IMAGERY

The unclear perspective in *YUMA, or The Land of Friends* is largely achieved through the montage of three satellite images taken between April and September 2013 that Caycedo purchased from a commercial imaging agency. The images show the construction of the 151-meter high and 632-meter long El Quimbo hydroelectric power plant on Río Magdalena in Colombia.¹³ One of the images was either colorless or edited, which is evident from the black and white portions. In the artwork, brown sections overlay the entire river in two places. These and other brown areas are the most jarring as they contrast strongly with the otherwise dominant green. The scramble of colors together with the black and white portions stirs associations of violence. The landscape depicted in this way symbolizes dispossession and displacement, which go hand in hand with extractive processes. It is not at first visible where the river flows

from and to. This is indeed logical because the dam deprived Río Magdalena of its flow dynamics and is now controlled by a technical construction. The reservoir thus created is an artificially flooded area that is 55-kilometers long and 1.4-kilometers wide. It displaced thousands of residents and has substantially damaged the environment.

The three satellite images represent three points in time in the construction process and their combination is a simulation of the violent intervention in the course of the river. Caycedo's artistic realization can be interpreted as an artificially produced fantasy. The same is also true for her source material, the satellite images. They are based on a "cultural technique,"¹⁴ which produces an image that is by no means a reproduction of a region but must be interpreted in a long tradition of techniques, epistemologies, and ontologies that produce a view of the world and a particular world itself. Leon Gurevitch speaks of the "mediacene" in this context,¹⁵ and Jussi Parikka refers to the chain of operations that turn such "material objects" into "ontological agents that shift the world through their operations."¹⁶ Satellite images as a cultural technique establish "non-propositional forms of knowledge."¹⁷ This valorizes iconic knowledge; it is a logos that is intrinsic to the visual and not subordinate to linguistic expression.¹⁸ However, this non-propositional agency does not automatically show an indexical representation or visual evidence. Satellite images are embedded in multiple operational processes that obscure other perspectives.

In this context, Caycedo's artwork is closer to a perspective that incorporates the conditions on the ground. The artwork shows the massive intervention of corporate terraforming from a supposedly safe distance. This impression results, most of all, from the dimensions of the artwork (580 × 473 cm) and the information panel that Caycedo adds (Fig. 2). The text panel contains facts about the El Quimbo Dam, such as its dimensions, the predicted power generation, and the connections between the companies and financing institutions involved. For example, a conglomerate of transnational energy companies is responsible for the development, construction, and maintenance of the dam. The companies used, among other things, satellite images to explore the location of the dam. It is a corporate and extractivist view, which Gómez-Barris describes as the view from above.

EL QUIMBO HYDROELECTRIC PROJECT HUILA - COLOMBIA

- Single-purpose hydropower project
- Concrete faced rock-filled dam 151 m high, 632 m long
- Auxiliary dike: 66 m high, 390 m long
- Project area: 8,586 Hectares
- Total capacity: 1,824 Million cubic meters
- Reservoir Life Expectancy: 50 years
- Construction: 2010 - 2014
- Enterprises: Endesa (Spain), ENEL (Italy), through their subsidiary Emgesa (Colombia)
- International Financial Institutions:
 - European Investment Bank and Inter-American Development Bank
- Estimated investment: US \$ 1.093 millions
- Impounds waters of the Yuma (Magdalena) and Cuacua (Suaza) rivers.
- Municipalities: Gigante, El Agrado, Garzon, Tesalia, Altamira and Palcol
- Type of Population: Rural
- Potential Affected Population: 15,000 (total rural population of affected municipalities)
- Population to be compensated: 2,212 (Endesa's census)
- First private sector hydroproject in Colombia built under Reliability Charge Scheme: Emgesa-Endesa-Enel receives an independent fixed income assigned for a period of 20 years, a price of US\$14 per megawatt-hour for the power sold to Huila department
- Compensation Measures Non-residents: Seed capital and accompanying program with training component.
- Compensation Measures Residents, Owners or Holders:
 - 5 ha or less: 5 ha with housing only if affected property had one.
 - Between 5 and 50 ha: Equivalent property in hectares and characteristics
 - 50 ha or more: Direct purchase
- Colombian Constitutional Court Ruling T-135 of 3-13-2013 orders "Emgesa to initiate the development of a new census of affected people to be compensated". The company has not complied.
- El Quimbo Installed Capacity: 400 Megawatts
- El Quimbo Average Generation: 2,216 Gigawatts hour per year
- Will supply about 5% of the Colombian energy demand
- Surplus electricity will be exported to Ecuador, Central America, and the Caribbean
- Colombia Installed Electricity Generation Capacity: 14.4 Gw, 60% hydropower
- Colombia Average Generation: 5.9 Terawatt hours per year, 68% hydroelectric
- Colombia Total electricity consumption 2013: 5.02 Terawatt hours
- Total electricity exports 2013: 57.8 Gigawatt hours
- Total electricity imports 2013: 0.1 Gigawatt hours

Satellite images acquired 11 April 2013, 24 June 2013 and 1 September 2013.
Coordinates: NW Lat. 2.4920, Long. -75.5900; Center Lat. 2.45983, Long. -75.56519; SE Lat. 2.42700, Long. -75.5400.
WorldView-1 50 cm per pixel, QuickBird 60 cm per pixel, Pleiades-1 50 cm per pixel.
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Fig. 2
Carolina Caycedo. *Yuma, or the Land of Friends*, 2014, installation detail. Courtesy of Carolina Caycedo.

Caycedo's counter-appropriation is not to be understood in the sense of an exaggeration intended to subvert. Rather, the violent intervention on the ground is transferred to images that are crucial for the appropriation of raw materials and, thus, extractivism. In *YUMA, or The Land of Friends*, some parts of the view from above are distorted; the artist uses the operational aspects of satellite images as a cultural technique to point out the field of tension that arises between airborne representation and relational perspectives in the regions.

It is important to avoid the impression that satellite images by themselves constitute the view from above; instead, several techniques are needed. What they have in common is that the relations on the ground and, thus, the submerged perspectives, fade away to allow the appropriation of "Cheap Nature."¹⁹ Other techniques are neo-liberal reforms or institutions of the Global North, such as the International Monetary Fund and the World Bank, along with foreign direct investment, large multinational corporations, commodity prices and commodity trading in the form of options or futures. Extractivist capitalism uses all of them. Furthermore, the progressive governments of the so-called "pink tide" in Latin America and their (mostly) conservative successors are an essential aspect as they support the conversion of Río Magdalena into an energy landscape or grant concessions for the extraction of natural resources.²⁰

FRACKING AND REMOTE SENSING

The artistic research collective Forensic Architecture also uses the digital techniques of extractive industries, most notably in their video *Oil and Gas Pollution in Vaca Muerta*, which was published on their website on October 14, 2019. In a span of five minutes and two seconds, the video covers the economic interests and the associated environmental and social abuses in Vaca Muerta, Argentina, a geological formation in the Neuquén province, where massive deposits of shale oil and gas were discovered in 2011. Forensic Architecture investigated the area from 2013 to 2019. The video is accompanied by a voiceover to guide viewers through their investigations and provide context. In 2013, the Argentinian government granted concessions to foreign petro-giants to extract shale oil and gas. Using before-and-after satellite imagery, Forensic Architecture illustrates the growth of tailing ponds or waste-storage facilities and the infrastructure that was built. The video shows a map of the extraction area to illustrate the immense impact on the region inhabited by the indigenous Mapuche community. Twenty companies work on a total

of 36 concessions covering an area of 8,500 square kilometers; around 2,000 fracking wells have been drilled since the discovery of shale oil and gas.²¹

Forensic Architecture's use of remote sensing in *Oil and Gas Pollution in Vaca Muerta* is particularly important in the counter-appropriation of the view from above. In general, remote sensing is a technique of mediating the object under investigation without physical contact.²² One current form of remote sensing is often used in extractivism to measure the electromagnetic radiation of a surface using a satellite or other flying objects.²³ Depending on the nature of the surface, more radiation is reflected or absorbed. A distinction is made between active and passive systems; the former is the source of the radiation, while the latter is reflected onto and do not transmit anything themselves.²⁴ In most cases, active and passive systems are combined because they produce images using different wavelengths. The topography of the ground and the subsoil is visualized, as remote sensing can visualize a wider range of wavelengths than the human eye can.²⁵ This technology is closely linked to early experiments in aerial photography but did not advance significantly until it was used in military and intelligence applications—a connection that endures.²⁶ The commercialization of remote sensing accelerated in the early 1990s, and since then, the global market has been dominated by a few major players, with an estimated revenue of \$2.6 billion in 2020.²⁷ Remote sensing has now become a “critical technology and method within environmental science and a crucial way in which to study environmental change on a global scale.”²⁸ Artists and collectives, such as Forensic Architecture, use remote sensing to make damage visible, which is itself produced by extractive activities through remote sensing.

In *Oil and Gas Pollution in Vaca Muerta*, Forensic Architecture uses remote sensing to highlight the impact of fracking on local vegetation (Fig. 3). The image shows the mined area around Añelo from 2013 to 2019. The deep black portions signify stability. The more grayish-white the soil is, the more stressed the vegetation; the yellow areas represent a loss of vegetation. It is immediately apparent that within a short period of time, the extraction of shale oil and gas had a massive impact on the local flora. Forensic Architecture uses normalized difference vegetation index (NDVI) to construct this image. The NDVI is a standard method for visualizing changes in vegetation using remote sensing. The example of remote sensing reveals that the technically mediated view from above *cannot* be considered

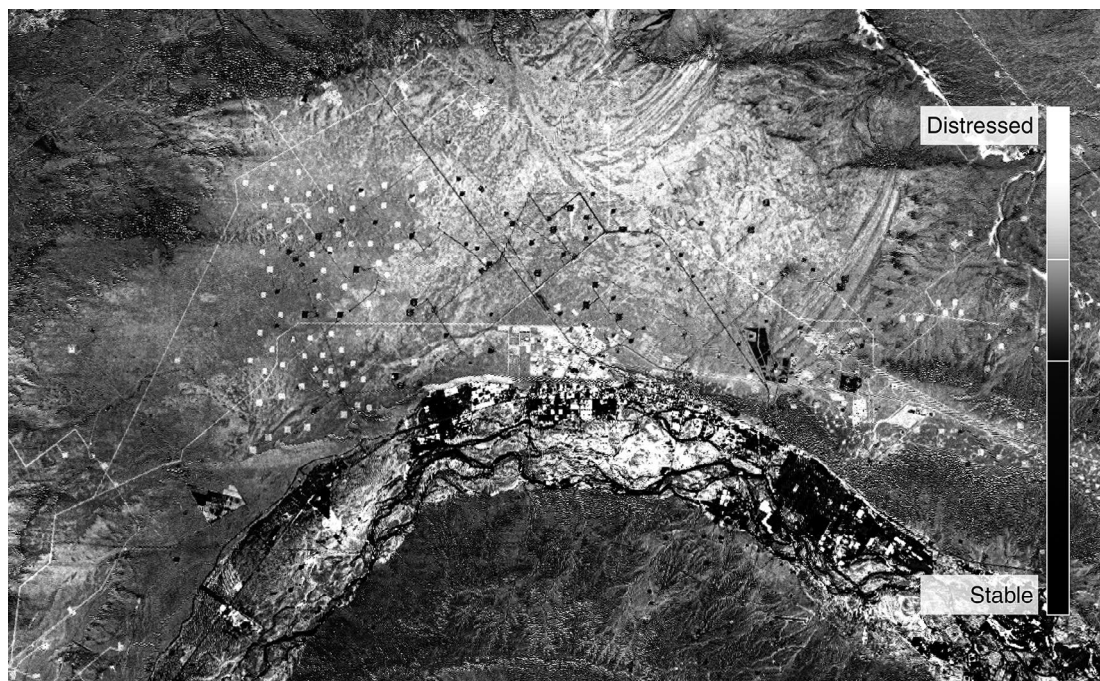


Fig. 3
Forensic Architecture, *Oil and Gas Pollution in Vaca Muerta*, 14.10.2019, TC 05:02 min.
Normalised Difference Vegetation Index (NDVI) analysis of the region surrounding the town of Añelo, in Vaca Muerta.
(Forensic Architecture)

a distant and all-seeing entity. Rather, there are many individual views that do not work with distance alone but also with proximity.²⁹ Artificial simulation is created from countless fragments, but this is also subject to limitations. For example, a satellite takes approximately 90 minutes to circumnavigate the earth, but because of the earth's rotation, it is in the same place again after 24 hours, leaving a gap in between.

However, Forensic Architecture's use of remote sensing is not a manipulative and violent intervention in the unity of the images as Caycedo's work is. Rather, remote sensing is used to clarify the damage to the ground by means of the technical process. A common feature of both works of art is that the artists use the same technical infrastructures that are used by companies, states, and militaries. These three actors—the material-extracting company, the concession-granting and rent-seeking state, and its executive—are confronted with their own instruments. In contrast, artistic counter-appropriation renders visible the destructive forces of the neoliberal economic system and its effects in remote areas. These works of art do more than merely depict or generate attention. The logic underlying the view from above is challenged; the constructed and abstract object Earth, which can be appropriated for profit, is by no means unified by technical representation; multiple interconnected ecologies on the ground also emerge through the supposedly sterile view.

TOWARD A NEW VIEW FROM ABOVE

Both Carolina Caycedo and Forensic Architecture contextualize aerial views with perspectives from participants on the ground but in markedly different ways. Caycedo includes various voices in her 2014 video *The Land of Friends*, which is part of the group of works, *Be Dammed*, and deals with the El Quimbo dam. In her book, *The Extractive Zone*, Gómez-Barris refers to this work of art to expound on submerged perspectives, presumably because direct visual equivalents, such as underwater shots, can be found. The work gathers a multitude of human and nonhuman perspectives from the residents of Río Magdalena who are the most affected by the dam. Forensic Architecture includes local perspectives in its work *Oil and Gas Pollution in Vaca Muerta*, such as the protesting Mapuche or the video recordings leaked by workers. The collective describes the result of its work process as an “evidence assemblage,” which is constructed on the basis of local perspectives and the satellite images.³⁰

However—and this is important—it *should not* be concluded that perspectives of participants on the ground are, in essence, different from the view from above. This would be an oversimplification, which can easily occur because of Gómez-Barris' abstract dichotomy of the view from above and the submerged perspectives. The extractive industries are present on the ground and work with the relationships and perspectives of the individual entities they find there. Multiple processes take place on the ground years before the extraction of raw materials, leading to the physical intervention in the environment. One of these processes is called “ground truth,” which describes the additional information that is collected to verify or falsify the interpretations of remote sensing.³¹ For example, fieldwork for scouting the topography on site or taking soil, water, or air samples; hence, ground truth is also referred to as “reference data.”³² Furthermore, after the concessions were granted and the territory was scouted, site visits were made by local representatives. Regional governments were involved, as were courts, local elites, and environmental institutions. For the El Quimbo dam, for example, the company that carried out the project submitted an initial environmental report as early as 2008.³³ In addition, in many Latin American countries, “prior consultation” is legally binding or recognized as self-commitment.³⁴ Prior consultation requires that those affected by an industrial project be informed in advance by the executing companies and that their demands be included. Nevertheless, “consultation” should not be confused with “consent.” Rather, it serves as a “soft tool” of extractivism. In addition, consultations are sometimes carried out when the project can no longer be significantly altered.³⁵

The main difference is the quality of engagement with the relationships on the ground and the inclusion of as many entities involved in the relationships as possible. This concerns both human and nonhuman entities. Gómez-Barris employs the notion of “local knowledge” to insist on taking different perspectives seriously, including marginalized ones.³⁶ However, looking at the works of art by Caycedo and Forensic Architecture, it can be seen that a submerged perspective can be supported with aspects of the view from above. Fractions of it must be extracted, reversed, and reapplied. Aerial representations play a role in the emergence of the view from above and the abstract logic of extractive industries. At the same time, they can also underpin submerged perspectives. The analysis of the two works and their context contest Gómez-Barris's abstract dichotomy and instead shows that the view from above can in fact become a submerged perspective through counter-appropriation.

- 1 Macarena Gómez-Barris, *The Extractive Zone. Social Ecologies and Decolonial Perspectives* (Durham, London: Duke University Press, 2017), 5–8.
- 2 Gómez-Barris, *The Extractive Zone*, 11, 134.
- 3 Francesco Durante, Markus Kröger, and William LaFleur, “Extraction and Extractivism: Definitions and Concepts,” in *Our Extractive Age: Expressions of Violence and Resistance*, eds. John-Andrew McNeish and Judith Shapiro (London and New York: Routledge, 2021), 19–30; Anna J. Willow, *Understanding ExtrACTIVISM. Culture and Power in Natural Resource Disputes* (London and New York: Routledge).
- 4 Brett Christophers, *Rentier Capitalism: Who Owns the Economy, and Who Pays for It?* (London and New York: Verso, 2020).
- 5 Eduardo Gudynas, *Extractivisms: Politics, Economy and Ecology* (Halifax: Fernwood Publishing, 2021).
- 6 Alberto Acosta, “Extractivism and Neoextractivism: Two Sides of the Same Curse,” in *Beyond Development: Alternative Visions from Latin America*, eds. Miriam Lang and Dunia Mokrani (Amsterdam: Rosa-Luxemburg Foundation, Quito, and Transnational Institute, 2013), 61–86; Henry Veltmeyer and James Petras, “A New Model or Extractive Imperialism?” in *The New Extractivism. A Post-Neoliberal Development Model or Imperialism of the Twenty-First Century?*, eds. Henry Veltmeyer and James Petras (London and New York: Zed Books, 2014), 21–46.
- 7 In her book, *The Extractive Zone*, Gómez-Barris addresses several other works from Caycedo’s *Be Dammed* project, as shown below.
- 8 Gómez-Barris, *The Extractive Zone*, 7–8, 96.
- 9 Martín Arboleda, *Planetary Mine: Territories of Extraction under Late Capitalism* (London and New York: Verso, 2020), 118.
- 10 Arboleda, *Planetary Mine*, 49.
- 11 Jussi Parikka, “Earth Volumes, Operationalized,” in *Rare Earth*, eds. Boris Ondrejčka and Nadim Samman (London: Sternberg Press, 2015), 126.
- 12 Hans Belting, *Florence and Baghdad: Renaissance Art and Arab Science* (Cambridge: Harvard University Press, 2011); Simonetta Moro, *Mapping Paradigms in Modern and Contemporary Art: Poetic Cartography* (New York and London: Routledge, 2022).
- 13 Río Magdalena, which is the officially used name, was named as such by the Spanish conquistador Rodrigo de Bastidas in 1501. Before that, the central river in what is now known as Colombia was known by several names. One of them is “YUMA,” which translates to “the land of friends” in the indigenous language. These different names evoke completely different connotations with regard to the connection and interactions with the river.
- 14 As Bernhard Siegert summarized, the understanding of the concept of cultural technique encompasses various levels and has become increasingly diverse. Thus, both “basic skills,” communication technologies and the “intrinsic relationship to their material carrier are included.” In addition, “operative chains,” “symbolic work,” and “self-reference” are decisive. Cultural techniques also have “the position of the third;” they precede distinctions and make them perceptible. Bernhard Siegert, *Cultural Techniques: Grids, Filters, Doors, and Other Articulations of the Real* (New York: Fordham University Press, 2015), 8–15.
- 15 Leon Gurevitch, “Google Warming: Google Earth as eco-machinima,” *The International Journal of Research into New Media Technologies* 20, no. 1 (2014): 85–107.
- 16 Jussi Parikka, *Operational Images: From the Visual to the Invisual* (Minneapolis and London: University of Minnesota Press, 2023), 38.
- 17 Horst Bredekamp and Sybille Krämer, “Culture, Technology, Cultural Techniques: Moving beyond Text,” *Theory, Culture & Society* 30, no. 6 (2013): 21–23. Horst Bredekamp analyzes the visual in relation to art, technology, and science and describes this with his theory of “image acts,” among other things. Horst Bredekamp, *Image Acts. A Systematic Approach to Visual Agency* (Berlin and Boston: De Gruyter, 2018). Sybille Krämer’s research on notational iconicity, writing-images, and the conditions of medium and medialization has a different focus. Sybille Krämer, *Media, Messenger, Transmission. An Approach to Media Philosophy* (Amsterdam: University Press 2015).
- 18 The “iconic turn” according to Gottfried Boehm and the “pictorial turn” according to W. J. T. Mitchell can by no means be unified. While the former examines the philosophical foundation of the image and develops the model of “iconic difference,” Mitchell has a stronger affinity to the picture as a (mass media) phenomenon, into which he also incorporates material and meta-reflexive aspects. However, both are crucial in the field of image theory, if images are to be analyzed beyond language. Gottfried Boehm, *Wie Bilder Sinn erzeugen: Die Macht des Zeigens*, 4th ed. (Wiesbaden: Berlin University Press, 2015), and W. J. T. Mitchell, *Picture Theory: Essays on Verbal and Visual Representation* (Chicago: University of Chicago Press, 1995). Studies on the visual epistemologies of climate images using satellite technology are an example of iconic knowledge in this context, and they are based on a variety of operations. Birgit Schneider, *Klimabilder. Eine Genealogie Globaler Bildpolitiken von Klima und Klimawandel* (Berlin: Matthes & Seitz 2018).
- 19 “The conditions for the rise of capitalism, in other words, was the creation of Cheap Nature. [...] Cheap is here understood as work/energy and biophysical utility produced with minimal labor-power, and directly implicated in commodity production and exchange.” Jason W. Moore, “The Rise of Cheap Nature,” in *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*, ed. Jason W. Moore (Oakland: PM Press, 2016), 99.

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- 20 Macarena Gómez-Barris, *Beyond the Pink Tide: Art and Political Undercurrents in the Americas* (Oakland: University of California Press, 2018).
- 21 Uki Goñi, "Indigenous Mapuche Pay a High Price for Argentina's Fracking Dream," *The Guardian*, October 14, 2019, <https://www.theguardian.com/environment/2019/oct/14/indigenous-mapuche-argentina-fracking-communities>.
- 22 "Remotely sensed data are turned into useful information through a combination of visual image interpretation and/or quantitative analysis." Jonathan Chipman, Ralph W. Kiefer, and Thomas Lillesand, *Remote Sensing and Image Interpretation*, 7th ed. (Hoboken: Wiley, 2015), 610.
- 23 Gökçe Önal, "Media Ecologies of the 'Extractive View': Image Operations of Material Exchange," *Footprint* 14, no. 2 (Autumn/Winter 2020): 33.
- 24 Magaly Koch and Paul M. Mather, *Computer Processing of Remotely-Sensed Images: An Introduction*, 5th ed. (Hoboken: Wiley-Blackwell, 2022), 17–19.
- 25 Önal, "Media Ecologies of the 'Extractive View'," 34.
- 26 Chipman, Kiefer, and Lillesand, *Remote Sensing and Image Interpretation*, 86–88, 609.
- 27 Delf Rothe, "Seeing Like a Satellite: Remote Sensing and The Ontological Politics of Environmental Security," *Security Dialog* 48, no. 4 (2017): 340–41.
- 28 Jennifer Gabrys, *Program Earth: Environmental Sensing Technology and the Making of a Computational Planet* (Minneapolis, London: University of Minnesota Press, 2023), 3.
- 29 Önal, "Media Ecologies of the 'Extractive View'," 45.
- 30 Eyal Weizman, *Forensic Architecture: Violence at the Threshold of Detectability* (New York: Zone Books, 2018), 58.
- 31 "From airborne photogrammetry to spectral imaging and many other techniques, remote sensing operates as productive cross-reading of ground truths and invisual technologies that prepare images to prepare data to prepare policy from extraction to sustainability." Parikka, *Operational Images*, 150.
- 32 Chipman, Kiefer, and Lillesand, *Remote Sensing and Image Interpretation*, 39–42.
- 33 Carolina Caycedo, "Be Dammed" (Thesis, University of Southern California, 2014), 29.
- 34 Charlotte Schumann, *Framing Prior Consultation in Brazil: Ethnographic Perspectives on Limits of Participation and Multicultural Politics* (Bielefeld: transcript, 2018).
- 35 Philippe Le Billon and Nicholas Middelorp, "Empowerment or Imposition? Extractive Violence, Indigenous Peoples, and the Paradox of Prior Consultation," in *Our Extractive Age: Expressions of Violence and Resistance*, eds. John-Andrew McNeish and Judith Shapiro (London, New York: Routledge, 2021), 75–81. For example, in Colombia there is no specific law on "prior consultation;" hence, companies take the lead, and the government merely facilitates the process. In 2017, there were 1,585 vetoes from the communities contacted, but none of them were recognized. Billon and Middelorp "Empowerment or Imposition?," 82.
- 36 Gómez-Barris, *The Extractive Zone*, 11.
-