ENVIRONMENTAL GOVERNANCE IN MEXICO:

WATER AND AIR SECTORS

Jorge Alejandro Silva Rodríguez de San Miguel

Economía, Organización y Ciencias Sociales

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Editorial Área de Innovación y Desarrollo,S.L.

ÁREA DE INNOVACIÓN Y DESARROLLO, S.L.
C/ Els Alzamora, 17 - 03802 - ALCOY (ALICANTE) info@3ciencias.com

Primera edición: **octubre 2017**

ISBN: **978-84-947848-1-1**

DOI: **http://dx.doi.org/10.17993/EcoOrgyCso.2017.26**

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Abstract

Environmental governance in Mexico is an unfolding phenomenon whereby the state, especially in the areas of water and air governance, seeks to safeguard its environmental largesse for posterity. There is a sense that a wide variance exists between various Mexican states in the area of enforcement and statutory comprehensiveness (vis-a-vis governance in the air and water sectors), and the data does reveal that many Mexican states are impoverished, already hampered by poor infrastructure and a depleted bureaucracy, and faced with choosing between the natural environment or extractive (or tourism) industries upon which they rely heavily. There are no easy answers, but greater cross-sectoral and multidisciplinary coordination – the type that allows resources to be leveraged and complementarities exploited – might be part of the solution.

Key words: air; architecture; collaboration; environmental domain; environmental governance; statutes; sustainability; water.

Resumen

La gobernanza ambiental en México es un fenómeno en el que el Estado, especialmente en las áreas de gobernabilidad del agua y el aire, busca salvaguardar su generosidad ambiental para la posteridad. Existe la sensación de que existe una amplia varianza entre varios estados mexicanos en el área de cumplimiento y exhaustividad legal (frente a la gobernanza en los sectores de aire y agua), y los datos revelan que muchos estados mexicanos están empobrecidos, ya obstaculizados por una infraestructura deficiente y una burocracia agotada, y frente a la elección entre el medio ambiente natural o las industrias extractivas (o turísticas) en las que dependen en gran medida. No hay respuestas fáciles, pero una mayor coordinación intersectorial y multidisciplinaria -del tipo que permite aprovechar los recursos y complementariedades explotadas- podría ser parte de la solución.

Palabras clave: aire; arquitectura; colaboración; dominio ambiental; gobernanza ambiental; estatutos; sostenibilidad; agua.

Introduction

Mexico is very much a nation that has been forced, out of necessity, to contemplate how effectively it governs and regulates its water and air resources. As previous work has shown, there is a formal high regard for both (as part of a larger commitment to environmental protection within the country), but oversight and maintenance has been limited by a lack of bureaucratic capacity, by the absence of coherent oversight mechanisms, and by a political culture that is complicated by neo-liberal imperatives and by the distractions of constant upheaval and strife. Thus, Mexico is a good instance of a country in which there is a formal declaration of support for the proposition that clean air and water matter, but the declaration lacks the necessary teeth to be a spur for dynamic action – though some positive steps have been taken over time.

As was the case during our discussion of urban water supply management in Mexico, Mexican states do appear to differ in terms of their approach to the environmental governance of this precious resource. Some states are blessed with a greater resolution to extend and modify archaic water infrastructure; some states are blessed to have in place (albeit fairlyrudimentary) diversion and recycling initiatives that recognize the value of getting the most out of each liter of water. And some Mexican states seem more able than others to identify that water and air management need to be seen as equal parts of a larger package of reforms and regulations that protect and nurture the natural environment and keep it from harm. Mexico is a state for whom water and air governance may seem less important than generating industrial and manufacturing jobs for its struggling masses, but it will ultimately be the protection of both that will determine Mexico's place in the congress of nations.

1. Methodology

What ensues is a systematic review of the literature addressing the environmental governance of Mexico and, of especial note, its numerous federated states. The framework in question is not guided by a specific ideology, per se, but is guided by a functionalist sensibility; in other words, how does the current legislative and bureaucratic regime found within Mexico (most of all, at the state level) contribute to the appropriate management and conservation (to the extent such exists) of the natural environment within the country? Can we identify government programs (and the results of their efforts) and government policies that have improved environmental engagement and governance? As will eventually become clear, there are frequently specific offices in the various Mexican states established to safeguard the natural environment, but their day-to-day activities are often mired in secrecy or scant reporting. Their results, however, are mixed at best.

In any case, it can be argued that a structuralist approach is implicit in this study in the sense that it is the firm contention of this author that the structure of environmental governance in any country shapes how enforcement will be carried out (and how efficaciously), and also essentially reveals – and perpetuates – the internal, bureaucratic culture of the state vis-a-vis environmental regulation and conservation. As will become apparent when reviewing the available scholarship, Mexico appears very much to be a state wherein there is a general affinity for protecting the natural world, but the actual enforcement (no doubt because of impoverishment and limited resources) literally belies the stated goals of ensuring secure and pristine waters, forests and air resources for future generations. As a final note, the materials are generally drawn from either peer-reviewed materials, or from online sources that are deemed credible and are respected as such.

Last of all, when we speak of governance in the Mexican context, it is understood to mean the regulation and coordination of activities ostensibly aimed at protecting the natural environment. If there is a difference to be found in a developing nation such as Mexico, and developed nations such as the United States, it lies in the fact that governance in the USA more directly entails compliance measures and mechanisms, whereas governance in the Mexican context revolves around state projects (aimed at bettering things) and construction and extension initiatives; compliance appears to be a lesser part of governance efforts in Mexico and its

federated states. Be all that as it may, it is critical to analyze the water and air sectors insofar as these are the realms wherein poor compliance or regulation manifests the most obvious toll in terms of pollution and thwarted human development. Toxic soil is problematic, but air and water are two items for which there are no appropriate substitutes for human beings; if they are compromised or scarce, then human development – even survival – is terribly compromised.

2. Environmental Governance in Mexico: An Overview

To get started, it is fairly clear that Mexico has been waging a largely unsuccessful rearguard action against environmental despoilment for some time. For instance, the Mexico City Metropolitan Area (MCMA) has seen worsening air quality since at least the 1980s as more and more industrial concerns (especially those emitting noxious chemicals and paints) cluster in the area. To this must be added ever-growing congestion and the massive increase in motor vehicles on the city's roads (and on the roads of surrounding environs) during that aforementioned period of time (Bravo-Alvarez & Torres-Jardón, 2012). The unsettling movement towards evermore noxious and contaminated air in the MCMA appears to be consistent with foliage, bark and xylem damage of Abies Religiosa within the basin of Mexico (Terrazas, & Bernal-Salazar, 2012); air pollution in the forests surrounding Mexico City (Zambrano, Nash III, & Herrera-Campos, 2012); and despoiling levels of oxidants in pines in Mexico City (Miller, de Bauer, & Hernandez-Tejada, 2012). For a host of reasons, which do appear (as we shall discover later) tied to the bureaucratic and physical incapacity to closely regulate what is spewed into the air, air contamination has been a pressing and persistent problem within the country of Mexico. Incidentally, all of this does not even begin to touch the understandable concerns elicited by the presence of high nitrate levels in the drainage waters of the Mexico City Air Basin (Fenn et al., 2012). Mexico is, in many respects, a country under siege because its indigenous environment is under siege.

When it comes to water, it is reported that at least 12 million persons in Mexico lack access to drinkable water. At least 90 million Mexicans need to filter their water through domestic purifying systems (of varying quality) or purchase it directly from private firms at high cost. Government storage systems, and the private storage systems and cisterns of many urban and rural inhabitants, are of a poor quality and make despoilment a constant danger. Distribution networks in the country's large cities are outdated and poorly maintained, and the existing canal and distribution system that allows water to flow from aquifers and water reservoirs to such places as the Valley of Mexico is sufficiently over-extended that it requires considerable energy just to operate – and ultimately pumps large amounts of carbon dioxide into the air. Any regulation on the over-harvesting of underground aquifers is poorly enforced, and the clandestine erection of private water wells has further drained subterranean reserves while also

revealing just how ineffectually the country (and its states) actually regulates well construction (Explorando Mexico, n.d.). Mexico simply does not do what is necessary to guard its most vital, and ostensibly cherished, natural resources.

The country's struggles with protecting the air and water sectors are markedly inconsistent with its 1988 General Law on Ecological Equilibrium and Environmental Protection. As per Aneiros, Castelló Pasquel and Westendarp Palacios (2017). This statute distributes power through the three basic levels of government and evidently establishes overarching policies for environmental regulation. There are also additional federal laws that may be delineated as follows: The General Law on Climate Change; the 2013 Federal Law on Environmental Liability; The 2014 Law on Dumping in Mexican Marine Areas; the General Law on the Prevention and Comprehensive Management of Waste; and the 2014 Law of the National Agency of Industrial Security and Environmental Protection for the Hydrocarbon Sector. The Secretariat of the Environment and Natural Resources (SEMARNAT) is charged with enforcing and regulating environmental policies and compliance at the federal level. Not surprisingly, environmental laws comparable to those above have found their way into the legislative canons of the various Mexican federated states (Icaza Aneiros et al., 2017). The laws do exist at the federal level, but the federal distribution of power, arguably coupled with SEMARNAT's (and local bureaucracies') inability to effectively monitor daily events, means that these laws are not enforced as they need to be enforced. And that is why problems such as those cataloged in the previous paragraph continue to manifest themselves in Mexico.

Having offered a brief thumbnail of the water and air governance and regulation issues that afflict Mexico at the federal level, now seems an appropriate time to look at how things stand within each of the Mexican federal states.

2.1 Aguascalientes

Aguascalientes has one basic environmental law: The Environmental Protection Law of the State of Aguascalientes. This broad-ranging law deals with waste disposal, establishes penalties for negligent emissions and water despoilment, and sets forth a template for sustainable commercial and personal living (Temas Actuales, n.d.). Thus, there most certainly exists an overarching framework for environmental governance within the state. Yet, research also indicates that the Aguascalientes Aquifer, the most important aquifer in the State of Aguascalientes, has long been over-exploited and now the average abatement levels for the aquifer have reached critical levels (Avelar González, Ramírez López, Martínez Saldaña, Guerrero Barrera, Jaramillo Juárez, & Reyes Sánchez, 2011). Clearly, water governance in the state has not achieved the laudable goal of protecting the aforementioned Aguascalientes Valley aquifer from over-harvesting. Moreover, studies carried out at the start of this decade pointedly reveal that the State of Aguascalientes has pervasively high levels of chronic kidney disease among infant children – this is especially so in the municipality of Calvillo – and this persistent issue seems directly conjoined to the fact that the state has not been able to prevent large concentrations of xenobiotics, arsenic, fluorides and metals from contaminating the drinking water of Calvillo and surrounding environs (Mendoza et al., 2011). Furthermore, hearkening back to the start of this paragraph, it is worthwhile to mention that Aguascalientes does not appear to have a stand-alone piece of governing legislation delineating the enforcement of pollution measures and compliance for the air and water sectors (Temas Actuales, n.d.). The state therefore does not possess comity of enforcement at the municipal and village levels (ergo, the problem in Calvillo), and it seemingly lacks uniform comprehensiveness insofar as there are not auxiliary or ancillary pieces of legislation to augment and buttress The Environmental Protection Law of the State of Aguascalientes.

As a final point before moving on from Aguascalientes, it bears mentioning that the governance architecture in Aguascalientes does appear, whatever other salutary aspects it may bear, to have interstitial space that allows for negligent disposal and occasionally shoddy effluent management: heavy metals and halogens have been identified in the aquifers of the state, and this is compounded by the fact that a considerable amount of surface water has been contaminated by the inadequate disposal of industrial waste (Mendoza et al., 2011).

What is ironic in all of this is that Aguascalientes does seem to have a strong reputation for effectively synchronizing state and municipal government action vis-a-vis pollution and sustainable industrial activities. Plainly though, much more can be done to ensure that the state optimally provides protection for its air and water sectors. In this instance, stand-alone legislation that expressly mandates specific actions on the part of the bureaucracy at specific intervals could be the answer inasmuch as the existing architecture, while highly impressive in many respects – at least to outside observers (OECD, 2015) – has not been able to completely eliminate the unfortunate discharge of noxious effluents.

2.2 Baja California

The state of Baja California is a prominent Mexican state that surely invites a closer look because of its size, proximity to the United States, and its population. As we quickly apprehend, the state has four major pieces of legislation geared towards environmental governance: The Environmental Protection Law of the State of Baja California; the Regulation Implementing State Environment Law; and the Law on the Prevention and Integrated Management of Wastes (Temas Actuales, n.d.). Of these, none deal primarily with air pollution or air management, just as there is no mention of water per se, but different laws undeniably assert themselves in both sectors: the Law on the Prevention and Integrated Management of Wastes touches upon the disposition of effluents and industrial waste that might find their way into local surface waters (Temas Actuales, n.d.); and The Environmental Protection Law of the State of Baja California has excerpts and passages that touch upon protecting the natural air endowment of the state (Temas Actuales, n.d.). It is really not formal statements and legislation that explain any pollution or mismanagement in Baja California; it is enforcement and the everyday lived reality of managing these vital natural sectors with limited staff and with political elites who are pressed by other issues and challenges.

Research quickly makes it apparent that this state is heavily reliant upon the insatiable maquiladora complex; as a consequence, it has long suffered from chronic air pollution that is made worse because of a lack of parkland, because of severe vehicular congestion, and because high-pollution industries monopolize the state economy and essentially exercise enormous influence upon what steps the state can take to guard its water and air resources (Environmental Health Coalition, 2011).

As was the case with Aguascalientes, Baja California does have a well-intentioned and rational architecture in place for protecting its water and air sectors: below the state executive lies a Technical Secretariat that interacts with elite state institutions and that interfaces with Expert Local Groups at the same time as the Technical Secretariat and allied universities habitually meet with External Advisors such as (ostensibly) NGOs and outside transnational bodies. There also appears to be sub-agencies and smaller offices beneath the more august entities noted above, and these smaller offices do deal with such environmental matters as water and marine resources, climate (which can include excursions into air pollution issues) and public health (Munoz-Meléndez, 2015).

The state has historically struggled with water despoilment (Michel, 2003), but its most pressing contemporary issue seems to be the fact that its existing water conveyance architecture is very much antiquated; there is a widespread recognition of the fact that the state needs to establish a more modern architecture in this area if it is to meet the challenges of providing potable water to its fast-growing population (Navarro-Chaparo, Rivera, & Sánchez, 2015). In assessing this state, one comes away with a sense that Baja California is wracked by limited options (as a result of its close association with the maquiladora complex), and is troubled by the hefty cost and engineering burden of upgrading a water system that, in addition to being threatened by despoilment occasioned by long-standing local practices (Michel, 2003), is also ill-equipped for the burdens it bears (Navarro-Chaparo et al., 2015). Its environmental governance is therefore deeply ambivalent and troublingly compromised.

2.3 Baja California Sur

In reviewing Baja California Sur, there is something striking about the state only having one stand-alone piece of legislation – at least as per Temas Actuales (n.d.): The Ecological Equilibrium and Environmental Protection Law of Baja California Sur. That the state should be absent discrete pieces of legislation (declarative or enabling) that deal expressly with water and air matters is a sign that Baja California Sur may lack the political will to combat despoilment in these areas. It is, at the very least, problematic to have such a want within the legislative corpus.

Turning our focus more fully to Baja California Sur, one is taken aback at the fact that the over-taxed water conveyance architecture of the state is notorious for chronic leakage (McEvoy, 2014) – which immediately creates the possibility of massive influxes of minerals and chemicals from the

outside into the water supply itself. The water available to the state is also very much in need of desalination, and this explains efforts to create additional such facilities in the past decade – though it appears from the literature that a thoroughly efficacious and comprehensive desalination network in Baja California Sur is not yet a reality (Aranda Martínez, Muir, & Leinweber, 2014). Water governance practices moving forward should consider prioritizing efforts to introduce such facilities as a means of reducing any onerous burdens visited upon existing freshwater aquifers or surface/subterranean resources.

There has been relatively less discussion of the air pollution endemic to California Baja Sur than there has been discussion of the historic despoilment of the marine and coastal areas of the state. NGOs and concerned local groups, not the state, have ostensibly taken the lead in expressing public disapproval with aggressive new tourism and development projects that promise to only add further blemishes and infelicities to the already-beleagured marine and coastal areas of Baja California Sur (Zapata-Lillo, 2013).

This suggests that Baja California Sur is literally embracing the governance doctrine of allowing aggressive and sprawling real estate and development enterprises to take hold, presumably on the condition that they be kind enough to think at least a little of the natural environs into which they are injecting their massive tourist installations. Given the state of affairs intimated by Zapata-Lillo (2013), it seems as though the state is favoring a somewhat laissez-faire approach that allows the interests of commerce and industry to occupy much of the policy-making space.

In any case, academics have long noted the poor air quality within Baja California Sur - especially around La Paz City (Ortega-Rubio et al., 1998) – and the state's sizable mining sector, which has been well-identified as a serious peril to produce air pollution (Spalding, 2015), is surely a good indication that the air pollution issues of today will not be retreating any time soon.

Baja California Sur may not be Mexico City, but the state is still faced with the confounding problem of how it can balance environmental protection and sensibilities with its understandable and undeniable need to exploit (or the need to allow others to exploit) its natural resources for capital gain. In fairness, the state has shown itself willing to combat air pollution through the fairly recent establishment of programs that create the following: an air monitoring network in northern Baja California Sur; a state vehicle

inspection program; and mitigation and conservation initiatives (best practices) and a template for improved energy efficiency (United States Environmental Protection Agency, 2015a). Once more, the persistence of pollution and despoilment issues suggests that the real problem is in responsive and effective enforcement and regulation.

2.4 Campeche

Campeche will quickly prove the exception to the general rule insofar as it does have a pretty impressive environmental governance architecture in place despite having only one substantial piece of legislation dealing with environmental issues and management: The Ecological Equilibrium and Environmental Protection Law of the State of Campeche (Temas Actuales, n.d.). This is rather incongruous, but is a tribute to how a determined state can take the words and declarations of even one piece of legislation and make sinews out of them if the will to do so is there among policy-makers and politicians.

According to the extant literature, Campeche's water governance framework does not include a measure for effectively and promptly addressing its growing water shortage problem: the state has historically received the bulk of its water from the Santa Rosa aquifer and from urban wells (Alonso, 2015); the waxing population of Campeche has sparked renewed calls for a diversification of the state's potable water reservoirs, and this has led to the proposed creation of a Hobomó-Campeche aqueduct that would nourish state municipalities along the totality of its 26 kilometers. However, it appears as though the aqueduct remains – at least as of 2015- very much a proposal and nothing more than that (Alonso, 2015).

If governance regulations and measures within the state cannot more efficaciously craft a viable, extended infrastructure, then water abatement and over-harvesting will only grow more acute. The irony of the Campeche situation is that, owing to its growing water shortage, the state may have to revisit one of the policy staples that has long made it admired by the outside world: its low water tariffs, at least within the capital city of Campeche (OECD, 2013a). Making water accessible is wonderful, but making water enduring and sustainable is surely even better – or every bit as vital.

Be that as it may, Campeche seems to lie in the vanguard of Mexican states when it comes to environmental protection – including protection of its

susceptible water and air sectors. Along with all other Mexican states, Campeche has a Climate Change Action Plan (Score, 2011). It also features a State Ministry of Environment and Sustainability (since September of 1997), that includes five departments designed to secure and safeguard the natural environment: Environmental Protection; Natural Protected Areas; Ecological Culture, Flora and Fauna; and Inspection and Monitoring. The state has also worked diligently to craft climate change adaptation plans in protected areas that commingle with extant restoration projects (Score, 2011). However, it does not appear as though bureaucratic governance in Campeche includes specific departments set aside to wholly focus upon air and water monitoring and regulation. It is fair to mention, as an addendum, that the state has further initiatives that encompass reforestation, the relocation of vulnerable infrastructure, the relocation of drinking water wells, closer monitoring of marine and beach wildlife, and an early alarm system dedicated to addressing changing water levels (The World Bank, 2013).

Of these, the relocation of drinking water wells is probably the one single measure that comes most nearly to addressing despoilment and mismanagement of the state's finite potable water supply – and it seems really geared more towards guarding against rising water levels in the future than it is geared towards conservation. Be that as it may, more systematic consideration of where subterranean wells are positioned could definitely reduce the burden upon ground aquifers and other strained water sources.

2.5 Chiapas

As is the case for multiple Mexican states, Chiapas has but one single piece of legislation (at the state level) dedicated to environmental or ecological governance: The Ecological Equilibrium and Environmental Protection Law of Chiapas (Temas Actuales, n.d.). As Campeche above indicates, this does not have to be an impediment to forward-looking governance. At the same time, it can also indicate something much less appealing. Certainly, the absence of targeted water and air legislation within the environs of Chiapas can be interpreted as a sign that the focus upon these sectors by the state is not unstinting.

In Chiapas, one of the most significant environmental issues is water access - which is really a referendum on the opportunities and prospects the state generates for its inhabitants, as well as a biting testament to the state's capacity to establish meaningful reform in the realm of water and air

conservation and management. At present, Chiapas produces 30 percent of all of Mexico's water while the Grijalva River has the inherent capacity to supply 40 percent of Mexico's hydrological power (Wilson, 2014). At the same time as water is abundant in Chiapas, research carried out in the past decade also reveals that Chiapas ranks with Guerrero, Oaxaca, Tabasco and Veracruz as Mexican states that have anywhere from one-quarter to one-third of the resident population unserved by a formal (state-instituted) water conveyance architecture (Barraque, 2011).

Extreme poverty is a sad, distinguishing feature of Chiapas (Ai Camp, 2017) which seems to explain why the state's water infrastructure is so rudimentary, and why efforts to extend it are so dilatory. Such poverty also has grim implications for water and air conservation and for broader environmental governance in these critical sectors. Put starkly, if the state cannot guarantee water conveyance and infrastructure for a sizable portion of its residents, then it is even less likely that the state will furnish funding or resources for the regulation and maintenance of compliance and conservation protocols (aimed chiefly at the water and air sectors) that might otherwise distract it from generating more wealth. Most certainly, the available literature on Chiapas indicates that NGOs, local agribusiness proprietors and operators, and even the federal government are much more intimately involved in fostering best practices and a compliance and regulation architecture for pollution and effluent management than the state government (Conservation International, 2017; Rainforest Alliance, 2014). Perhaps more multidisciplinary, collaborative, and synergistic relationships between the State of Chiapas and the above-mentioned NGOs and federal government can allow the state bureaucracy to develop the competencies needed to assume a leadership role in water and air management and governance.

2.6 Chihuahua

Chihuahua is a state that, as with so many others across Mexico, has a paucity of legislative pieces dedicated to environmental and ecological governance. The one piece of legislation that appears to govern how the state deals with regulation and compliance within the air and water sectors is the ensuing: The Ecological Law of the State of Chihuahua, as amended in 2004 (Temas Actuales, n.d.). Again, the absence of dedicated and discrete pieces of legislative writ set aside for air and water governance can be viewed as one reason why this state – as with so many others – has troubling interstitial space between what it wants to do (as per its formal declarations), and what actually gets done.

The ability of Chihuahua to exercise appropriate levels of state governance in the air and water sector is complicated by the fact that the state happens to have part of its holdings in the Paso del Norte region – a region which happens to include the American city of El Paso, Texas. El Paso, and the Chihuahua city of Ciudad Juarez, have long been embroiled in a bitter battle over finite water resources, a battle which has also drawn into the mix, in various ways, the state governments of Chihuahua and the American state of Texas (Turner, Hamlyn, & Hernández, 2003). Leaving aside the considerable resources needed to battle rapacious American states for precious resources, there is also the fact that unhealthy competition and rivalry has only heightened aggressive water procurement for agribusiness irrigation and wanton surface water use (Turner et al., 2003). Thus, when it comes to the water sector, Chihuahua has comparatively less water to protect and conserve, while also having its state-wide initiatives hampered by the fact that it is doing battle in Paso del Norte with a formidable foe that is accustomed to getting its own way. Environmental governance, sadly, is not merely a question of what a state is willing to do, but what the state actually can do – and what sort of neighbors it may have.

If we depart briefly from the unhappy tension prevalent in Paso del Norte, we must also acknowledge that the state of Chihuahua has not helped its cause because it has only fitfully addressed ways of preventing natural resources from being contaminated – and this contamination includes not only human-made effluents and waste, but also contamination from minerals and toxins found in the natural world. To elaborate, fluoride and arsenic infiltration of residential water supplies has long been a problem in Chihuahua, and speaks to the state's inefficacy in crafting an administrative and regulatory architecture (and conveyance infrastructure) that can keep waterways (and, as an addendum, airways) pristine (Jiménez & Rose, 2009). Once again, this grim situation seems to trace its way back to the limited resources of Chihuahua (resources which are seemingly too often drained in battles with other jurisdictions) and to its blunted ability to govern air and water disposition in a salutary fashion.

Finally, and in parting, the air sector in Chihuahua does receive some dutiful attention from the state, but this attention occurs within a policy-making and regulatory context that is heavily shaped and influenced by factors independent of environmental considerations. Since the late 1990s, Chihuahua has had in place a state law that provides sanctions and regulations vis-a-vis air pollution produced by fixed facilities and motor vehicles. Indeed, licensing requirements set in place for industries and manufacturers are extensive, and the state's environmental law is tailored

to fit closely with both the federal government's Environmental Law, and with the Official Mexican Standards (Emerson, Angulo, Shaver, & Rincón, 1998). Regrettably, the formal support proffered by the aforementioned laws and protocols is somewhat compromised by the heavy reliance of Chihuahua upon the financial activity emanating from the teeming maquiladora sector (OECD, 2012). Suffice it to say, efforts at effective water and air sector regulation are very much undermined by the omnipresence of commercial and heavy manufacturing interests at the policy-making table.

2.7 Coahuila

In the case of Coahuila, it has but two laws set forth for environmental governance: The Ecological Conservation and Environmental Protection Law of the State of Coahuila de Zaragoza; and the Law on the Prevention and Integrated Management of Wastes (Temas Actuales, n.d.). Neither one deals fundamentally or principally with either the water or air sectors, though plainly the Law on the Prevention and Integrated Management of Wastes can most certainly be used to deal directly with water despoilment.

Coahuila is a very arid state with few aquifers and a significant water shortage (Schneider, 2015). Seen against that backdrop, it is manifest that strong environmental governance in the water sector is integral to any sustainable future for the state and its inhabitants. And, to Coahuila's credit, it has taken positive steps in this regard: it has member status with the US-Mexico Border 2020 Environmental Program, a broad-based partnership that involves the US EPA, SEMARNAT, ten border states within the countries of Mexico and the United States, and a medley of US border tribes. Four regional workgroups comprise this impressive collaboration, and each of the workgroups has three sub-regional task forces. Coahuila is part of the Texas-Tamaulipas-Nuevo-Leon-Coahuila Regional Workgroup (Texas Commission on Environmental Quality, 2017). In theory, Coahuila thus has a chance to exercise regional leadership on the matters of air and water governance. In practice, though, the state is compromised by its affiliation to a much larger entity that includes powerful US states and, of course, the even more powerful US government. Thus, even if Coahuila should want to push for joint measures that might aid it in cleaning up its air and water ways, predominant US interests will come to the fore. A good example of this is the Conchas Mine Complex in Coahuila, Mexico, where drainage and recovery efforts are spearheaded by the US EPA (United States Environmental Protection Agency, 2015b). There is nothing at all wrong with the US aiding Coahuila in environmental cleanup or

remediation, but there is something very much wrong with the US government or its array of agencies forcing its agenda (ostensibly driven by economic and political imperatives) upon Mexican states. Coahuila may be blessed to have a Secretariat of the Environment (with an internal Office of the Director of Conservation) blessed with close ties to the Attorney General of the State (TCEQ, n.d.), but the absence of state-level legislation pertaining to the conservation and protection of the air and water sectors (Temas Actuales, n.d.), coupled with the state's immersion in a regional partnership that features deep-pocketed and powerful US interests, means that Coahuila may not have the full freedom of movement it needs to make the policy modifications and additions necessary for its own gain.

2.8 Colima

For its part, Colima has three main pieces of legislation pertaining to environmental governance: The Law on the Sustainable Development of Forestry in the State of Colima; the Environmental Preservation Law of the State of Colima; and the Waste Law of Colima (Temas Actuales, n.d.). But, once more, no specific laws pertaining to water and air pollution or management.

Colima is one Mexican state that does appear to have a well-developed and highly rational water conveyance system (Barraque, 2011); this speaks well of its bureaucratic and administrative apparatus. However, while the state does appear to devote itself fully to tackling desertification and soil erosion issues, it seems curiously less interested in bolstering air quality; at the very least, air quality monitoring and protection does not seem to occupy the same policy-making space as the former two (Tegel, 2012). Conversely, the state most definitely holds despoiled waterways as a serious matter, and environmental governance in this domain has been dominated in recent years by the erection of new wastewater plants to combat water and marine contamination and the unhealthy spread of effluents (United States of America, Department of Commerce, 2016). Colima is an often-overlooked state, but it is a state that is making heady progress vis-a-vis water and air conservation and governance. As with all Mexican states, and most jurisdictions world-wide, far more can still be done.

2.9 Durango

True to form, Durango is notable for having in place only one law that deals with environmental governance at the state level: The State Ecological Equilibrium and Environmental Protection Law of the State of Durango

(Temas Actuales, n.d.). The absence of auxiliary or accompanying pieces of legislation may well be indicative of a lack of bureaucratic or regulatory capacity; in other words, without adequate resources for compliance and regulation, further pieces of legislation would be – at best – superfluous.

Durango does not appear to have any state-level legislation dealing with the appropriate environmental governance of its marine or water reserves. And this is quite consequential in light of the fact that the states in the Lagunera Region (which includes Durango) all have elevated levels of arsenic in their surface waters (Murcott, 2012). Stand-alone legislation addressing arsenic despoilment of waterways would surely be a critical next step if Durango is sincere about protecting the well-being of its inhabitants and the integrity of its marine resources.

On the other hand, Durango has been a positive outlier in resolving air and water pollution from commercial or industrial ventures. As far back as 2003, Durango began requiring industries to track pollutants generated via manufacturing endeavors (Nations Encyclopedia, 2017). Significant environmental assessments also accompany any new highways and similar major developments within the state – though as we shall see, ultimate responsibility for these assessments is rather more complicated than the state simply reviewing new proposals and offering its imprimatur. In any case, it seems as though environmental impact statements for prospective projects are part and parcel of the environmental impact procedure of the National Ecology Institute, a decentralized body of the Ministry of the Environment, Natural Resources, and Fisheries (Pisanty, 1999). The tracking of pollutants, and the appreciation of the need for the EIA activities delineated above, are signs that Durango does take water and air governance more seriously than most Mexican states. That being noted, and to touch upon a comment made earlier, it seems the federal government – and not the actual state of Durango – oversees the environmental assessment of new projects and developments within Durango (Pisanty, 1999). It does not seem as though the state does this out of malfeasance, so it is likely that limited resources also limit its ability to spearhead aggressive reviews of how new developments will impact the marine, air and soil ecology of Durango.

2.10 Guanajuato

Guanajuato does not make provision for the governance of the air and water sectors in its legislative corpus. Chiefly, it has but one law pertaining to environmental matters: The Environmental Technical Norm Establishing Requisites for the Management of Non-Hazardous Industrial Wastes (Temas Actuales, n.d.). To be fair, however, the state has worked industriously to establish a comprehensive bureaucratic architecture for monitoring its air and water sectors – though the ultimate efficacy of such endeavors is clearly in doubt.

Specifically, with regards to Guanajuato's bureaucratic architecture, 1996 was the year that saw the state establish an environmental regulatory institution deemed capable of enforcing the General Law of Ecological Equilibrium and Environmental Protection: The State of Guanajuato Ecology Institute. As one finds with many Mexican states, though, this institute has been more honored in the rhetoric than in the practice insofar as it has been chronically understaffed and underfunded since its beginnings (Blackman & Sisto, 2005). Even though Guanajuato was an early leader in setting forth institutional tools for protecting the vulnerable air and water sectors – the State Water Commission of Guanajuato was established in 1991, while the Environmental Attorney General's Office for the State of Guanajuato was established in 1996 – the regulation of industrial effluents into the environment (be it water or air) has mostly relied upon the idiosyncratic self-monitoring of business enterprises. This definitely explains why the City of Leon, which has a large tannery industry notorious for its water and air despoilment, has been unable to resolve its environmental pollution issues over the years despite a host of committees and working bodies dedicated to doing precisely that (Blackman & Sisto, 2005). Enforcement and oversight mechanisms must have teeth that bite, and Guanajuato has elected not to bare any teeth – maybe because, as one can see by examining the lack of funding for the State of Guanajuato Ecology Institute, the monies and resources to do so are not there.

2.11 Guerrero

It has been previously noted that Mexican states do appear to have a dearth of laws that might outline and describe environmental governance within their respective jurisdictions. Guerrero is typical of this trend insofar as it has but a single law pertaining to environmental and ecological governance: The Ecological Equilibrium and Environmental Protection Law of the State of Guerrero (Temas Actuales, n.d.). There is no stand-alone law

that might set forth prerequisites or guides for regulating the water and air sectors in the state – though help is most surely needed.

Water and air governance in Guerrero is undeniably compromised by the state's limited resources and general impoverishment. The sanitation, sewage and water treatment infrastructures of Guerrero are all significant laggards and have required substantial investment from CONAGUA – especially the water treatment facilities within the state (Alonso, 2016b). If the ecology of the Temocate Lagoon is any indication, the State of Guerrero has also done an uninspired job of protecting its marine wildlife and lagoon tracts (Villerías-Salinas, Violante-González, García-Castro, & Alonzo-Guzmán, 2016). The literature does not deign to mention if Guerrero has comprehensive air monitoring or emissions compliance mechanisms in place for air-borne effluents, but it does suggest that any concerted effort to regulate and protect the air sector will need to come from NGOs. For instance, as it pertains to the widespread practice of illegal logging, a group called the Peasant Ecologists of the Sierra Petatlan have battled hard to draw attention to the infelicities of the practice and demanded that it be stemmed. For their troubles, members of this aforementioned group have faced censure and even arrest at the hands of powerful local political chieftains (Buckman, 2014). It is manifest that the state lacks both the resources and the will to protect its assets adequately in both domains.

2.12 Hidalgo

In Hidalgo at least, there is some specific consideration for air despoilment courtesy the Ecological Technical Norm Establishing Maximum Permissible Limits for Gaseous Emissions by Automotive Vehicles Using Gasoline and LPG as Fuel (Temas Actuales, n.d.). The difficulty here, alas, is that the sole piece of legislation in the state pertaining to environmental governance deals with only one small part of the constellation of factors causing air pollution – and not at all with water contamination or despoilment.

On the matter of water governance, Hidalgo is a state that seems incapable of crafting an indigenous architecture that thwarts or discourages conflict vis-a-vis the disposition and diversion of water resources. For example, Barraque (2011), describes Hidalgo as being frequently wracked by bitter conflicts over water reclamation and water diversion, and the state's recent past has been marred by battles between various interest groups over how water is to be partitioned and exploited (Barraque, 2011). It seems the state is incapable of crafting a policy-making universe that is able to bring together political, academic, industrial, civil and popular actors and agents

to form a coherent union that establishes comity and a predictable framework for disposing of natural water resources.

Be that as it may, water governance within the state does contain a surprisingly robust water recycling initiative. To be specific, wastewater from Mexico City ends up in the rivers and reservoirs of the rural Mezquital Valley, where it has been regularly utilized for agribusiness irrigation endeavors (In Mexico, fears a new plant will kill wastewater farming, 2017). Additionally, 2017 has seen steps undertaken to build a new US$530 million water treatment facility, the Atotonilco plant, in Hidalgo – though wastewater farmers have expressed displeasure that any such facility will end their access to the raw sewage that has given them fertilizer-rich water for so many years (In Mexico, fears a new plant will kill wastewater farming, 2017). Seen as a broad panorama, water governance policy and practice in Hidalgo appears very much a struggle between those who favor wastewater dumping into surface reservoirs, and those who believe that mechanical treatment and disposition (with subsequent reclamation and diversion) is the preferred approach. The relative wealth of wastewater agriculturalists within the large and fairly populous Mezquital Valley (Romero-Alvarez, n.d.), means that this political battle will complicate efforts at policy comity for the foreseeable future.

Moreover, as with Guerrero, air and water governance in Hidalgo is burdened by the fact that 70 municipalities, drawn from the states of Hidalgo, Mexico, and Tlaxcala, are grouped under the massive Metropolitan Zone of Mexico City – with another 29 municipalities receiving consideration to be incorporated under the sprawling umbrella noted above. This means that the extant Metrpolitan Fund from which resources are drawn for local projects and endeavors (ostensibly including air and water governance and conservation), are already stretched – and will continue to be stretched – to their most extreme limits (Morales Novelo, & Rodríguez Tapia, 2011). Fractious relationships, missing political leadership, and limited resources – these seem the hallmarks of air and water governance policy and practice in Hidalgo.

2.13 Jalisco

Jalisco has but a cursory approach when it comes to formulating laws for environmental governance. Specifically, it has two laws that outline the state's commitment to protecting the natural endowment it has been bequeathed: The Ecological Equilibrium and Environmental Protection Law of the State of Jalisco; and the Law on the Integrated Management of

Wastes (Temas Actuales, n.d.). There is no discrete legislation dealing with water and air pollution or the management of either sector.

Water sector governance in Jalisco is marked by a curious inability or unwillingness to diversify the water resources that nourish the state. For instance, the principal city of the state, Guadalajara, is noted for its historic over-reliance upon the Lerma-Chapala River Basin. This over-reliance, a troubling long-time phenomenon, is sufficiently severe that water depletion was far exceeding supply by the early 2000s (Bertrab, 2003). It thus may be said that water governance in Jalisco is characterized by a historic failure to establish sufficiently varied and diverse reclamation projects and systems that allow for reservoirs such as the Lerma-Chapala River Basin to be used in a fashion more suitable to their actual capacity.

The inability to safeguard overwhelmed water reservoirs and resources is made even worse by the fact that its surface lakes and streams are consistently marred by industrial – and residential – effluent discharge, with the latter being especially prevalent (Greenberg, Shear, de Anda Sanchez, & Ortiz-Jiménez, 2008). If we glance even briefly at the air sector, we find that adequate governance seems lacking here, as well: air pollution remains an abiding area of concern within Jalisco, and this despite warnings being sounded by academics and NGOs for some years (Ramírez-Sánchez & García-Guadalupe, 2012). Yet, even with these problems crowding the agenda, Jalisco persists in having a dearth of auxiliary and regulatory laws that mandate best practices and protocols for the management of the state's air and waterways (Temas Actuales, n.d.). Something must surely be done.

2.14 Mexico

The State of Mexico, possibly owing to its central status within Mexico and the country's political apparatus, has five pieces of pertinent legislation addressing environmental management: the Law of Environmental Protection for the Sustainable Development of the State of Mexico; Regulation on Prevention and Control of Soil Contamination; Regulation on the Protection of Non-Smokers; Regulation on the Prevention and Control of Water Pollution; and the Water Law of the State of Mexico (Temas Actuales, n.d.). Here, at last, is a state that does establish parameters for effluent disposition, and does establish guidelines for the use of water resources, be they aquifers, groundwater, or surface water. But the marked absence of a stand-alone law addressing the air sector is a note of concern

given the state's – and, especially, Mexico City's – long battle with smog and air pollution.

Governance within the State of Mexico vis-a-vis vital water and air resources is rather more detailed and comprehensive than what one finds within many other Mexican states. For instance, Mexico City has a Metropolitan Environmental Commission (CAM) that moderates and regulates interactions between local and state agencies, federal entities and agencies, and state-owned enterprises. The ostensible end of this large bureaucratic organism is to ensure that comity prevails between local and federal efforts to keep the environment of Mexico City (and environs) secure and sustainable (Frfield's page, 2017). Interestingly, one of the more appealing innovations to be found within Mexico City, and one which was borne out of necessity, is its sweeping air monitoring system (Frfield's page, 2017). Although the efficacy of the Federal District in combating air and water despoilment can be openly questioned, in light of persistent problems and oversights that reach back many years (The Wilson Center, 2016), Temas Actuales (n.d.) lists approximately 60 environmental statutes and pieces of legislation for the Federal District. These run the gamut from the proper incineration of specific items to appropriate waste management to wastewater discharges and waste packaging to air pollution controls (Temas Actuales, n.d.). Despite all of this, the air pollution levels of the autonomous jurisdiction of Mexico City are deemed today to be at their worst levels since the early 1990s (The Wilson Center, 2016).

Paying greater heed to the situation within the air sector, one finds that the Valley of Mexico and Panuco River Basins are blighted by at least 200 wells contaminated by untreated watewater originating from the industrial quarters of Mexico City. The problem is sufficiently severe as to seriously afflict the Mexico State cities of Chiautla, Ecatepec, Jatlenco and Coyotepec (OECD, 2013a). Brackish and contaminated water is a reflection of a state bureaucratic apparatus that may have many laws, but does not possess the qualified and determined operatives needed to regulate and control individual and organizational behavior vis-a-vis the design and construction of such wells and the types of effluents that can approach them in any case.

2.15 Michoacán

Michoacán's environmental governance is distinguished by four state-level laws: The Ecological Equilibrium and Environmental Protection Law of the State of Michoacán; the 2004 Amendment of the Environment Law; the Law Implementing Regulation for the Law on Ecological Equilibrium and

Environmental Protection; and the Health Law of Michoacán (Temas Actuales, n.d.). The latter law does create a space for the regulation of the air sector; other laws, such as The Ecological Equilibrium and Environmental Protection Law of the State of Michoacán, and the Law Implementing Regulation for the Law on Ecological Equilibrium and Environmental Protection, establish the broad parameters on how contamination and pollution in all its forms – including the despoilment of waterways – is to be overseen and regulated (Temas Actuales, n.d.). While stand-alone legislative pieces do not exist, there is still a sweeping architecture in place (at least legislatively), for water and air sector governance.

Michoacán is conspicuously noteworthy in the sense that its water domain governance appears to be defined by water treatment facilities that are laggard, defective, or even wholly obsolete. To expand on this point, La Piedad, Sahuavo and Pastor Ortiz are formerly prominent water treatment plants (as of 2011) that actually no longer work at all (Peña, 2011). It would most certainly appear as though the absence of necessary stores of potable water is one area wherein water regulation and governance in Michoacán falls well short of expectations (Peña, 2011). Still another concern is that rampant water pollution of Zirahuen Lake has continued without cessation even as the matter has increased in profile (Armendáriz Arnez & Martínez Villalba, 2016). For its part, air pollution continues to be a problem, though any observations about the peculiar air quality of the state tend to be submerged into a larger discussion about the poor air quality of the country of Mexico as a whole (Lougheed, 2011). The State of Michoacán simply does not accompany or complement its air and water quality statutory architecture (modest though it is) with a vigorous oversight and regulatory capacity.

2.16 Morelos

Morelos has two laws that deal with environmental governance of the sort that most interests us: The Environment Law of the State of Morelos; and the Regulation on Municipal and Special Solid Wastes (Temas Actuales, n.d.). Out of this, we can say that effluents that potentially contaminate water ways across the state are of greater import than air pollution – or at least that is the impression one might form from viewing the Regulation on Municipal and Special Solid Wastes (Temas Actuales, n.d.). The air and water sectors may lack a distinct corpus of stand-alone legislation of their own, but the detailed catalog of best practices for the disposition of solid and industrial waste at least acknowledges the importance attached to protecting waterways from contamination (Temas Actuales, n.d.).

Morelos does not have a strong tradition of efficacious water governance, though it has shown positive signs in the past decade of breaking free of this unhappy condition. The OECD (2017) reports that Morelos still has a general inability to distribute clean water; still struggles to protect supply sources of water; still endures excessive seepage losses within its water conveyance infrastructure; and still falls short of establishing needed extensions to its water conveyance infrastructure (OECD, 2017). On the other hand, the state has taken giant steps since 2012 to rectify its situation – particularly in the realm of water reclamation and treatment. For instance, 2017 saw 43 sewage treatment plans in Mexico, up from a mere 22 sewage treatment plants in 2012. The sewer networks since 2012 have also been expanded so that wastewater is more efficiently captured and can be directed to the appropriate treatment sites (OECD, 2017). Besides mitigating water supply issues, such measures as those above also go a very long way towards ensuring a greater sustainability of the existing water reserves within the state.

In the area of air security and air quality, Morelos continues to be plagued by high levels of air pollution and air despoilment (Mexico News Daily, 2016); what makes it altogether more problematic is that Morelos does have a General Environment Law and a law regulating municipal and solid waste (Temas Actuales, n.d.) - but not a specific, stand-alone, state-level statutory architecture for battling air pollution. That being said, even if such an architecture were introduced, any and all pertinent statutes would be irrelevant if they did not also include an aggressive and assertive regulatory and compliance apparatus – which Morelos does not appear to have, judging from its present condition.

2.17 Nayarit

Nayarit has only one law guarding the natural environment: State Ecological Equilibrium and Environmental Protection Law of the State of Nayarit (Temas Actuales, n.d.). This may be the first and best reason when striving to understand why the state grapples with ecological issues as it does.

But another reason, one which can further explain why Nayarit has done so little to grow its statutory corpus of environmental laws, is that the tourism sector is predominant. Consequently, any advances in the areas of rainwater collection, in the creation of wastewater treatment centers, and in the construction of new storm sewers, have all occurred when such measures were deemed as necessary for the improved robustness of the

tourism and hotel sector (Puerto Vallarta Angels, 2014). In fairness, the tourism and resort/hotel sector of Nayarit has been exemplary (if self-interested) in pursuing the erection of an impressive array of eco-friendly innovations designed to keep (at least on the surface) the state's beaches and tourist attractions as pristine and sustainable as possible (Jiménez, 2017). Be all that as it may, the state's water and air governance seems driven more by tourist concerns than by progressive state policy. In fact, air pollution is not something that is commonly discussed when the literature turns Nayarit, and survey texts on the state – and on the country of Mexico – are much more likely to stress air-borne diseases caused by flying insects (and their inherent dangers for tourists) than to delve into air quality problems within the state (Brunette, 2017). It is arguable that one reason air quality issues are downplayed is because the state's chief economic sector remains (and most surely for the foreseeable future) its tourism sector.

2.18 Nuevo León

Nuevo León has four distinct pieces of legislation pertaining to environmental governance: The Environment Law of the State of Nuevo León; the Regulation Implementing State Environment Law; the Law on Potable Water and Sanitation; and the Law Creating a Decentralized Public Organ Denominated Metropolitan System for Processing Solid Wastes (Temas Actuales, n.d.). There is no specific mention of the air sector (though air pollution is touched upon in the Environment Law of the State of Nuevo León), but the latter two laws plainly do address the regulation and protection of natural waterways that might fall prey to industrial effluent or improper waste disposition practices (Temas Actuales, n.d.). This is, at least, a start to something better.

The state capital of Monterey depends a great deal upon three water basins within the Sierra Madre Oriental: the Santa Catarina River Basin; Basin of the San Juan River and La Boca Dam; and the Basin of the Ramos and Pilon Rivers. The region is quite dry and rapidly growing and industrializing. Pressures upon water supplies have increased markedly in recent years, and a great many of the deep wells drilled in the 1970s simply came to naught: 18 of the 41 deep wells struck in that decade never drew water, or only drew water for an exceedingly brief period of time (Oesterreich, Medina Aleman, & Martinez de la Cerda, 2002). A state like Nuevo León thus needs, as part of its water governance architecture, an array of extremely effective water reclamation and diversion tools if it is to make the most out of its comparatively meager water resources. Fortunately,

May of 2016 did see a tentative agreement established between the state and the federal agency, CONAGUA, to extend and enhance – among other things – the state's water reclamation architecture (Alonso, 2016a). The results remain to be seen, but it does constitute a start, however modest. It also suggests that water governance in Nuevo León may not be beyond salvage.

On the matter of air governance, Nuevo León does have as its chief tool the Environmental and Natural Resource Protection Agency. One would think that this state agency would be buttressed by having Nuevo León as part of a regional work group featuring a number of American and Mexican states sitting adjacent to one another along the US-Mexico border. After all, exploiting the complementary resources and strengths of partners to tackle air pollution would appear to be an ideal scenario for a state of relatively modest means such as Nuevo León. Unfortunately, one must consider how easy it is for Nuevo León's concerns to conveniently get lost when powerful US states – such as Texas – sit at the policy-making table. This might well explain (partly) why Nuevo León continues to have terrible issues with air quality in such cities as Monterrey (Lamadrid, 2016). Air governance must include compliance measures with teeth, and Nuevo León seemingly lacks those.

2.19 Oaxaca

Oaxaca is notable for having only one law addressing environmental governance: The Ecological Equilibrium Law of the State of Oaxaca (Temas Actuales, n.d.). In that regard, it seems to find itself among that cluster of Mexican states that have only a thread-bare legislative architecture in place to guard the natural environment from harm.

Oaxaca is formally committed to the protection and well-being of its indigenous biodiversity and vegetation zones, as per interviews this decade with leading state political figures, and has had in place for a number of years a Clean Beaches Committee and an Adopt a Beach initiative aimed at maintaining these vibrant (and economically lucrative) areas. Water monitoring programs, have been comparatively lax, and much of the focus vis-a-vis combating air pollution has fixated upon making local tourism sites wholly carbon neutral (Huatulco Life, 2011). The fact that Oaxaca continues to have only one law pertaining to both water and air governance would seem to suggest that making a formal declaration of support and love for the environment is far easier than actually setting in place tools and frameworks that will secure and protect the natural environment. Despite a

Strategic Plan for the Water Supply and Sanitation sector, one which includes extending the existing wastewater treatment and reclamation network (The World Bank, 2014), the state still grapples with acute water shortages (Rodriguez, 2017a). On the other hand, air quality within Oaxaca de Juarez – as measured through user-contributed online assessments – is considered to be fairly good (Numbeo, 2017). That may be more good fortune than good state policy, though, since Oaxaca – as discussed above – is not known for a flourishing or comprehensive statutory framework that aims to keep its air and water sectors safe and secure (Temas Actuales, n.d.).

2.20 Puebla

Puebla is a state in the happy vanguard of Mexican states insofar as it has a handful of laws that regulate and govern environmental affairs: the Law on the Sustainable Development of Forestry in the State of Puebla; the Law for the Protection of the Natural Environment and Sustainable Development in the State of Puebla; the State Health Law; Law on the Protection of Non-Smokers; Law on Sustainable Urban Development; and Law on the Prevention and Integrated Management of Urban Solid and Special Management Wastes (Temas Actuales, n.d.). Even at a cursory glance, we can see that the water sector, more so than the air sector, is given relatively more weight because of the abiding preoccupation with waste management and disposition (Temas Actuales, n.d.).

It would certainly seem, in the case of Puebla, that fractiousness and poor (permeable) jurisdictional lines are an issue in Puebla: water supply and governance is overseen by a host of federal, municipal, and state organizations, with private enterprises also assuming a medley of responsibilities. Their duties often overlap, and fragmentation and overlap leads to unhappiness and to a failure to construct a unified and coherent water policy (OECD, 2013b). Within the air sector, it may be noted that the state has the Office of the Secretary of Environment and Natural Resources and this is complemented, at the municipal level, by the City of Puebla's Environmental Protection and Sustainable Development Agency. However, while the state is notorious for information campaigns and outreach programs aimed at young students, it has not seen fit to establish a schedule of baseline environmental reviews for air quality (Siemens, n.d.). It seems Puebla is in desperate need of a revised bureaucratic architecture for water governance and a more thorough and comprehensive approach to measuring air quality.

2.21 Querétaro

Querétaro does not set itself apart from other Mexican states in the realm of environmental governance, at least from a legislative perspective, as it has but two laws that deal with the subject: The Ecological Equilibrium and Environmental Protection Law of the State of Querétaro, As Amended in 2000; and the Law on Prevention and Integrated Management of Wastes (Temas Actuales, n.d.). Nothing specific – again – about the regulation and protection of the water and air sectors, though the wording and sensibilities of the Law on Prevention and Integrated Management of Wastes clearly does acknowledge the need to secure and protect vital waterways from despoilment (Temas Actuales, n.d.).

However, one thing that Temas Actuales (n.d.) does overlook is The Law for Superior Audit and Accountability of the State of Querétaro. This item was published in December of 2014 and established the Entidad Superior de Fiscalización del Estado de Querétaro (ESFEQ). This independent organization is really not involved with environmental matters, focusing instead upon auditing public agencies and government appendages (OECD, 2017). It would seem a wonderful means of addressing water and air governance problems within the state. Yet, there is evidence that such oversight has not been useful in light of the fact that Querétaro continues to rely upon an antiquated water conveyance system (Schlarman, 2013) and continues to lag in terms of wastewater treatment and remediation (OECD, 2016a). Air quality does not appear to be quite as pronounced an issue, however, since Querétaro (or, to be more specific, the cornerstone City of Querétaro) generally scores well in studies looking at livability within different parts of Mexico (Banderas News, 2013). It is water governance wherein the state seems to be in the most dire circumstance.

2.22 Quintana Roo

The state of Quintana Roo has but two state-level laws pertaining to the regulation and protection of the natural world: The Ecological Equilibrium and Environmental Protection Law of Quintana Roo; and the Law on the Prevention and Integrated Management of Solid Wastes (Temas Actuales, n.d.). In a glance, we can identify that the state does, particularly when examining the latter piece of legislation, possess a sensibility to the water sector and to the safeguarding of its integrity from biological and industrial waste (Temas Actuales, n.d.). Be that as it may, the state does not further undergird this sensibility with additional stand-alone laws or statutes that delineate best practices and what kind of enforcement apparatus will be

used (and at what intervals) to protect and nurture the waterways of the jurisdiction. And economic governance in Quintana Roo, beyond passing and generic comments in the Ecological Equilibrium and Environmental Protection Law of Quintana Roo (Temas Actuales, n.d.), has no discrete legislative architecture in place for safeguarding the air that residents breathe.

Massive growth and development has not been accompanied by a similar growth in the state bureaucracy governing the disposition and distribution of water, thereby leading to Playa de Carmen and Cancun experiencing serious water shortfalls (Velázquez Morlet, 2014). If anything, environmental despoilment is not confined to water, but can creep into air pollution, too, insofar as industries that produce money for the state are given a greater latitude or freedom that might otherwise be advisable. The best example of this is the tourism sector, a sector wherein developers and real estate interests do seem to have a wide berth to do as they wish on matters that might impact them (Pelas, 2011). Within Quintana Roo, commercial interests are formidable actors who can easily lead state policies and initiatives astray.

2.23 San Luis Potosí

San Luis Potosí stands firmly in the vanguard of Mexican states inasmuch as it does have a far-reaching governance structure in place, at least when viewing its legislative corpus. Specifically, the state has five laws of note: The Environment Provision of the State Constitution; the Environment Law of the State of San Luis Potosí (as last amended 2006); Health Law of San Luis Potosí; Law to Protect the Health of Non-Smokers; and the Water Law of San Luis Potosí (Temas Actuales, n.d.). The last of these laws establishes (or privileges, as some might argue) best practices for the use, disposition and safeguarding of water; it does also establish measures for the conservation of natural waterways and ground/surface waters exploited by the state (Temas Actuales, n.d.; Legislatura Constitucional del Estado libre y soberano de San Luis Potosí, 2006). On balance, this state does appear to be in advance of other Mexican states that do not make explicit legislative guarantees (and schedules) aimed at protecting the water sector. Furthermore, the Law to Protect the Health of Non-Smokers (Temas Actuales, n.d.) is quite useful because it does address air pollution in the form of carcinogenic and combustible effluents expelled into the air and how this is to be curbed (Legislatura Constitucional del Estado Libre y Soberano de San Luis Potosí, 2005). Yet, such items are but a small slice of the products and noxious substances that plague air quality in San Luis

Potosí, and there is no detailed discussion about the disposition of, reporting of, regulation of, and elimination of noxious carbon-based gases or industrial excretions that find their way into the air. Stand-alone laws that tackle these latter issues would seem vital to ensuring that the state is able to guarantee the long-term well-being of its breathed air.

San Luis Potosí is intriguing insofar as, though nominally a state matter, a private concern, Interapas, is in charge of water service and provisioning. This private concern has been accused of negligent and ineffectual practices in the past, however, and it is a sad reality that San Luis Potosí continues to lag behind when it comes to recycling stormwater or when it comes to exploiting local water catchments as alternative water supplies (Martinez, Kralisch, & Escolero, 2010). One might argue that San Luis Potosí is a good instance of what can happen when private concerns insinuate their way deep into the fabric of water conveyance and water service: because these concerns have interests that do not primarily involve the public good, shortcuts and diversions can create scenarios that distract from progressive approaches to water sustainability and conservation.

Contemplating air governance within San Luis Potosí, it is striking to uncover that, while air sampling and air monitoring has been a staple of the state since at least the 1990s, the major city of San Luis Potosí has long struggled with the presence of massive concentrations of suspended lead-rich particles as a consequence of its large metallurgical industry (Aragón Piña, Torres Villaseñor, Santiago Jacinto, & Monroy Fernández, 2002). It does take time to change an industry and a culture, but municipal and state officials obviously need compliance heuristics and protocols that do far more than merely report when the air quality is unsafe.

2.24 Sinaloa

If one wishes to successfully trace the origins of the struggles of the State of Sinaloa in the realm of water and air governance, then one need look no further than the dearth of legislative materials within the state for expressly tackling water and air despoilment and (at least in the case of the former) over-harvesting. To wit, Sinaloa has but one state-wide and state-level law pertaining to environmental governance: The Ecological Equilibrium and Environmental Protection Law of the State of Sinaloa (Temas Actuales, n.d.). Such a law may be very good at articulating a broad support for, and sensibility to, environmental concerns, but it lacks the enforcement and regulatory sinews that come with a more extensive bevy of enabling and

constitutive laws that set forth particular agencies and bureaucratic practices aimed at protecting the fragile water ways and air of Sinaloa.

If we examine more closely the governance of the vulnerable air and water sectors of Sinaloa, we encounter findings of considerable import. Not least of all, the state government is earnestly committed to diversifying (to the extent possible) its water sources, and is formally committed to water protection, but lacks the resources to make these possible in a practical way. For example, the much-heralded Picachos-Mazatlan pipeline, envisaged as a means of diversifying water sources and easing local water shortages, has been stalled because only a portion of the needed funding is presently available (Rodriguez, 2017b). Be that as it may, Sinaloa does have a best practices architecture in place for agribusiness designed to protect the natural environment, and it has worked at some length to develop (in tandem with the federal government) a GHG Emissions Inventory that is augmented by multiple mitigation technologies (World Bank, CIAT, & CATIE, 2014). While imperfect, the collaboration between the state and the federal government, and the willingness to invest in mitigation tools, indicates that air and water governance in Sinaloa has the potential for growth in the future. Right now, the GHG Emissions Inventory is a very hopeful sign, while the state must find a way to secure the Picachos-Mazatlan pipeline so that local water shortages are reduced and water source diversification becomes a reality.

2.25 Sonora

Sonora, like aforementioned Sinaloa, has a general legislative architecture aimed at providing guidance in the proper governance of waterways and airways. However, as with Sinaloa (and various other Mexican states), it lacks a detailed and extensive roster of subordinate and prescriptive laws that create institutions, offices and sub-departments orientated towards watching over natural resources. To elaborate, Sonora appears to have only two state-level laws dealing with environmental governance: The Ecological Equilibrium and Environmental Protection Law of the State of Sonora; and the Environment Provision of the State Constitution (Temas Actuales, n.d.). What is truly needed is a corpus of laws that set forth specific schedules, intervals and bodies for oversight and regulation, and which set forth which sub-bodies and actors are to be charged with carrying out specific enforcement and oversight activities. In short, Sonora needs to have enabling legislation in place that adds flesh to broad proclamations and large statutes such as those above, and that fills in the interstitial space that

invariably comes with making broad decrees about protecting the environment from the manifold harms that exist.

Environmental governance is a serious matter in Sonora and this assertion is buttressed by the fact that the city of Nogales, Sonora, is home to a Research and Planning Institute orientated towards monitoring and studying air pollution and particulate contamination. In part because of this studious approach to the problem, the city of Nogales initiated a large-scale infrastructure modification and extension in the 2000s that reduced the large number of unpaved roads perceived as contributing to high concentrations of pollution across Sonora (Woodhouse, 2016). Thus, even in the absence of details about specific municipal and state-level offices geared towards cleansing the state's air, it does appear as though political executives are well-prepared to aggressively tackle air pollution issues. On the other hand, any concomitant or complementary regulatory and developmental architecture aimed at protecting the water sectors appears to be lacking, inasmuch as the Sonora River has been hit hard by at least one (and possibly other) major toxic spills in the past decade that has placed several hundred thousand inhabitants within Sonora at risk (Telesur TV, 2015). Although it is conjecture, it is arguable that one reason why Sonora seems to lack a sweeping bureaucratic and regulatory governance structure is because the state is subsumed within the larger Border Environment Cooperation Commission (BECC) that furnishes technical assistance grants, spearheads environmental projects and initiatives, and which entails partnerships with the US Environmental Protection Agency and the North American Development Bank (Border Environment Cooperation Commission, 2017). Consequently, Sonora may well be excessively reliant upon others to offer solace for environmental problems (such as infrastructure extensions or regulation) and thus ostensibly leaves its own internal architecture under-developed. There have been some positive gains in the area of air pollution, but the recent Sonora River spill raises concerns about environmental governance vis-a-vis the water sector.

2.26 Tabasco

To its considerable credit, Tabasco stands apart from many Mexican states insofar as it does come more nearly to realizing the ideal of having stand-alone pieces of legislation that set forth a particular roster of penalties for the violation or degradation of water and air resources. To be particular, Tabasco has four laws of note: The Environment Amendment to the State Constitution; the Law on Civil Responsibility for Environmental Harm and Deterioration; the Environmental Crimes Title of the State Penal Code; and

the Law on Water Uses (Temas Actuales, n.d.). The law on Water Uses, and the Law on Civil Responsibility for Environmental Harm and Deterioration, are the two laws that come much nearer to what is needed for true environmental governance (the latter law most of all) insofar as they set down prescriptive measures for compelling obeisance, and delineate what happens to those who deign to act towards the state's water and air resources in a negligent manner. But, to echo an old refrain, it seems clear that more stand-alone legislation can be produced by the state to outline how it will enforce specific practices in specific areas (for instance, the drilling of water wells in areas wherein the ground waters have been previously despoiled), and how specific sub-bodies of the state are to execute their environmental duties – and are to interact with local municipalities. But what Tabasco has in place presently is certainly a useful start.

Whatever environmental governance structure exists in Tabasco, it cannot seem to escape the gravitational pull and influence of major oil firms that operate within the state. Such influence may well explain why the main aquatic ecosystems within the state are wracked by industrial discharges, and why the Seco River, a major waterway, is troubled by a large concentration of physico-chemical and biological pollution (Ferrer-Sánchez et al., 2014). Tabasco is also bedeviled by persistent air pollution, but information about air quality is not made public, and an air quality monitoring system around the Paraiso, Tabasco, municipality is no longer functional (Muriel-García, Cerón-Bretón, & Cerón-Bretón, 2016). It does not appear as though the state has a dedicated office set aside for combating air pollution issues. Environmental governance in Tabasco, therefore, seems to be taking a sizable step backwards at a time when some other Mexican states are making grudging progress.

2.27 Tamaulipas

Turning to Tamaulipas, we find that Tamaulipas has four laws of consequence vis-a-vis environmental governance: The Law on Sustainable Forestry Development of the State of Tamaulipas; Environment Provisions of the State Constitution; the Ecological Equilibrium and Environmental Protection Law of the State of Tamaulipas; and the Regulation on Special Management Wastes (Temas Actuales, n.d.). Two of the four laws are general laws – Environment Provisions of the State Constitution, and Ecological Equilibrium and Environmental Protection Law of the State of Tamaulipas – while the Regulation on Special Management Wastes is orientated far more towards industrial and hazardous waste (which impacts

water in a much more proximate manner than air, of course) than it is towards air-borne effluents that can cut down on air quality (Temas Actuales, n.d.). Moreover, it is striking that there is a Law on Sustainable Forestry Development of the State of Tamaulipas, but no law on sustainable marine development, or a law specifically outlining what the state will do to protect air and water resources. Tamaulipas thus seems to squeeze uneasily halfway between such states as Sonora and Tabasco: its legislative architecture for environmental governance is more comprehensive than Sonora's, but it still falls short of the prescriptive set of laws that govern environmental oversight and protection within the state of Tabasco. On balance, Tamaulipas is better than some Mexican states when it comes to the governance and protection of the water and air sectors, but it is lesser than others. And, ultimately, as with so many federated states in the Mexican union, it falls far short of the ideal.

If Tabasco seems to be going backwards, then Tamaulipas is one Mexican border state that is making intrepid progress in the area of environmental governance. Tamaulipas is presently part of a regional work group that is nestled comfortably in the rung just below national coordinators (agencies): The United States's EPA and Mexico's SERMARNAT. This regional work group collaborates and interfaces with constituent members of the group to formulate comity in policies and standards in a range of areas – from air and water preservation and conservation, to material management to cooperative enforcement of environmental law. Tamaulipas, as with all member states, participates in joint task forces aimed at resolving environmental concerns or issues (United States Environmental Protection Agency, 2017). It would certainly appear as though Tamaulipas has immersed or subsumed its own state environmental governance bureaucracy within this massive trans-state entity, at least given the scope and need for shared resources and strategic planning that such regional work groups demand of each constituent state (United States Environmental Protection Agency, 2017).

In any case, the state does have modest regulatory bodies in place to deal with a host of environmental issues. Among the numerous promulgated state laws that protect the various environmental sectors, there is the Water Law of 2006, and the Public Service Law of Drinking Water, Sewage, Drainage, Treatment and Disposal of Treated Water of 1992. There is no specific law combating air despoilment, however, and there does not appear to be an air sector corollary or equivalent to the State Water Commission of Tamaulipas (constituted in 2006) (Castro-Ruiz & González-Ávila, 2012). It should come as no surprise that, absent stand-alone

legislation aimed at the heart of air pollution, Tamaulipas continues to grapple unhappily with serious air pollution in the southern part of the state (Zumaya Escobedo, 2017). As with Tabasco, Tamaulipas might be well advised to look more carefully at filling in the interstitial spaces (perhaps, in part, created by its heavy involvement with its regional work group) of its environmental governance with proprietary offices and initiatives of its own. One such initiative is the construction of a committee to monitor and address air quality in Tamaulipas, though the effort remains in its early stages as of 2017 (Zumaya Escobedo, 2017).

2.28 Tlaxcala

Tlaxcala is a striking example of a Mexican state that, certainly at first glance, appears committed to allowing the federal government set forth the rules for environmental governance while it lags behind. To wit, the state has only adopted a state-level variant of the state environmental protection law: The Law of Ecology and Environmental Protection of the State of Tlaxcala (Temas Actuales, n.d.). When seeking to understand some of the problems that afflict Tlaxcala (and while bearing in mind that states with more impressive legislative architectures are also bedeviled by problems), it seems a good starting point is the state's incapacity to establish an independent and flourishing environmental governance corpus of laws, statutes and codicils that particularly target Tlaxcala's peculiar air and water sector challenges.

Tlaxcala is impoverished and lacking in human resources (Knoema, 2017), and this manifests itself in a dearth of administrative and regulatory governance tools; it also likely explains why only one major state-level law exists to combat environmental abuse. To the surprise of no one who has studied the situation in Tlaxcala, the state has significant bacterial and biowaste pollution in surface waterways such as the Ayotac River (Rodríguez-Tapia & Morales-Novelo, 2017). There is not a lot of material to be found vis-a-vis the ecological or environmental bureaucracy of Tlaxcala, but what does exist paints the picture of a struggling state overwhelmed by the challenges it faces.

2.29 Veracruz

Tabasco has a law on water uses, and Veracruz is in a similar frame of mind inasmuch as it has in place a State Law on Waters that guards the treatment of, human interaction with, and conservation of, waters within the State of Veracruz (Temas Actuales, n.d.). The state also features some other

consequential environmental laws: The Environment Provision of the State Constitution; the State Environmental Protection Law; and the Law on the Prevention and Integrated Management of Urban Solid Wastes and Special Management Wastes (Temas Actuales, n.d.). Both the Law on the Prevention and Integrated Management of Urban Solid Wastes and Special Management Wastes, and the State law on Waters shows a clear and direct appreciation for, and acknowledgment of, the vulnerability of the water sector. But, save for almost allusive references in the State Environmental Protection Law (Temas Actuales, n.d.), Veracruz does not seem to pay nearly as much attention to the air sector. Presumably, the federal state's own efforts to mitigate air pollution and smog may be part of the reason, but it is curious how little time is devoted within the corpus of Veracruz's environmental law to safeguarding the air of the state. This is a common failing of Mexican states, of course, and Veracruz is far from alone in this respect.

In any event, there are some blights marring Veracruz's approach to fighting air and water pollution. Most notably, the state appears to lack close collaboration with leading tertiary educational institutions vis-a-vis crafting coherent environmental policy, and it seems to be laggard in addressing troubling concerns about biodiversity within the state's environs (OECD, 2016b). This lack of synchronicity explains why the state's marine preserves and beaches appear to be often choked with synthetic and human-generated waste despite the presence of local ordinances and a formal resolve to end the practice of dumping and despoilment (Rupe, 2014). On the other hand, air quality monitoring and assessment networks ostensibly established by local municipalities – as well as apparently ad hoc ones crafted by academics – have called attention to air quality issues within the state and have contributed to a new consciousness that has seen air quality pollution moderated in recent years and even mitigated (González Rocha, Cervantes Pérez, & Baldasano Recio, 2016). The state may not be performing optimally when it comes to water pollution, but it is at least calling attention to air pollution – and with salutary results.

2.30 Yucatán

The criticisms leveled against other Mexican states – that they lack enabling and auxiliary laws to add sinew or muscle to their broad environmental protection directives – may be leveled at the State of Yucatán, too. It has, so far as Temas Actuales (n.d.) notes, two state laws on the environment and its concomitant governance: The Environment Provisions of the State

Constitution of Yucatán; and the Environmental Protection Law of the State of Yucatán. Giving environmental provisions, the seal of the state constitution seems a healthful step, but these two laws do not set forth enabling legislation that empowers and shapes smaller agencies within the state bureaucracy charged with specifically addressing water and air sector issues – of which there are undeniably many. In that regard, Yucatán seems to offer a bold declaration of support for the environment, but does not have the correspondingly mature corpus of laws that would add strength and stolidity to enforcement and governance.

Yucatán's parsimony when it comes to state laws is accompanied by an unwillingness to make available data pertaining to ground water and the status thereof. There is also evidence that the state has been dilatory in establishing relationships between various stake holders that might lead to better environmental outcomes, and there is some suggestion that the state is laggard in crafting large, multidisciplinary research groups that can provide answers for the state's acute water shortage and water management issues (IUCN Water Knowledge Platform, n.d.). On the positive side, the state has established biosphere reserves that house indigenous communities committed to conservation principles as delineated in the state's Environmental Protection Law (Doyon & Sabinot, 2014). It is a progressive step, but the key take-away is that local communities and committees seem to be taking the lead in protecting the air and water sectors. Although air pollution in the Yucatán is not discussed pervasively in the literature, it is well-established that the state does have a problem with despoiled water (OECD, 2007). At some point, the Yucatán will have to retreat from letting local communities handle environmental affairs in favor of a more comprehensive state-directed approach. The community-centered approach highlighted above is, in and of itself, not enough.

2.31 Zacatecas

Zacatecas is the final state to be discussed, and it is noteworthy – in a rather unfortunate way – for having only one law that deals (at the state level) with environmental governance: The Law for the Sustainability and Environmental Protection of the State of Zacatecas (Temas Actuales, n.d.). The absence of other consequential laws is problematic and indicates that not enough prescription exists to properly guide or steer bureaucratic forays into environmental regulation and compliance. This problem is a common one in Mexico, however, and is hardly unique to Zacatecas.

Bureaucratically, state decrees have worked in Zacatecas in combating air pollution. Chiefly, the state has pursued new urban policies that mandate retrofitting, the use of different (non-carbon-based fuels), forced relocation and mandated propane use to mitigate emissions caused by brick kiln firms (Blackman, 2006). The state also frequently commissions environmental assessment programs and is quick to delineate the many laws it has in place (as well as federal laws it apparently follows scrupulously) guiding human-environment interaction; those same publications, though Zacatecas tends to be mum as to the precise nomenclature of the state-level offices that ensure compliance with these laws (PwC, 2014). It is very much a state dominated by mining interests, and air and pollution agencies that might combat the influence of these interests are likely modest in scale and relatively under-funded.

3. Discussion

Scanning over the data, Mexico can be aptly described as a nation that has a fairly wide variance in terms of the state-level laws promulgated in each jurisdiction. Some states, such as Mexico, Puebla, and San Luis Potosí, have a fairly comprehensive legislative structure in place (Mexico most of all). Other states, such as Tabasco and Tamaulipas, have a multi-faceted and multi-sectoral legislative framework of their own that is geared towards protecting the air and waterways of their states. States such as Aguascalientes, wherein there appears to be credible interaction and collaboration between various agents and actors to achieve positive environmental results, are proof that it is not necessarily imperative that a wide array of laws be in place – just as long as the commitment and fidelity to environmental conservation is sincere. However, it is also evident, when looking at Mexico in the main, that many states do not have specific state-level laws dealing with the air and water domains or sectors. Even if one allows that the specific Environmental Law of each state (in spirit, if not in actual text) establishes imperatives for conserving, regulating and protecting the air and water sectors, the absence of specific laws creates interstitial space that can then be used by businesses and individuals to circumnavigate their responsibilities to the natural world. There needs to be a concerted effort within Mexico to create more laws that deal wholly with air and water protection – and that delineate specific responsibilities and expectations for specific agencies and offices. One of the Mexican states which appears to be in the vanguard, in terms of creating a credible enforcement and regulatory architecture, is the tiny state of Campeche, which is proof that forward-looking legislators and political executives can most definitely create something meaningful which will advance environmental governance. However, the singular example of Campeche also invariably leads to another issue that comes to light from this investigation.

Chiefly, the various Mexican federated states seem loathe to discuss what precisely they do (and who does what) so that the air and water sectors can be protected from harm. Likewise, the scholarly literature seems widely disinterested in discussing specific state-level agencies or offices within Mexico's federated states. Almost all of the federated Mexican states express their solidarity with the natural environment, and their concern for preserving nature's bounty for future generations, but they also provide meager details as to particular offices or bureaus or agencies that work to advance the conservation of the water and air sectors on a daily basis.

Overall, the data accrued above suggests that government policies within Mexico's 32 federated states have led to only mixed results: these states continue to struggle with water depletion and abatement, with extreme shortages, with pollution of their air and water resources, and with under-funded infrastructures that lack conveyance and coverage capabilities. Air monitoring has improved – especially in states such as Baja California Sur, Mexico, and San Luis Potosí – but the accumulated evidence does not point to air quality monitoring and emissions compliance as being staples in all Mexican states. And even states that do try and be progressive on environmental issues, such as Tabasco, are constrained by their reliance upon extractive or manufacturing sectors. Ultimately, engagement and governance can be shaped by government programs and initiatives, but information about many of those programs and initiatives, at the state-level, is thread-bare. Furthermore, the general finding is that they have only been mixed in achieving meaningful results. Environmental governance in Mexico still has some ways to go.

4. Conclusions

In the end, Mexico is a country that is constrained by the improvidence of its bureaucratic and human resources, and by the fact that the country must rely upon industries – be they tourism or manufacturing or mining – that are not at altogether conducive to environmentalism. Some Mexican states do better than others, and others do worse than all. The main challenges appear to be rooted in creating a more interdisciplinary approach to combating environmental despoilment, and finding ways of leveraging complementary resources and assets so that more can be accomplished. It would also be of great benefit if more Mexican states would create a legislative and statutory architecture that explicitly and expressly addresses water and air governance in a stand-alone fashion; this would definitely reduce the interstitial space that allows for abuse or negligence. Of course, the wealth must be present for all of this to be made possible. In the final analysis, Mexico needs more programs that champion environmental governance and regulation, but they need to happen at the state level, and they need to be accompanied by a programmatic and statutory approach that recognizes the value in creating linkages between all of the pertinent players and agents.

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