

**DEVELOPING LITHIUM VALLEY: GREEN EXTRACTIVISM AND THE
IMPORTANCE OF COMMUNITY ENGAGEMENT FOR A JUST TRANSITION**

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SIGNATURE PAGE

THESIS: DEVELOPING LITHIUM VALLEY: GREEN
EXTRACTIVISM AND THE IMPORTANCE OF
COMMUNITY ENGAGEMENT FOR A JUST
TRANSITION

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equitable for every human, non-human, and nonliving factors that make life on this planet possible.

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ABSTRACT

California, as well as the entire United States, has crafted new policy regulations to limit fossil fuel emissions and mitigate climate change. These reforms have incentivized the production of critical materials that support electrified transportation and renewable energy, including lithium: a key component of lithium-ion batteries. Developers have now proposed a new method to produce lithium directly from geothermal brine of the Salton Sea Known Geothermal Resource Area (Alston et al., 2020). Development for lithium extraction is under way, which seeks to transform Imperial Valley into “Lithium Valley,” with hopes that the industry will provide the region with a more promising economy. However, it remains unclear how economic and environmental benefits will be redistributed back to a working-class community that has some of California’s worst rates of air pollution. Lithium resources in Imperial Valley have been presented as a panacea to the problems associated with “green extractivism”, for they are coupled with existing geothermal power plants that purport to make the extraction process close-looped, resulting in less potential water and land usage than conventional brine evaporation or open-pit mining. In the past, industry has moved into Imperial Valley delivering promises of stable paying jobs, housing and workforce development training; however, these promises have been broken time and time again, causing community members to be skeptical of new industries and economic development proposals. Drawing from interviews, document analysis and participant observation, this research contributes to community engagement on the proposed geothermal lithium development. The Lithium Valley project has the potential to transform perceptions of what resource extraction looks like, so long as the local community is given a proper seat at the table.

TABLE OF CONTENTS

SIGNATURE PAGE	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	v
LIST OF TABLES	ix
LIST OF FIGURES	x
CHAPTER 1: INTRODUCTION	1
Statement of the Problem	1
Extractivism & Green Extractivism	4
Regenerative Studies Approach	5
Principles of Environmental Justice	8
Gaps in the Research	8
Research Questions	9
Language and Terminology	10
CHAPTER 2: METHODS	12
Data Collection	14
Data Analysis	17
Limitations	18
CHAPTER 3: LITERATURE REVIEW AND BACKGROUND ON THE SALTON SEA	20
Introduction	20
Reclamation	20
Restoration	24

Recovery	30
Conclusions.....	35
CHAPTER 4: THE COMMUNITY OF THE SALTON SEA AND THEIR CONCERNS	36
Communities of the Salton Sea Region	36
Impact of Industrial Development	37
Water Concerns.....	39
Air Pollution.....	42
Conclusions.....	44
CHAPTER 5: AREAS OF IMPROVEMENT.....	46
Lacking Infrastructure.....	46
Lacking Education	47
Lacking Outreach.....	50
Conclusions.....	52
CHAPTER 6: DISCONNECT IN COMMUNICATION.....	54
The Historic Way	54
The Lithium Valley Commission.....	56
Misinformation on Job Creation	60
Misinformation on Water Use	61
Misinformation on Seismicity.....	63
Imperial County Economic Opportunity Investment Plan.....	65
Conclusions.....	68
CHAPTER 7. CONCLUSIONS	69

APPENDIX A. LITHIUM VALLEY COMMISSION MEETINGS ATTENDED... 76

APPENDIX B. SALTON SEA MANAGEMENT PROGRAM MEETINGS

ATTENDED 79

REFERENCES 80

LIST OF TABLES

Table 1: Number of estimated jobs reported by Controlled Thermal Resources in their Lithium Valley Commission presentation vs. their estimate in the initial environmental review.....	60
Table 2: Water use for Controlled Thermal Resources' Hell's Kitchen geothermal and lithium extraction site based on development phase.....	61

LIST OF FIGURES

Figure 1: Visual representation of communication dynamics in relation to green extractivism in Imperial Valley 4

Figure 2: Salton Sea Land Ownership (University of Redlands, 2015) 24

Figure 3: Managed Marsh Complex in relation to the distance of the Salton Sea Shoreline (Google Earth, 2022) 28

Figure 4: CalEnergy Geothermal Plant near the southern shore of the Salton Sea (Geoffrey James Britton, 2021) 30

Figure 5: Earthquakes in the Salton Sea Region 05/02/22-05/09/22 (USGS-Caltech, 2022) 63

Figure 6: Word clouds representing common themes in community responses and the Imperial County Economic Opportunity Investment Plan..... 65

CHAPTER 1:

INTRODUCTION

Statement of the Problem

The Salton Sea: A place where dreams go to die; a hot, dry, and complete wasteland. This is how the media and popular culture portray the Salton Sea (Olalde, 2020); however, the reality of the sea is much more complicated than this. For decades, the Salton Sea has been a dumping ground; a place where waste ends up, toxic air is rampant, and the people who live there are hardly acknowledged as members of California's society (Buck, 2020; English et al., 2017; Voyles, 2021). In hopes to restore, or at least make the area more economically sound, there have been several attempts to revive this region. Some of these efforts included making the Salton Sea a resort town, building housing developments, transforming it into a weapons test site, and most recently, a green technology utopia (Alston et al., 2020; Buck, 2020; Voyles, 2021).

The new vision for the Salton Sea region entails the implementation of geothermal direct lithium extraction (geothermal DLE). Geothermal DLE is an extractive process in which lithium, and other minerals, like manganese and zinc, are removed via adsorption, ion exchange, or electrochemical processes from 700–800-degree F brines that are brought up to the Earth's surface for use in geothermal energy generation (Blair et al., 2022) generating steam, which spins turbines generating electricity (Gaucher et al., 2015). Compared to lithium extracted by evaporation common in South America and Nevada, geothermal DLE extraction process requires less water and land use (Blair et al., 2022).

As the climate crisis continues, the world is transitioning towards renewable energy sources rather than the continued use of fossil fuels in order to reduce carbon emissions. The transition to renewable energy sources requires an increase in resource extraction for the materials that are necessary to support renewable energy developments. Lithium is a key component for the energy transition, as it is used in lithium-ion batteries that power our phones, computers, power plants and electric vehicles (EVs) (Calexico Chronicle, 2022). Although lithium is necessary to reduce our reliance on fossil fuels, it is important that we take a regenerative approach to lithium extraction, in which meaningful considerations are made to improve the human and non-human environments of the region, rather than one that follows the status quo.

Throughout the years, private corporations have come to the Salton Sea, promising to clean up the air pollution that results from the toxic PM10/2.5 particulates from the playa of the shrinking Salton Sea, dust from the surrounding desert, and agricultural emissions (Adams & Rudy, 2002; Cantor & Knuth, 2019; CARB, 2012; Farzan et al., 2019). However, residents near the Salton Sea still experience adolescent asthma rates that are over double the national average (Fogel, 2021). Due to the high rates of respiratory health issues in an area that has minimal access to healthcare, and high unemployment rates, the Salton Sea community is facing a serious disadvantage (Buck, 2020; Farzan, 2019).

Most recently, it was discovered that the Salton Sea could provide up to one-third of the global lithium demand (Alston et al., 2020). In 2020 the California Energy Commission (CEC) created the Lithium Valley Commission (LVC), in order to “analyze opportunities and benefits for lithium recovery and use in the state” (Commission, 2021).

The committee is composed of a diverse group of stakeholders, including NGOs (community health groups and environmental organizations), irrigation districts, automobile companies, renewable energy developers, tribal members, environmentalists, and state/local government officials.

Although the LVC has been meeting since the beginning of 2021, the local community voices were not expressed at these meetings until a November 2021 forum. Meetings were also not available in Spanish until August 2021, even though much of the Salton Sea region's population is Spanish speaking (census, 2021). As these meetings occur, developers have already started building and drilling for these projects. In doing so, the community has not been adequately engaged on the benefits and burdens of direct lithium extraction (DLE) and geothermal energy; therefore, they are justifiably skeptical of resource imaginaries. In figure 1, the lines of communication between public agencies, project developers, and community groups and tribes in relation to green extraction projects are not solidified. The goal of this research is to open a line of communication with local community members.

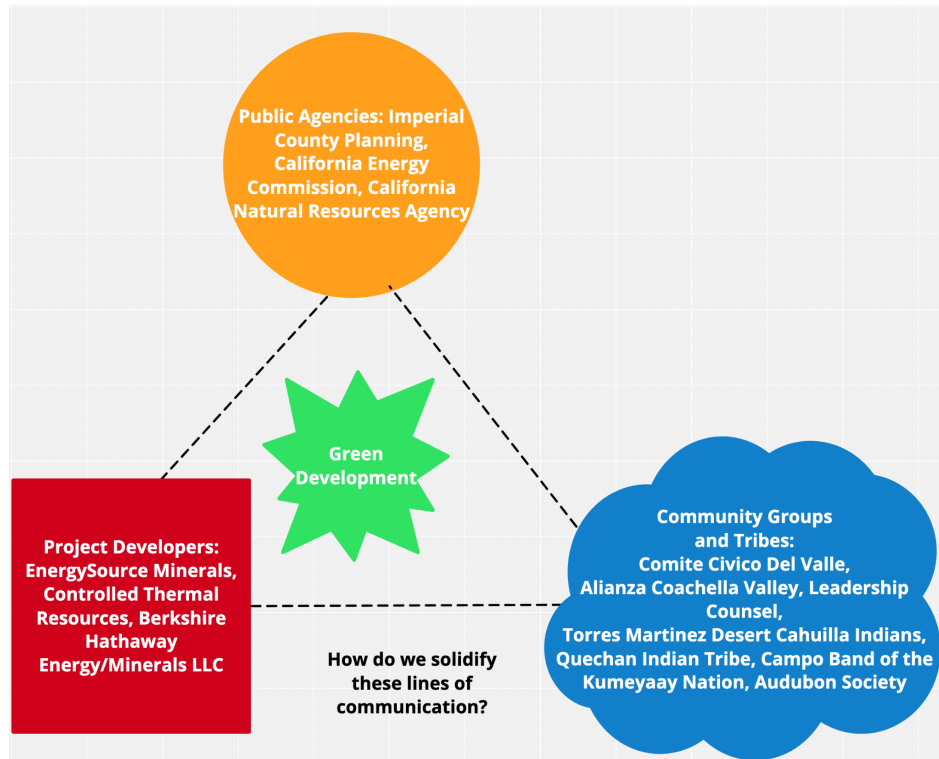


Figure 1: Visual representation of communication dynamics in relation to green extractivism in Imperial Valley

Extractivism & Green Extractivism

According to Gudynas (2018, p. 63), the term extractivism aims to describe any developments that entail mining, oil, or intensive agriculture. The term is used by both supporters of these developments, as well as opposers. With extractivism, there are no products created, instead, “everything is extracted.” It is important to understand that although geothermal DLE requires technology to separate lithium from the brines and requires chemicals to transform the extracted lithium into a usable form, there is not a product created. Instead, lithium is removed from a source that it has existed throughout for generations, creating a “net loss of heritage.”

Geothermal DLE falls under the category of green extractivism, in which the process of resource extraction is framed as being better for the environment since it

supports the transition to renewable sources of energy (Jerez et al., 2021; Riofrancos, 2019). Green extractivism is concerning because there still are environmental and human impacts (Riofrancos, 2019). In the Salar de Atacama region of Chile, brine evaporation for lithium extraction has created a significant impact on freshwater availability and ancestral lands (Jerez et al., 2021). This region is arid, with very minimal rainfall each year, but brine evaporation-based lithium extraction is still prominent (Kalazich et al., 2019). Similarly, the Salton Sea region is an arid desert, which can regularly experience temperatures in the triple digits and a yearly average rainfall of less than 3 inches per year. Although geothermal DLE is expected to use less freshwater, there is still an impact, especially in a region that faces multiple hydrosocial conflicts, like the receding Salton Sea and polluted waters from industrial agriculture. Although lithium is a critical mineral for the energy transition to occur, it is necessary to understand that transitioning to renewable energy sources is not the end of environmental and social harms. This is rather the beginning of the transition, and it is critical to instead envision a world in which the nuclear family ideal of a white picket fence, multiple vehicles, and a large yard is a historic way of thinking; in this new world of transition there needs to be an emphasis in reducing consumption and eliminating the concept of disposable regions (Riofrancos, 2019).

Regenerative Studies Approach

Regenerative Studies emphasizes the importance of taking the concept of place into consideration. Through recognizing the significance of place, one must not only consider the land and resources that exist on it, but also the people and the animals, the biotic and the abiotic factors that give rise to this ecoregion (Lyle, 1996). The Salton Sea

region, as I refer to it, focuses on the Imperial Valley, which is located closest to the geothermal power plants and the proposed lithium extraction sites; however, the Coachella Valley is taken into consideration because its residents are impacted by the same air basin that is heavily polluted from the dust generated from the playa (shore) exposed by the receding and evaporating Salton Sea.

Where sustainability aims to minimize the symptoms of climate change, Regenerative Studies aim to create a holistic perspective, in which the causes of climate change are addressed, and humans live cooperatively with the environment rather than dominating it (Gibbons, 2020). Current lithium extraction practices, as seen in the Salar de Atacama in Chile, utilize a degenerative approach, in which lithium extraction causes significant detrimental impacts to the natural environment, as well as social impacts (Bustos et al., 2021; Garcés et al., 2020; Jerez et al., 2021; Kalazich et al., 2018). For geothermal DLE to be truly regenerative, it is critical for developers to incorporate whole systems thinking, in which there is an understanding of how to create development that improves both human and non-human sectors of the environment where the development exists (Ajilore, & Willingham, 2020; Gibbons, 2020; Du Plessis et al., 2015; Mang et al., 2012). This requires looking at the short-term, mid-term, and long-term social and environmental impacts of the project (Gibbons, 2020). Improving the human sector can occur by incorporating lived experiences of community members in the decision-making process. Understanding the needs and values of all diverse community members of the region and incorporating those needs into the decision-making process can create a project that uplifts a community, rather than extracting from it (Ives et al., 2020). A regenerative approach would enhance the current state of the region's environment, for

example, creating more wetland space to mitigate dust, as well as provide space for migratory birds

Imperial County has experienced and continues to experience the aftermath of the mastery of nature (Apffel-Marglin, 2020; Hand & Liere, 1984; Plumwood, 1994). A receding, partially human-made sea exposes the community to a playa that has pollutants from chemical fertilizers and pesticides that are used in industrial agriculture, as well as military waste from a naval base that has become a shell of its former existence (Voyles, 2021). Geothermal power plants that have been operating since the 1980s have been emitting pollutants into the air and pulling toxic metals from underground, like lead, arsenic, and barium (CARB, 2019; Cart, 2021). If Lithium extraction occurs here, and geothermal development increases, mitigation must occur in order to ensure that the process generates minimal harm and maximum benefit to the community and the environment. Ensuring that this development does not do any further harm requires taking a holistic, regenerative and critical approach to green extractivism (Dunlap and Jakobsen, 2019; T. Riofrancos, 2019; Garcés and Alvarez 2020; Jerez et al., 2021; Voskoboynik and Andreucci, 2021), which includes listening to the concerns of the community members that will be living with this development for generations to come.

Principles of Environmental Justice

My research on community engagement is rooted in environmental justice principles. In the Imperial Valley, many of the principles of environmental justice have been violated. For example, the use of chemical fertilizers for industrial agriculture has increased rates of asthma and cancer, which violates all seventeen principles of environmental justice (First National People of Color Environmental Leadership Summit., 1996). The research presented here focuses primarily on principles two and seven, which ensure that public policy is created in a way that is “just for all peoples involved, and that all community members are allowed to participate in the decision-making process...” (First National People of Color Environmental Leadership Summit., 1996). In order to warrant the success of proposed direct lithium extraction and increased geothermal development, it is critical to implement environmental justice principles throughout the planning process. Only through the implementation of these principles would a just, holistic, and sustainable energy transition be possible. Under these conditions, the Lithium Valley development might have the capacity to serve as a precedent for a more positive role of extraction for a just transition in support of underserved communities.

Gaps in the Research

This research explores gaps in critical research on green extractive industries, which tends to focus on the Global South, as well as more conventional forms of mining and drilling (Dunlap and Jakobsen, 2019; T. Riofrancos, 2019; Garcés and Alvarez 2020; Jerez et al., 2021; Voskoboynik and Andreucci, 2021). In order to ensure best practices, this research aims to provide the Lithium Valley Commission, The Lithium Valley

Coalition¹, and the California Energy Commission with a report that discusses the experiences of local community members, analyzes the benefits and burdens that the lithium industry would have on local community members, and provides suggestions for how the lithium extraction industry and the government should be including, informing, and listening to the public throughout the environmental planning process.

Research Questions

The Salton Sea and Imperial Valley are riddled with environmental concerns that require an interdisciplinary approach. For my research, one of my goals was to focus on creating trust between Imperial Valley community members and academic research, as well as building relationships that allow for a collective voice to be amplified in order to provide Imperial Valley with a seat at the table in the decision-making process. In order to successfully build trusting relationships, there must be conversations that discuss the lived experiences of community members, previous attempts by industry to reap profits from this desert landscape, and ways that the state, county, and industry can come together and begin to repair the damaged relationship that currently exists. In order to help develop a community plan, my research asks:

- How have the government and industry treated community members in the past?
- How do local community members currently view the government and private corporations that have investments in the Salton Sea and its subsoil resources?

¹ The Lithium Valley Coalition is an emerging group of Imperial Valley stakeholders who are representing the disadvantaged communities of the region in relation to local lithium extraction projects.

- How would community members like the government and the private sector to engage with them on proposed development projects?
- How do community members perceive the risks/benefits of geothermal lithium development?

Language and Terminology

Throughout my research, I discuss this region by distinguishing them into four different sections. When referencing the southern end, I refer to it as the Imperial Valley, and the northern end as Coachella Valley. What is referred to as the Salton Sea region is composed of both Coachella and Imperial Valleys. The term Lithium Valley is only used when directly speaking about the proposed lithium development that is located on the southeastern edge of the Salton Sea encompassing the Salton Sea Known Geothermal Resource Area and the unincorporated community of Niland, CA, the frontline community of this development, closest to geothermal lithium resources under exploration.

This research examines the importance of the extraction industry going the extra mile, so that communities are not displaced, or further disadvantaged. The Imperial and Coachella Valleys are home to historically disadvantaged communities. In this research, a disadvantaged community is a community that faces public health concerns from air, water, and soil pollution (Schroeder et al., 2002; Farzan et al., 2019; Morales, 2021). A disadvantaged community also lacks economic investment, meaning that there are little to no well-paying jobs, limited housing options, limited transportation infrastructure, and limited education opportunities from kindergarten through twelfth grade, as well as minimal higher education facilities.

Throughout this research I refer to the extraction of lithium as direct lithium extraction (geothermal DLE), in which lithium is pulled directly from the brine through selective electrochemical processes, ion exchange, or adsorption (Blair et al., 2022) that are generated from geothermal power. Industry will often refer to this process as “lithium recovery” however, this is not recovery, it is resource extraction. The word recovery is used by industry to deceive the public into seeing their development as separate from other forms of resource extraction. Lithium is a naturally occurring element throughout the globe, but it needs energy intensive refining and processing in order to be used in batteries, and therefore, to remove it from deep beneath the ground is to extract it, not recover it.

CHAPTER 2:

METHODS

While this research focuses on the Salton Sea region, and the Imperial Valley, it is part of a larger conversation on best practices for resource extraction. It is evident that an energy transition is required in order to reduce our consumption of fossil fuels, however, there are well-established frameworks for a just transition that allows for more to benefit (Tucker & Lee, 2018). This research consists of a mixed-method approach of primarily qualitative methods, including semi-structured interviews, observation, and document analysis - utilizing transdisciplinary methods embracing techniques originated in anthropology and sociology (Braun & Clarke, 2006; Gupta & Ferguson, 1997).

Fifteen semi-structured interviews and two listening sessions were conducted with stakeholder organizations, including labor unions, environmental justice organizations, community organizations, and immigrant rights groups. Interviews discussed the lived experience of Coachella and Imperial Valley residents, along with recommendations as to how the government and industry should proceed with lithium development. Residents were interviewed from Imperial Valley, as they are the fence line communities of this development. Coachella Valley residents were also interviewed, as they are a part of the Salton Sea region and both communities share the same air basin. Interviews with community members and community organizers were a necessary component to this research, as the lived experiences of long-term residents are too often missing in conversations regarding development in the Imperial Valley (Buck, 2020).

Observation was used to analyze the Lithium Valley Commission (LVC) meetings and the Salton Sea Management Program (SSMP). Lithium Valley Commission

meetings between February 2021 through April 2022 were attended via Zoom (except for the November community forum, which was attended to in person in El Centro, CA) and field notes from the meetings were analyzed (Jhangiani et al., 2019). Observations of the LVC meetings were a large driver in exploring the importance of community engagement, as these meetings have been relatively inaccessible to the general public in Imperial and Coachella Valley due to the length and time of meetings, as well as limited access to the internet during the COVID-19 pandemic, which required all meetings to be conducted via video conferences held on Zoom. The November 2021 community forum in El Centro, California was attended in person. Observations of the SSMP meetings occurred from December 2021 through March 2022 were conducted by video conferencing in order to compare how the SSMP and the LVC interact with local community members. The SSMP meetings are focused on implementing a 10-year plan that aims to mitigate the impacts of the quantification settlement agreement (QSA), which requires the transfer of Colorado River water to the more urban San Diego County (SSMP, n.d.). Although the SSMP is focused on the development of restoration projects in the region, the LVC and the SSMP are inextricably linked due to the environmental and public health concerns that many community members are focused on in this region.

Document analysis was used to decipher comments and materials that were posted to the docket of the LVC (Gupta & Ferguson, 1997), as well as the Imperial County's Lithium Valley Economic Opportunity Investment Plan (EOIP). Analysis of the docket and the EOIP was necessary for this research in order to examine the difference between concerns of government and private entities compared to local community members. Analysis of the initial study for Controlled Thermal Resources' geothermal

facility and lithium extraction site was conducted to better understand the environmental and social impacts of this development in the Salton Sea Region. Although Energy Source Minerals has a publicly available Environmental Impact Report, the decision was made to focus on Controlled Thermal Resources due to their initial study being conducted by Imperial County, as well as their representation on the Lithium Valley Commission.

Data Collection

In September 2021, this research was approved by the Cal Poly Pomona Institutional Review Board (IRB) under the protocol number IRB-21-93, in which I was approved as a co-PI for a longer-term project exploring the role of mining in the energy transition. Once approval was received, I began contacting LVC commission members and local community organizers that were working closely with the Lithium Valley development. Participants were found initially from attending the Lithium Valley Commission meetings. In these meetings, I looked for committee members and public commenters that were expressing their concerns about community engagement. These committee members and public commenters were then contacted via email using an IRB approved recruitment script. Interviews and listening sessions took place from December 2021 - April 2022. Interviews were primarily conducted via video conferencing (Zoom), except for one meeting that took place at a coffee shop in Coachella, California. As these interviews took place, participants provided me with contact information for other community members that would be interested in participating in this research. Interviews and listening sessions were conducted in a semi-structured format, in which an IRB approved set of questions was asked, but the conversations were allowed to skew away

from these questions. The semi-structured format was utilized in order to allow participants to discuss their concerns and life stories without feeling like they had to follow a strict set of questions. Interviews were scheduled to be an hour long, but participants were free to continue the conversation past the hour mark if they wanted to do so. Some participants wanted to stick solely to the interview questions, while others wanted to have a more fluid conversation about the environmental and social complexities that exist in the Salton Sea region. All audio from the interviews was recorded and transcribed using Zoom's audio transcription software and/or Microsoft Word's transcription feature.

For the interview questions, I wanted to create a script that allowed for a profound discussion about past instances in which the community was impacted by industrial developments, as well as what they would like to see Lithium Valley provide for the community if it comes to full fruition. In order to do so, I asked questions about participants' life stories, if they have lived in the region their entire life, forms of pollution they have experienced in the region, their main concerns about pollution in relation to lithium development, and how they would like to see the Lithium Valley development engage and positively support the community. Drawing from Lilja and Bellon, (2008) it was key to make this research participatory, using a holistic approach that allows community members to be a part of the decision-making process. In previous developments and research, underserved communities, like Niland and Calipatria have often been left out of the conversation, causing development to create more harm than good. Some participants were reluctant to discuss certain questions, while others were very open about their experiences and opinions. Participants frequently discussed issues

outside of the proposed questions, although still relevant to the concerns of community engagement and disadvantaged communities.

A large portion of my research focused on observation of two different committees: the Lithium Valley Commission and the Salton Sea Management Program, totaling 60 hours of observations. Observation of the LVC was a key component in understanding the current relationship dynamic between the lithium industry, local and state government, and the local community members (Gupta & Ferguson, 1997). The SSMP meetings were observed to compare how the LVC approaches community engagement versus the approach of the SSMP. Since these governing bodies both exist to improve the Salton Sea region in different ways, it was important to see if one commission was more successful at engaging the local community members than the other.

Meetings for the LVC were observed on a monthly - sometimes twice monthly - basis. The meetings were approximately three and a half hours long each, and notes were taken as a complete observer (Peters, 2015). Complete observation entails the observation of stakeholders without interaction (Peters, 2015). Since these observations are discussing the decision-making process and the role of community engagement, complete observation gave me the ability to explore these meetings in a non-invasive way (Jhangiani et al., 2019). Observations were made during presentations by committee members, during public comment, and when the chat feature was used. Meetings for the Salton Sea Management Program Long Range Committee and Community Engagement Committee were observed periodically from December 2021 through April 2022. The

meetings were approximately three hours long each, and notes were taken in the same format as mentioned for the LVC meetings.

A more technical understanding was needed for the environmental and social impacts of geothermal energy, as well as DLE in the Salton Sea Region. Document analysis was performed on four reports that focused on the environmental impacts of geothermal energy and direct lithium extraction, as well as an economic investment report from Imperial County. Public comments published in the LVC docket that were made in response to the LVC's community forum that occurred in November of 2021 were also analyzed. This comment section required particular attention as this thesis is focused on community engagement. Public comments are important to study, as they provide in depth insights into how the community has been involved in the decision-making process (De'Arman, 2020). The community's response to this forum was very vocal, and merits greater recognition and analysis in order to improve community engagement in relation to the Lithium Valley development.

Data Analysis

For this research, I wanted to create a platform in which disadvantaged communities were given a seat at the decision-making table. It is important that the lived experiences of community members are represented in this process in order to pursue lithium extraction development that reduces greenhouse gasses, while addressing the needs of those who will be placed at the greatest disadvantage as a result of resource extraction (Powell et al, 2019). To do this, I analyzed the data from an emergent, inductive approach, in which the data itself will reveal the themes of this research, rather than applying an already existing theme to it (Braun & Clarke, 2006). All interviews,

docket materials, and notes from observations were uploaded to Taguette (Taguette, n.d.), an online qualitative data analysis tool. With Taguette, I was able to tag portions of the data with relevant themes. The themes I investigated included community engagement, public health, environmental impact, state benefit, community benefit, economic impact, water, power dynamics, confusion, critique, industry, job creation, resource extraction, and resource nationalism. These themes were chosen after examining data closely and recognizing that these concerns were repeatedly proposed in interviews, docket materials, and reports.

Once all the data were imported and tagged using Taguette, I created word clouds, using the software, Word Clouds (Word Clouds, n.d.) as visual representations of the differences in concerns between the government, industry, and local community members. Word clouds allow for a quick, visual understanding of the common occurring words in a qualitative data set. Rather than using the words of the data sets themselves, I created word clouds from the themes that were tagged in each data set. Since data were collected from a multitude of sources, language across data was inconsistent. By using the terminology from the tags I had created, I was able to establish a common language between documents, making the word clouds effective for comparison.

Limitations

Interviews were conducted mainly with community organizers as a result of my remote location, travel restrictions, and difficulty trying to find community member contacts. Despite this, my research still represents the importance of community engagement. All the community organizers that were interviewed for this research currently live, or have lived, in the Salton Sea region. They work closely with local

community members through their work, which aims to create a stronger, resilient future for the communities of the Salton Sea.

There is also a fair amount of hesitancy throughout this region in participating in academic research, making the applicant pool for interviews small; however, concrete relationships were formed with community members who decided to participate in this research. In the case of the Salton Sea region, it is better to approach human-subject research in a way that builds relationships and creates bridges between academic institutions and disadvantaged communities. Although having a large, broad pool of interview participants would have allowed for more input—and this may be pursued in future phases of research and planning—it is important to work at the speed of trust when working with disadvantaged communities (Brown, 2017).

This research takes place prior to the commercial development of Lithium Valley. As a result, this research will not explore the true, direct impacts that the community will face from DLE. There is already a lot of environmental damage surrounding the Salton Sea region however, and these concerns must be taken into consideration when discussing geothermal DLE. There has been and continues to be several hydrosocial dynamics at play in the Salton Sea Region that explicitly connect water with society: driving actions, shaping outcomes, and allowing collectives of people to recognize common purpose (Linton & Budds 2014; Hommes & Bolens 2017). These dynamics must be considered when developing any project that will have an impact on the hydrosocial space.

CHAPTER 3:

LITERATURE REVIEW AND BACKGROUND ON THE SALTON SEA

Introduction

My research in the Salton Sea region relates to three hydrosocial imaginaries (Linton & Budds, 2014): (1) reclamation; (2) restoration; and (3) recovery. Reclamation discusses the sea's history in relation to colonialism and industrialization. Restoration discusses the current ecological and social state of the region, as well as previous and current attempts to mitigate the negative environmental and public health impacts that the receding sea inflicts on the region. Recovery discusses the attempt of the resource extraction industry to revitalize the region's economy. Recovery also provides insight into the current state of the communities, and the concerns of individuals that need to be addressed in order to ensure adequate, equitable recovery. Within every imaginary, the concept of community is used to explain the benefits and burdens that exist throughout the different social classes and racial formations in the Salton Sea Region.

Reclamation

The Salton Sea previously existed as a portion of what Indigenous peoples refer to as Lake Cahuilla. During the Pleistocene and Holocene, Lake Cahuilla expanded and contracted in relation to the flow of the Colorado River (Lynch & McNeece, 2020). By the sixteenth century the lake was completely dry (Doede & DeGuzman, 2020). The narrative around why the Salton Sea exists transformed when reclamation projects began in Imperial Valley. From 1905 to 1907, flooding diverted the entire flow of the Colorado River through a breach in an under-construction irrigation canal partially refilling the

Salton sink creating the largest inland body of water in the state of California (Doede & DeGuzman, 2020; Ross, 2020).

From 1901 until the present, the primary land-use in the Imperial Valley is industrial agriculture, supplying 80% of winter produce grown in the US (Clark, 2011). This bounty resulted from technological advances that made it possible to provide desert environments with irrigation (Adams & Rudy, 2002). For colonial settlement of the Imperial Valley to take place, several entities had to work together including white US settlers and the Mexican government (Andrés & Andreas, 2014). The Reclamation Act, which was established in 1902, provided financial means to fund irrigation projects throughout the western United States (Dowd, 1956). For the Imperial Valley to become successful in a year-round growing season, they needed an adequate source of water. The Reclamation Act granted the Imperial Valley with the ability to create an irrigation project in 1903, known as the Laguna Diversion Dam, which provided the region with water from the Colorado River (Dowd, 1956). In 1942, the Laguna Diversion Dam and the Alamo Canal were replaced by the Imperial Dam and the All-American Canal (Dowd, 1956). The All-American Canal and Imperial Dam were built by the Bureau of Reclamation, and are now operated by the IID (Dowd, 1956). The success of the IID in providing water to family farms and the ability to grow crops year-round, completely transformed the Imperial Valley, and in turn established a major competitor in the national agriculture market (Adams & Rudy, 2002; Andrés & Andreas, 2014).

Agriculture in the desert requires a significant amount of water, not only to provide the crops with enough moisture, but to prevent increasing the soil salinity. In order to reduce the salinity, farmers practice flood irrigation, in which the land is

completely submerged in water. The excess water is then drained to the Salton Sea, which has historically maintained, and even increased the depth of the sea (Cantor & Knuth, 2019; Doede & DeGuzman, 2020; Lynch & McNeece, 2020). This practice has been altered in recent years due to the implementation of the Quantification Settlement Agreement (QSA) in 2003, which requires the IID to transfer 200,000 acre-feet per year to the San Diego County Water Authority (SDCWA) (Lynch & McNeece, 2020). According to Kjelland & Swannack (2018), for the first fourteen years of the IID-SDCWA settlement, the IID was required to mitigate the limited water flow that would be entering the sea. However, since 2018, the IID is no longer required to provide this mitigation, creating a drastic reduction in return flows to the sea. As a result, the sea is now receding at a rapid rate, causing more playa to become exposed and swept into the atmosphere, causing a further decrease in air quality.

The development of industrial agriculture in the middle of a dry desert established evidence and continued to confirm the idea that humanity was capable of “taming the natural environment” (Adams & Rudy, 2002, p.7). This concept of taming the environment for humanity’s needs is not new to American ideology and is repeated throughout the westward expansion of the United States (Plumwood, 1994). When agricultural runoff is diverted into the sea, chemical fertilizers are introduced to the aquatic environment. These fertilizers are made up of nitrogen, phosphorus, and potassium (NPK), which algae consume (Conley et al., 2009). The high concentration of fertilizers in the sea, as well as the remains of aquatic organisms that thrived for years in the sea until the salinity increased (Setmire et al., 2001) results in large algal blooms, especially when stratified water becomes overturned by winds. These events are often

accompanied by odor events, in which deeper water that contains high levels of hydrogen sulfide reach the surface (Setmire et al., 2001). Once the algae begin to die and decompose, oxygen is depleted, which results in mass die-offs of aquatic and benthic organisms. As the sea begins to recede again, humans are exposed to the dust containing high concentrations of naturally occurring selenium and arsenic. Particulate matter is further exacerbated by heavy industrial agriculture, as well as polluting industries in more urbanized areas across the border in Mexicali (James, 2019). Residents breathe in this particulate matter, resulting in lower respiratory tract health issues, like asthma and COPD (Jones & Fleck, 2020). The rate of asthma in elementary-aged children in Imperial Valley is double that of the national average and is expected to increase as the sea continues to rapidly recede from the impacts of climate change and the Quantification Settlement Agreement (Farzan et al., 2019).

Practicing reclamation results in negative impacts to the environment. For the state of California, the implementation of reclamation projects resulted in a ninety percent loss of wetland environments, which are critical habitat for migratory birds. With nowhere else to go, the Salton Sea – although not the healthiest environment – provides an oasis for birds migrating along the Pacific Flyway (Cohn, 2000). According to Wilson & Cronon (2010) the Salton Sea serves as just one of the conflicted refuges that have replaced filled and drained marshes and wetlands that were the natural habitat for these birds. While the Salton Sea provides a necessary resting point for migratory birds when traveling to their breeding grounds, there are also birds that live here year-round. Many of these birds are already endangered as it is, they do not have many stopping points in California due to the reclamation of wetlands, and the only place they have left to stop

(the Salton Sea) is rife with death and disease. Due to rising salinity levels caused by the QSA’s reduction of inflow, the mortality rate of fish has gotten so high, that it is common to walk on hundreds of crushed bones and barnacle shells rather than sand on the shoreline as a result of political inaction that has caused limited funding to mitigate the environmental catastrophe (Buck, 2020; Detwiler et al., 2002; Lehrman, 2022). In the 1990s, it was common to see as many as 14 - 20,000 waterfowl die from avian botulism (Cohn, 2000).

Restoration

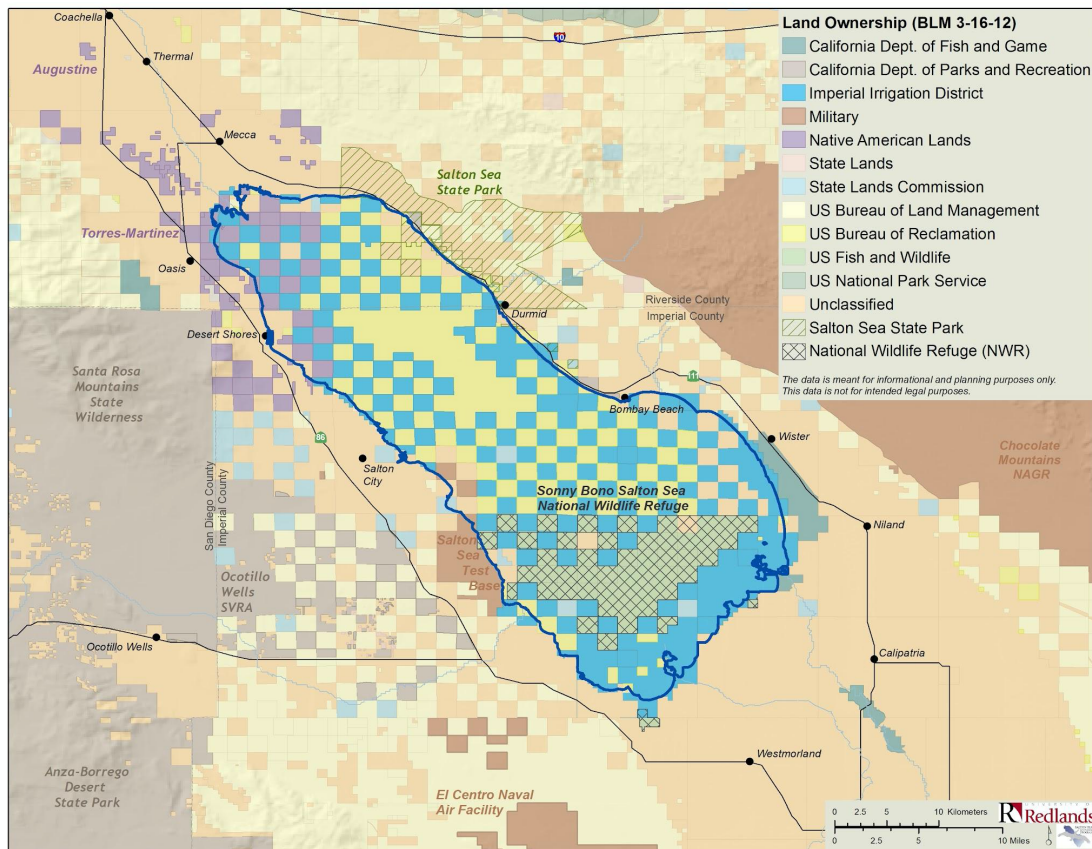


Figure 2: Salton Sea Land Ownership (University of Redlands, 2015)

Restoration of the Salton Sea region is very complex, as the land surrounding the region is owned by several different stakeholders, multiple agencies at the local, state, and national level have overlapping jurisdictions, and water is increasingly scarce in the

Colorado River watershed. The Salton Sea is simultaneously artificial and natural. Due to this “second nature” (Cronon 1991), it has become difficult to craft or enforce environmental protections for the region. Is the Salton Sea a manufactured accident that does not deserve policy makers' attention, or is it a key place for the transition to renewable energy, potential habitat restoration and regeneration? Some would argue that it only serves as a dump for industry, while ecologists and bird lovers see it as vital habitat for migratory birds that travel along the Pacific Flyway (Cohn, 2000; Voyles, 2017).

According to Voyles (2021) the Salton Sea experienced a short period of Hollywood Glamour in the 1930s until the 1960s, when it served as a tourist destination. During this time, the sea was artificially stocked with game fish, both to control mosquitos and for recreational anglers. As a result of introducing nonnative species to the sea, the endangered desert pup fish population declined drastically. The most advertised activities from this period of the Salton Sea’s history included water-based recreation like swimming, fishing, boating and water skiing, which at the time was only accessible to the white, wealthy community.

Voyles (2021) discusses that during the same time that the Salton Sea was a tourist destination, it was also a training and weaponry testing site for the United States military force. Military presence was seen on several bases surrounding Salton City and resulted in the continuation of “the development of white settler masculinity, which entailed concrete - and often devastating - environmental consequences” (Voyles, 2021, p. 8). Military waste that the Salton Sea became exposed to included replicas of the bombs dropped on Hiroshima and Nagasaki, food waste, and waste from ships. Ballast

water from Seaplanes and buoys introduced barnacles to the sea, whose shells still litter the shoreline (Detwiler et al., 2002).

The Salton Sea, being that it is a part of the desert ecosystem in California, features relatively few housing developments on its coastlines (Parker et al., 2018), making its clean-up less of a priority compared to projects like the restoration of the Sacramento Delta (Buck, 2020). This can result in the restoration of the Salton Sea being continuously placed on the back burner to prioritize projects situated near more affluent populations in coastal areas of California (Buck, 2020). Another issue is that the government has been known to struggle with large-scale engineering projects, especially ones that deal with cleaning the environment that surrounds a disadvantaged community (Buck, 2020). Buck explains that “you have unelected officials making decisions that profoundly affect minority populations, where decisions are made on the basis of money as opposed to public health” (Buck, 2020, p.6). This process of inaction will continue to occur until it is more economically feasible to clean the areas up than to keep them in their current state.

There are numerous factors that have caused the track towards restoration to be extremely slow, with the dominant one being funding. In the past, there have been discussions of the need to clean the Salton Sea, but something always causes the efforts to be put on hold. In January 2000, the Bureau of Reclamation and the Salton Sea Authority proposed a report for possible remediations that was sent to Congress (Cohn, 2000). Based on this environmental impact statement, the Clinton administration compiled a plan to “stabilize and restore the sea” (Cohn, 2000, p.299). Rather than getting physically involved in the Salton Sea right away, the plan got caught up at the

government level, resulting in much of the funding being spent on planning instead of environmental stabilization and restoration (Cantor & Knuth, 2019).

In 2003, the Quantification Settlement Agreement (QSA) created further complications at the Salton Sea. The agreement was made between the IID and the San Diego County Water Authority (SDCWA) in order to supply the thirsty metropolis. However, the reduction in irrigated acreage required to divert water to the coastal residents, reduced inflow to the Salton Sea, resulting in dropping water elevation exposing large areas of the playa, increasing salinity, and greater concentrations of existing pollutants (Upadhyay et al., 2013). As a result, it was required that the IID implement mitigation projects throughout the region in order to limit the impact of dust pollution and loss of wetland habitat (CH2MHILL, 2002). In 2015, the IID partnered with the United States Fish and Wildlife Service (USFWS) in order to restore 1 square miles of wetlands at the Red Hill Bay Marina (Chen, 2021). The project was supposed to reach completion in 2016, however, the entire bay remains barren and desiccated (Chen, 2021). In the fall of 2021, the IID initiated the restoration process by implementing furrows into the playa, which create deep windrows, dramatically reducing dust emission (Abou-Diwan, 2021). The decision to create simple furrows throughout Red Hill Bay was dramatically different from the nearly \$5 million project that was proposed in 2015, in which the Red Hill Bay Restoration Project was tasked with creating wetlands that would provide critical habitat for fish and birds (Wilson, 2021). In October 2021, the IID bulldozed \$1.5 million worth of infrastructure that had been laid on Red Hill Bay in order to transfer water from the Alamo River to the restored wetland habitat (Wilson, 2021). Rather than continuing down the path of creating shallow wetlands, the IID has opted for

furrowing and the planting of vegetation, explaining that they believe this is the best measure to take in a timely manner (Wilson, 2021).

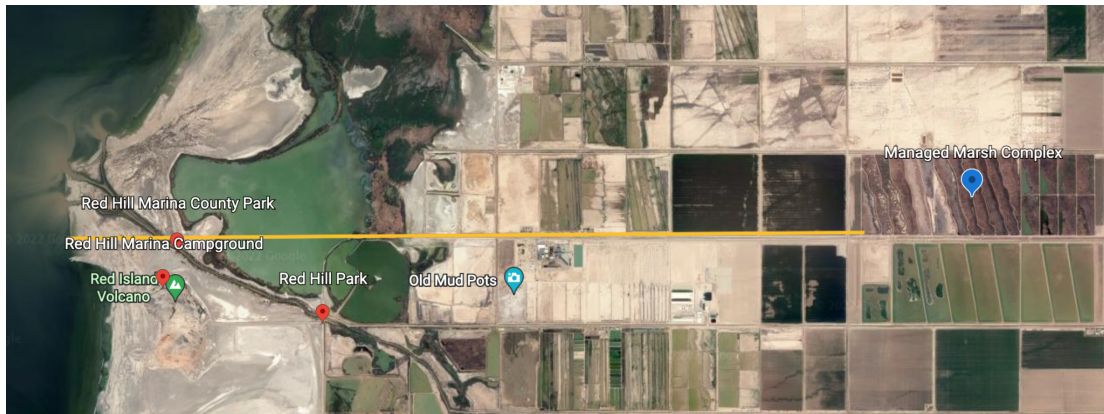


Figure 3: Managed Marsh Complex in relation to the distance of the Salton Sea Shoreline (Google Earth, 2022)

The IID has had some success in creating wetland habitat, despite the controversy that surrounds the Red Hill Bay Restoration Project. The Managed Marsh Complex, located near Niland, California, is a habitat creation project that provides one-thousand acres of healthy marsh and riparian habitat for wildlife (IID, n.d.). The Managed Marsh Complex was set to be completed in 2019, however, the project did not reach full completion until 2022 (Joyce, 2021). Despite the completion delay, the Managed Marsh Complex was successful in creating necessary habitat for threatened and endangered species (IID, n.d.). Although the Managed Marsh Complex created a healthy habitat, the marsh and riparian ecosystem is not located on the playa of the Salton Sea (as seen in figure 3), meaning that this project does not mitigate the toxic dust concerns. Currently, the QSA states that the water districts involved in the QSA are only responsible for mitigating the impacts in relation to avian habitat due to the increasing concentrations of selenium (IID, n.d.). In order to truly restore the Salton Sea region from the impact of the QSA, amendments need to be included that require the water districts to create mitigation

projects that address both concerns of environmental impact and public health. This could be done by creating wetland projects like the Managed Marsh Complex, but created on the playa, instead of further inland.

Inaction to protect the Salton Sea has caused people to see it as an example of the government failing its own people (Buck, 2020). The process of inaction has not only caused ecological degradation, but it has also influenced social collapse. In this environment, the fish are dying, the birds are dying, the sea is drying up, and the residents are exposed to premature death from respiratory illness because of industrial waste (Buck, 2020). This has resulted in residents feeling that there is no hope for the region. Many developments have arrived at the Salton Sea, like the resorts, housing developments, and even the government, promising a cleaning up of the sea, as well as an influx in jobs, but it never actually happens. There are constant discussions about remaking the Salton Sea as an example of successful restoration and proper water management, but there has not been any real funding or action that occurs to place the Salton Sea on this trajectory (Buck, 2020).

Recovery



Figure 4: CalEnergy Geothermal Plant near the southern shore of the Salton Sea (Geoffrey James Britton, 2021)

On the Southeastern edge of the Salton Sea lies one of the largest sources of geothermal energy in the United States (McGuire et al., 2015). This geothermal energy is the result of volcanic activity which has created mud volcanoes, hot springs, and mud pots in the surrounding area (DiPippo & Lippmann, 2020). Due to the size and magnitude of the geothermal field, geothermal power explorations have occurred on the Salton Sea for the past 40 years (DiPippo & Lippmann, 2020). Currently, there are 14 units in operation, with more planned in the future (DiPippo & Lippmann, 2020). Geothermal power is generated by pulling hot water from underground, which is then used to turn turbines, resulting in renewable electricity that is accessible at all hours of the day, unlike solar and wind energy (Hawken, 2017). The ability to tap into geothermal power throughout the entire day will allow California to reach their goal of “50% renewable

energy by 2030 and 100% by 2045” (Alston et al., 2020). Much of the geothermal energy within the Salton Sea region is still underwater, however, leading some to speculate that geothermal DLE developments may be incentivized to allow the sea to continue to recede (Cantor & Knuth, 2019).

California recently declared that the sale of new internal combustion engine vehicles will end in 2035 (CA.Gov, 2020). This action has caused an increase in the demand for lithium, as it is a key component in the creation of electric vehicles (EVs). The Salton Sea has become a hot spot for proposed lithium extraction due to the discovery of lithium in the geothermal brines that are created from generating geothermal energy at the Salton Sea Geothermal Field (McKibben & Elders, 2020). It was discovered that these brines have a lithium content that is higher than 200 ppm, which is a significantly higher concentration compared to the 40- ppm content of the neighboring rocks (McKibben & Elders, 2020), comparable to the concentrations of lithium in the Clayton Valley Nevada brine (Davis, 1986). However, the geothermal brine lithium content in Imperial County is still significantly lower than the Salar de Atacama, which is 1,400 ppm (Munk et al., 2016).

One of the major positives that would result from the extraction of lithium in the Salton Sea would be that it might result in a less environmentally degradative extraction process compared to the brine evaporation ponds located in the Puna de Atacama region of Chile. In the Atacama, lithium mining companies use large evaporation pools that increase the possibility of draining wetlands in an already arid environment (Blair et al., 2022; Heubl, 2019). Draining wetlands has already caused two of the three flamingo species in the region to leave (Gutiérrez et al., 2022; Heubl, 2019). Not only has lithium

extraction caused a decrease in the presence of native flamingos, but it has also created stressors for the Atacameño/Lickanantay people (Balcázar, 2020). As the demand for lithium increases while nations try to meet the goals of the Paris Accords by prioritizing the shift to electric vehicles, water continues to deplete to the point that the Atacama has reached enduring deterioration (Balcázar, 2020). According to proponents of the Salton Sea direct lithium extraction (DLE) process, there is no need for evaporation pools, as the lithium is instead directly extracted from the geothermal brine which is then reinjected back into the geothermal reservoir (Alston et al., 2020). Proponents report that there is minimal use of surface water or groundwater close to the surface, air pollution is little to none, and the residents of the Salton Sea will still be able to remain in the place where they call home.

Developers suggest that along with being less environmentally damaging, coupling geothermal energy production with direct lithium extraction may provide the area with much needed jobs and revenue from taxes and royalties. As the green revolution continues, the demand for materials to create these green technologies is skyrocketing (Whitmore, 2021). According to Atwood (2021), lithium demand can be expected to increase by up to 40% within the past year. This surge in demand and the proximity to potential EV battery plants, as well as Silicon Valley, would mean that the lithium extraction plants in the Salton Sea could be large-scale and could create an entire new sector of jobs, not currently available in the region. Moreover, once it has been proven that it is safe and makes economic sense to carry out lithium extraction, more jobs may be created to manufacture lithium-ion batteries from the locally extracted lithium (Alston et al., 2020). In April 2022, Statevolt announced that it would be partnering with

Controlled Thermal Resources in order to develop a \$4 billion battery Gigafactory, which would utilize the lithium from the DLE facilities in Lithium Valley (Calexico Chronicle, 2022). Creating battery manufacturing facilities in Imperial Valley would allow the benefits from the emerging lithium industry to stay within the Salton Sea area, providing jobs throughout the entire process. With the three existing Salton Sea projects, there could be an estimated 4,690 jobs created just for lithium recovery (Alston et al., 2020).

There is also the promise that by working with public institutions and private corporations, there could be enough funding and enforcement that the Salton Sea ecology and society would be able to move towards stabilization and restoration. This would be carried out through collaboration between the U.S. Fish and Wildlife Service (USFWS) and the Lithium Valley Commission, a Californian government entity that was created by the California Energy Commission. This relates to the Imperial Irrigation District's proposed Salton Sea Restoration and Renewable Energy Initiative, in which there could be resources available for "restoration of long-term stable aquatic and shoreline habitat for the historic levels and diversity of fish and wildlife that depend on the Salton Sea" (Cantor & Knuth, 2019, p.533) through the development of renewable energy projects. Since the government now sees that there is an economic future in the Salton Sea, the chances of them following through with restoration are perhaps more likely than in the past.

Geothermal energy and DLE are not void of environmental and public health impacts, despite being an improvement from the use of fossil fuel and other forms of energy resource extraction. When geothermal brine is brought to the surface and used to produce energy, it is placed in a holding pond before it is reinjected into the reservoir

(Gonzalez, 2015). The brine that is used in geothermal energy in the Salton Sea region is very heavy in solids (25%), and these solids include hazardous materials like arsenic and lead (Gonzalez, 2015). The hazardous materials are only removed occasionally, otherwise they may become exposed to local community members and/or wildlife (Gonzalez, 2015). Flexer et al. (2018) discuss the concerns of brine reinjection and the degradation of the lithium resource over time. They explain that as spent brine is returned to the reservoir, the resource becomes depleted over time, especially in a region with rapidly increasing salinity. Controlled Thermal Resources initial environmental analysis (County of Imperial, 2022), discusses the possible environmental impacts geothermal and lithium extraction will have in the Salton Sea region. In the report, they explain that there is a possibility the developments will impact seismicity², liquefaction, air quality, sensitive species, wetland and riparian ecosystems, cultural resources, ground failure, transportation, tribal cultural resources, and more (County of Imperial, 2022). Although DLE and geothermal provide promise for a zero-carbon future, there are still many concerns that need to be adequately conveyed to community members that are not able to easily access these reports.

² Seismicity is a significant barrier to establishing manufacturing in the region. Manufacturing often does not adequately address seismicity concerns, leaving them vulnerable to damage that can cause public health concerns if an earthquake were to occur (Griffin & Conzen, 2018). <https://www.fauske.com/blog/mitigating-earthquake-risks-at-industrial-facilities>

Conclusions

The Salton Sea has been riddled with social and environmental contradictions since its accidental re-emergence. As time has gone on, there have been attempts to make the region economically attractive. These attempts to make the region economically attractive, as well as the dumping of agricultural waste, resulted in copious amounts of pollution that put an already disadvantaged community at a high risk for respiratory illness or even death. There is hope for the restoration of the Salton Sea and a new economic endeavor through the process of direct lithium extraction, in which lithium would be extracted from already existing geothermal brines that are produced from the energy plants that are located on the southeastern edge of the Salton Sea. Before the region implements this project, it is critical that stakeholders take into careful consideration what the impacts will be on all the communities that exist within the Salton Sea.

CHAPTER 4:

THE COMMUNITY OF THE SALTON SEA AND THEIR CONCERNS

Communities of the Salton Sea Region

The Imperial and Coachella valleys are home to several marginalized groups of people. Much of the population is nonwhite, due to the racial hierarchy and classist structure of agriculture in Imperial Valley, which has allowed for white ownership of farmland combined with Black, Japanese, and Mexican farm labor (Adams & Rudy, 2002). Seventy-five percent of the population lives below the poverty line (Voyles, 2021; Cantor & Knuth, 2019). The community predominantly consists of Latinx workers recruited as a migrant labor force on the farms of the Imperial Valley as a result of the Bracero Program that was implemented in the 1940s (Adams & Rudy, 2002; Cantor & Knuth, 2019). There are also several Indigenous communities including the Kumeyaay, Cahuilla, Quechan, Kuupangaxwicheh (Cupeno) and Xawill kwnchawaay (Cocopa) (Voyles, 2021).

This diverse community is experiencing several disadvantages due to the lack of attention this region receives for restoration. The air pollution is a part of their everyday lives, unemployment is extremely high, and there is an ever-expansive income gap (Cantor & Knuth, 2019). Toxic dust from the playa can be swept up into the air, causing a severe, negative impact on local air quality, and can even cause national impacts (Jones & Fleck, 2020). It was discovered that this dust can result in increased rates of lower respiratory death, and that as the Salton Sea continues to desiccate, these rates will continue to increase (Jones & Fleck, 2020).

The changing environment of the Salton Sea has impacted the recreation and tourism that used to exist there. Without much to bring to the economic table besides agriculture, geothermal power, and government positions, there are few opportunities for employment for community members surrounding the Salton Sea. What once used to be a hustling and bustling town full of sun-seeking tourists, and a place of military technological advances, has now become a shell of its former existence. Entire resorts and housing developments that spanned “10,000 residential lots” had been completely abandoned by the 1970s (Cantor & Knuth, 2019). A squatter settlement is surrounding the southeastern edge of the Salton Sea (Du Bry & Rissolo, 2001) in the lawless town called “Slab City,” where there are virtually no regulations in terms of how and where to live.

Impact of Industrial Development

The Salton Sea region is home to a massive industrial agriculture complex. The Coachella and Imperial Valleys generate approximately 3 billion dollars’ worth of agriculture-based products annually (Farzan et al., 2019; Stahl, 2020). The influx of industrial agriculture has provided the Imperial Valley with job opportunities; however, these jobs are low-paying, and the practice of industrial agriculture creates large costs to the environment and public health. Isabel Solis from the Board of Directors for Imperial Valley College and Los Amigos de la Comunidad explained that their Brawley community had been exposed to hazardous materials in the soil, including DDT and other pesticides that cause chromosomal changes. The site that was discussed was a former PureGro site that was discovered to have contaminated soil from hazardous materials and pesticides (Morales, 2021). When it came time to clean the contaminated site, community

members demanded that soil samples be collected from neighboring residential areas by the California Air Resources Board (CARB); however, the state placed the Department of Toxic Substances Control (DTSC) in charge of examining the site, despite previously ill-handled cleanups by DTSC in the past (Morales, 2021). Isabel explained that she had seen severe illnesses become increasingly frequent in her community as the polluted soil continued to exist on the PureGro site. They continued to explain that children died of cancer and cases of asthma and other illnesses became more frequent.

Agriculture and government positions provide the Salton Sea region with a large portion of their available jobs. Several interviewees explained that community members view the government positions as the “ideal” or “high paying” jobs because of their benefits and consistent salary. However, those that are limited by education and language barriers are often exempt from obtaining government positions, causing a reliance on the agricultural sector for work. Farm workers are paid very little for their work, requiring them to work long hours in the fields in order to provide for their family. An interview participant that has lived in Imperial Valley their entire life depicted their childhood as having very little, coming from a family of two farm workers. They spent their childhood in a trailer and constantly traveled between Imperial, Coachella, and the Central Valley depending on growing and harvest seasons.

The time spent traveling and working extended hours in the fields is concerning in relation to large, industrial development because farm workers have limited time to participate in meetings that would educate and engage them on development that could impact their daily life. This concern was brought up in the comment period that occurred after the November community forum of the Lithium Valley Commission. Commenters

explained that community members took time out of their day to attend this meeting, despite this being a space that “they rarely venture out to” (Flores, 2021). The aforementioned interview participant explained that during their childhood, because they lived outside of the city in a trailer, they were not very connected to the community. Instead, their focus was solely on providing as much as they could for their family. To properly engage this portion of the community in the decision-making process, it is critical to meet the farm workers where they are at. For example, outreach can be conducted in areas where the farm workers often frequent. Isabel Solis and Eric Reyes, also of Los Amigos de la Comunidad, set up COVID-19 vaccination clinics and handed out masks, and hand sanitizers near the Mexico border where farm workers cross every day for work. This allowed farmers to obtain access to critical equipment and healthcare services that they would not normally have. Like this scenario, it is critical that Lithium Valley development creates equitable access to resources so that it can positively support the community (Powell et al., 2019). Lithium Valley development can achieve this by providing easy access to community meetings. For example, community forums can be conducted in areas that farm workers have access to. Calexico is located right near the border of Mexico, where Imperial Valley farm workers enter the United States to go to work. In addition to fenceline communities in places like Calipatria and Niland, meetings can be held here during appropriate times when farm workers are available.

Water Concerns

The Salton Sea region exists in the southeastern corner of the state of California. The climate here is extremely arid and water is very scarce. Imperial County currently receives all its water from the Colorado River, via the All-American Canal (Dowd, 1956).

The water is then distributed to the community through the Imperial Irrigation District, where it is used for residential and commercial uses, like housing, irrigation of agricultural fields, and habitat restoration (Dowd, 1956). Because the Salton Sea experiences high concentrations of selenium, as well as other commercial waste that is produced from industrial agriculture, it is not a reliable source of freshwater. The Salton Sea is a constant reminder to the community that they are being put in harm's way by industry. Nonetheless, the sea is not the only water concern in the region. As of 2017, the Imperial Irrigation District is no longer required to provide inflow to the Salton Sea, and farms have limitations on their water use (Kjelland & Swannack, 2018). California is currently experiencing severe and extreme drought throughout much of the state (Rippey, 2022), leading community members to be concerned about the availability and quality of their water.

Water is a key element for restoring the Salton Sea to a healthier version of itself that can support migratory birds and the community members that inhabit this space. Allowing the sea to continue to recede would increase exposed playa, further decrease air quality, and decrease the amount of habitable space for wetland environments. It has been extremely difficult to create restoration projects that rely on fresh water, as drought is the new climate change normal for California. The Red Hill Bay Restoration Project was aimed at creating healthier wetland habitat on the polluted playa, but the promise of this project was broken when the irrigation infrastructure was later dismantled (Wilson, 2021). The removal of millions of dollars of infrastructure left community members to become skeptical of the Imperial Irrigation District's intentions. The Red Hill Bay project takes place on geothermal-leased lands, leaving one community member to believe that

the decision was made to remove irrigation infrastructure in order to provide space for industrial development to increase, as this would create significant financial gain for the Imperial Irrigation District.

Arsenic, lead, and selenium in water sources is a major concern in this region (Gonzalez, 2015; Schroeder et al., 2002). Selenium concentrates in the Salton Sea as a result of industrial agriculture practices, which rely on selenium in the form of liquid fertilizers (Schroeder et al., 2002). Selenium is also naturally occurring in the Colorado River water that is transported to Imperial Valley (Schroeder et al., 2002). When selenium becomes too concentrated in the water, it can bioaccumulate in the fish, and eventually be consumed by the birds that inhabit the Salton Sea. Selenium is extremely toxic for both species, and can result in death (Schroeder et al., 2002). It was also recently discovered that too much airborne exposure to selenium in humans can have serious impacts, including respiratory conditions, such as lung cancer, as well as type 2 diabetes (Ahmed et al., 2019). Community members are concerned that there is more of a focus on providing water for the development of geothermal DLE rather than improving the health of the Salton Sea. Mariela Loera, a Leadership Counsel staff member explained that the IID has already reserved water for lithium extraction. She further discussed that community members often make the comment that “if the geothermal is going to use water, why are we not prioritizing the Salton Sea?” Restoration of the Salton Sea has been in discussion since the early 2000s, but there still is not a concrete restoration plan that ensures that the community’s public health will be improved. Community members are disheartened that the conversation has begun to shift from how to improve the Salton Sea to how the state can invest in lithium extraction.

Air Pollution

The Salton Sea region regularly experiences air quality that does not meet the federal standards (CARB, 2012). As a result, respiratory illness is relatively common, and the impacts of air pollution are felt daily for the Salton Sea community members. A Coachella Valley community organizer described their first experience with the smell of the sea as intense, with the horrible smell entrenching their entire apartment, despite living approximately twenty minutes away from the northern shoreline. They explained that “I smelled it like in my closet... I smelled it in my fridge and like I cleaned out all of it... it’s so strong that I thought it was in my own apartment.” Odor advisories are often implemented when the Salton Sea exceeds the state’s standard levels of hydrogen sulfide, which is thirty parts per billion (Atagi, 2020). When advisories are created, it is common to see hydrogen sulfide levels nearly double the standard levels in communities that border the Salton Sea (Atagi, 2020). Whenever the communities are impacted by the odor of the Salton Sea, they are reminded of the current air pollution concerns that they currently face, as well as the future concerns that might arise from the development of geothermal DLE. The interviewee observed that whenever the sea experiences odor events, local media outlets and community members would begin to discuss their concerns about lithium development in the region.

It is evident that the main concern of the region relates to the impacts of poor air quality. Every interview participant and most public commenters during Lithium Valley Commission meetings discussed their concerns about air pollution. Air quality concerns result from the recession of the Salton Sea, which is causing more playa to become

exposed each year. There is also the concern of increased diesel truck traffic during the construction phase, as well as during the transportation phase of minerals, and possibly fully constructed batteries. Those who already struggle with asthma will experience more frequent hospitalizations as a result of increased dust emissions (Farzan et al., 2019).

Preventing exposure to poor air quality is a part of a community member's everyday life. English et al. (2017) shows that Imperial Valley residents regularly experience elevated levels of particulate matter, yet due to the rural nature of Imperial Valley, it is difficult to correctly represent certain sectors of the community that may experience periodic events of elevated particulate matter. Those who live in Imperial Valley are familiar with the IVAN flag system that notifies residents when it is safe to be outside based on the color of the flag. Unfortunately, it is common to see the flags turn to red, alerting community members that it is necessary to avoid outdoor physical activity. The IVAN air monitoring alert system was created in collaboration between the local community non-profit, Comité Civico del Valle, the California Health Tracking Program, the University of Washington, and University of California, Los Angeles. The air monitoring network has allowed community members to become directly involved with tracking public health concerns. In doing so, the community is very knowledgeable about certain areas in Imperial Valley that experience poor air quality on a frequent basis. With this knowledge, the community becomes better equipped to advocate for themselves, and prevent further harms to their air basin.

During the November community forum hosted by the Lithium Valley Commission, a community member commented that “no amount of ‘financial opportunity’ or ‘jobs’ are worth risking the health and well-being of already vulnerable

communities” (Ambriz, 2021). Another community member discussed their concerns stating that “what use does money have when the people ‘it was supposed to benefit’ are displaced, severely sick from contamination, and worse?” (Marquez, 2021). As the October deadline approaches for the Lithium Valley Commission to deliver a report on the opportunity for DLE in the Imperial Valley, community members are becoming persistent about public health concerns. From September 2021 through February 2022, conversations about lithium extraction in Imperial Valley were primarily discussed in relation to the Lithium Valley Commission and local media outlets; however, beginning in March, the conversation began to arise in other settings, like the Salton Sea Management Program meetings. In the April 11, 2022, Salton Sea Review Panel meeting, discussion was supposed to focus on water importation project proposals that would help mitigate playa exposure. In the chat feature of the Zoom meeting, community members were not discussing water importation projects, they were instead focusing on the concerns surrounding unanswered health concerns related to geothermal DLE. Attendees of the meeting asked how the lithium extraction would be helpful in saving the Salton Sea region, as well as the possible impact that lithium extraction would have on air pollution and that this must be closely monitored to ensure that no further harm is caused.

Conclusions

The Salton Sea community is currently facing serious disadvantages including poverty, air pollution, and water concerns. Low wages for farm work and limited career availability have placed the region at an economic disadvantage. Moreover, residents also experience poor air and water conditions from industrial agriculture. Community members anticipate that geothermal DLE could impact air quality and water quality,

which are already greatly impacted by industrial agriculture. Although lithium developers have discussed that they will provide an increase in job availability, the community is more concerned with the current state of public health—so much so that they have brought up their concerns in meetings that are not directly related to lithium development.

CHAPTER 5:

AREAS OF IMPROVEMENT

Lacking Infrastructure

In 12 interviews, participants discussed their concerns around the limited infrastructure that currently exists in the Salton Sea Region. Throughout Coachella and Imperial Valley, there are many areas that look barren and abandoned. There are few buildings, and the roads remain dirt instead of paved. Dirt roads continue to contribute to the poor air quality as moving cars not only produce tailpipe emissions, but also throw more dust into the air when they travel across them.

The limited housing in the region encourages migrant farm workers to remain living in Mexico, which causes Census data to incorrectly capture the true population of Imperial Valley. An interview participant explains that there is a daytime population that works the farms in Imperial County, but they are not present at night, when they return to their homes in Mexico. Roughly 15,000 migrant farmworkers make the journey from Mexicali to Imperial Valley every day, but are not represented in Census data (Martin, 2001). This creates what some interview participants called a “binational” region, in which you have United States residents and Mexican residents working together in the United States. The United States also benefits from the proximity to the vibrant food and culture in more urban Mexicali (Méndez Fierros & Santillán Anguiano, 2011). Incidentally creating a binational region has allowed Mexico to absorb the housing crisis in Imperial Valley, permitting California to focus its affordable housing developments near urban areas. Despite the need for affordable housing in Imperial Valley, urban areas

continue to receive funding for economic and environmental populations because their population is better represented by Census data.

Despite frequent hospitalizations (especially in children) as a result of the poor air quality, Imperial County does not have a children's hospital. For Imperial County residents, the closest children's hospital is Rady's Children's hospital - San Diego, which is an approximately two-hour and twelve-minute commute from Brawley. This is concerning because hospitalizations from asthma related conditions are the highest amongst youth in Imperial County (Farzan et al., 2019). For the success of Imperial County and new geothermal lithium development, basic needs of the community need to be met, and that includes increasing infrastructure so that residents can receive access to critical services, like healthcare.

Lacking infrastructure and social institutions in the Salton Sea region will make it difficult for community members to have equal access to the benefits that will be created from lithium extraction. For example, Solis mentioned that there was only one charging station in Imperial Valley (now two with the addition of one installed at Comite Civico Del Valle's headquarters). Therefore, if Salton Sea region community members wanted to purchase an electric vehicle, they would be very limited in areas where they would be able to charge their vehicle, making it difficult to commute throughout the area. This is especially true for those who make the commute from across the border.

Lacking Education

Educational opportunities for the Salton Sea region are very limited. Several interview participants explained that many community members do not know how to read or write. Access to STEM education, both at the collegiate and k-12 level is extremely

limited. Isabel Solis revealed that there “are two STEM labs here in Imperial County out of all of the high schools, which are many.” Imperial County is known to experience the phenomenon called the “brain drain” in which many of the educated people move away from Imperial County (Schiff & Özden, 2005). This causes Imperial Valley to experience some of the “lowest education levels in the state” according to Solis. Many people make the decision to move across the border to Mexico, where higher education in fields, such as engineering is readily available. This is concerning in terms of trying to hire a local workforce for lithium development, because as of the current date, according to Solis, Imperial County does not have an engineering population to fulfill the demands of current and future development in the Salton Sea region. This can cause developers to recruit for engineering positions from other geographic regions, limiting the number of jobs that will be available to local community members.

Collegiate level education in the area consists of a sister campus to San Diego State University (SDSU), Imperial Valley College (IVC), and for-profit universities like Phoenix University. Although San Diego State is a large, four-year university, their degree programs in Imperial County are a fraction of what is available to study on their main campus. Currently, the Imperial County campus offers eight majors, six minors, and six degree programs in the Professional Studies department (SDSU, n.d.). For STEM majors, the only programs currently available are mathematics and psychology (SDSU, n.d.). There are not any current programs relating to physics, chemistry, or engineering,

which are necessary majors that would support the operation of geothermal DLE³. Up until recent years, the Imperial County campus for SDSU was only available to transfer to during a student's junior or senior year, so a student would have to begin their education at a community college or the San Diego campus initially.

Limited opportunities to engage with the STEM curriculum is making it difficult for community members to qualify for higher paying careers at the geothermal facilities and lithium extraction sites, like engineering and lab technician positions. Currently, the Salton Sea region is not prepared for the influx of jobs that would be created from the increase in geothermal power and lithium extraction. Many community members do not know how to read or write, or their reading level is very limited at the second grade reading level. Although many of the jobs will only require a high school diploma, there is a 64.50% high school graduation rate in Imperial County, which is more than 20% below the national average at 86% (Socrata, 2018). If geothermal and lithium developers are promising to hire a predominantly local workforce, it is critical that they invest in increasing access to STEM education throughout primary and secondary education.

Imperial County is 85% Latinx (census, 2021), and as a result there is a primarily Spanish-speaking population. One electrical worker described how it can be difficult for community members to achieve certain certifications to become an electrical worker because of the language barrier. When the pandemic forced students to attend class, many

³ Development is in the works for a STEM campus that would support Lithium Valley (Rode, 2022). <https://www.desertsun.com/story/news/2022/03/24/lithium-valley-imperial-county-get-stem-facility-sdsu/7143501001/>

resorted back to speaking their primary language. Solis explains that you mostly hear students speaking Spanish on campus since opening back up after the pandemic shut down, where they used to hear a lot more English conversation. This is a concern because the companies involved in geothermal lithium extraction are primarily English-speaking. When the Lithium Valley Commission commenced meetings starting in the beginning of 2021, Spanish interpretation was not available. Spanish interpretation of meetings was not made accessible until July of 2021. Loera has scrutinized the Spanish interpretation of the Lithium Valley Commission meetings and she noticed that it was not a very accurate representation of the English version. This is concerning because it can limit the understanding of Spanish-speaking residents, which prohibits their ability to provide informed consent for these industrial developments.

Lacking Outreach

In the February Salton Sea Management Program community engagement committee meeting, one public commenter expressed their disappointment in outreach efforts. They described the Western Shores restoration efforts as having a disconnect between what the community is expecting restoration to look like and what the Salton Sea Management Program is doing. The image of scattered hay bales meant to mitigate dust from wind gusts is depicted; however, those who use the Western Shores for recreation have decided these hay bales have another purpose - framing a motorcycle track. There is not any signage on the sea that depicts what restoration efforts are happening and there has not been an effort to organize the community for plantings of what the community would like to see, which is “green things in the dirt not just hay bales.” This description represents the disconnect in communication that is created when

trying to make larger decisions related to the future of the Salton Sea region. In this scenario, there are insiders and outsiders. Insiders are those that are directly involved in the Salton Sea Management Program, while the outsiders are the community members that are directly impacted by the neglect of the environmental and public health concerns of the Salton Sea.

The Lithium Valley Commission has faced similar issues to the Salton Sea Management Program, in which the community feels like they are not completely informed on the process of this development. This can result in community members feeling powerless, like their voice cannot be heard and considered at the decision-making table. Loera explained that many of the community members she has been in discussion with feel like despite their opposition to the development of lithium extraction, California will continue to support and fund geothermal DLE because it is economically beneficial for the state and helps achieve their climate plan goals. This feeling of helplessness can often cause community members to further limit their participation in meetings that relate to the development of geothermal DLE. One community member made a comment during the November community forum, in which they explained that “When we say that we do not want extraction to happen, period, is there even a chance for the project to be stopped? All the commissioners talk like it's going to happen regardless of what we want. Will you listen to us or is this just lip service?” In recent years, community organizers have expressed that there has been a push to ensure that disadvantaged communities are included in the decision-making process. The California Energy Commission established the Lithium Valley Commission to create development that had voices from the local communities; however, members of the Lithium Valley Commission are not paid for

their service. As a result, community engagement has been limited because they do not have enough funds to engage a region that extends from the border of Mexico and the United States to Coachella. This has shaped perceptions of the Lithium Valley Commission to be a space where the community is free to voice their concerns, but they must be available to attend three and a half hour-long meetings on weekdays, via Zoom.

The outreach that has been conducted in relation to the development of geothermal DLE has been very limited, with one community forum conducted in November by the Lithium Valley Commission and one forum conducted by Berkshire Hathaway Energy. The November community forum was over three hours long and focused on introducing commissioners to the community rather than listening to community concerns. A public comment period was not made available during the meeting until the last thirty minutes. Although the commission extended the time of the meeting so that they could hear from community members, many community members had already left, as they expected the meeting to last from six to eight P.M. For farm workers, attending and participating in this meeting was extremely difficult. After a long workday, they were tasked with attending a meeting in which their education on the topic was very limited and provided with a small-time frame to ask questions. Since the community forum, there have been efforts to distribute factsheets that cover the process of geothermal DLE, as well as the environmental impacts of geothermal DLE; however, the information covered in these items is limited.

Conclusions

The Salton Sea region currently faces limited infrastructure, including paved roads, housing, educational institutions, and hospitals that are crucial in providing care to

those that are negatively impacted by the playa dust. Limited access to STEM education creates a barrier for Salton Sea residents to qualify for the higher paying, engineering and lab technician positions that are related to increased geothermal development and DLE. Limited outreach efforts have caused a disconnect in understanding between commissioners, developers, and local community members. Currently, the Lithium Valley Commission follows the status quo of outreach, in which only a select few can participate and engage with the subject matter at hand (Goetz et al., 2020). It is critical that the lacking infrastructure, education, and outreach be improved so that community members are better prepared for the influx of activity that will be created as a result of geothermal and DLE development. Lithium Valley can become a precedent for what the future of lithium extraction can look like, so long as developers and decision makers are willing to remove the current disadvantages of the community in which they plan on conducting business.

CHAPTER 6:

DISCONNECT IN COMMUNICATION

Communication in the Salton Sea region can be difficult for a multitude of reasons. One of the main limitations is the rural aspect of the Salton Sea region. There are around seventy-six miles between Coachella and Imperial, making it difficult to create meetings in a central area that is easily accessible for community members. When COVID-19 restrictions were lifted, the Lithium Valley Commission had to cancel their meeting at the last minute, as they could not create a quorum in person due to commuting difficulties (Wilson, 2022). Even when remote meetings were held, community members had a difficult time attending, as many of them do not have access to a computer or the internet, as discussed in multiple interviews.

The Historic Way

The historic process in which community engagement has occurred in Imperial Valley in the past, consisted of what one interview participant explained as being the “good ol’ boys,” in which those who are allowed to engage in the planning process are those who have a direct stake in the development. A good ol’ boys system allows for the networking of those in positions of power to provide favors to others in order to remain in power (Nelson, 2017). This system is seen in Imperial Valley primarily with the environmental and public health impacts that have resulted from industrial agriculture. Interview participants discussed the use of synthetic fertilizers and pesticides in agriculture and how these products have concentrated in the Salton Sea. This hazardous waste has fertilizers and pesticides in it that are now banned in the United States, but agriculture has not had to pay for the damage that was caused. Eric Reyes explained that

there has not been any accountability or acknowledgement by farmers for their contributions to the contamination of Imperial Valley.

With agriculture providing the region with the second largest sector of jobs, planners wanted to ensure that the farmers continued to perform business in the region. According to the USDA (2017), there are 396 farms in Imperial County that span 521,729 acres, with an average farm size of 1,317 acres. Despite Imperial having a dominantly Latinx population, about 95% of agriculture producers are white. Imperial County received its name from the Imperial Land Company, which participated in the reclamation of the southern portion of the Colorado River in order to establish industrial agriculture in the valley, sealing the fate of the region as a permanent sector for industrial agriculture.

Several interview participants explained that the producers and farm owners reap the economic benefit of industrial agriculture, while those who are the laborers are subject to harsh working conditions and little pay. This concept relates to the conversation around whiteness and urban planning in Goetz et al. (2020), in which Imperial Valley communities are painted as “low opportunity” aiding in the permission of large-scale industrial development. Harvey (2008) explains the process of dispossessions, in which the poor and underprivileged will experience the most harm from the process of “urban restructuring.” While industrial agriculture in the Imperial Valley is a multi-billion-dollar industry (Ortiz, 2020), the workers receive the smallest portion of the economic benefits, making just slightly more than minimum wage (Martin, 2001). Those experiencing poverty in Imperial Valley are exposed to the harms of this industry every day.

The Lithium Valley Commission

The goal of the Lithium Valley Commission is to create a report that discusses the opportunities for increased geothermal and DLE development in the Salton Sea region. The committee consists of local community organizers, tribal representatives, lithium developers, environmentalists, and state/local government entities. Meetings of the Lithium Valley Commission have been ongoing since February 2021. Meetings are an average of 3.5 hours long, but consistently go over time, as there are a lot of conflicting values on the Commission. Meetings are open to the public, and each meeting has multiple public comment periods where community members are free to ask any questions or voice their concerns on a specific topic that is scheduled for discussion, so long as their comment is made within three minutes. Although the Lithium Valley Commission is an improvement from the historic approach to community engagement according to some interview participants, there are still several concerns that need to be addressed.

Aligning with the traditional ways of planning (Goetz & Damiano, 2020) , the Lithium Valley Commission convened without any interpretation made available for Spanish or Purépecha, a language spoken by Indigenous Michoacán people speakers at first⁴. This caused many community members to be incapable of understanding content that will impact the future of their lives in Imperial Valley. There were five Lithium

⁴ Sue Reager discusses how speech translation allows for the full expression of conferences and meetings (Reager, 2018)

<https://www.speechtechmag.com/Articles/ReadArticle.aspx?ArticleID=124741>

Valley Commission meetings to which Spanish speakers did not have access. Although Spanish interpretation has now been made available, meeting recordings and transcripts are only available in English; therefore, if Spanish speakers are not available to attend the actual date of the meetings, they will not have access to the information discussed.

Purépecha, is another language that is prominent in the Salton Sea region. Despite this, Purépecha interpretation for meetings is not available; however, important notices and documents are translated and made available to the public via the Lithium Valley Commission's website. Difficulties with interpretation were prominent in the November community forum, regardless of Spanish interpretation being utilized for the previous four months. In the El Centro location, where I attended in person, technology for the interpretation services was switched at the last minute, leaving the staff member confused on how to use technology that they were not trained about. Comments were also made urging commissioners to slow down so that Spanish interpretation was adequately reflecting the English discussion.

With only one community forum conducted, community members were left to speculate as to what geothermal lithium extraction development would look like in the region. Limited outreach to the community caused a mass spreading of misinformation, in which community members began to discuss and spread their own thoughts about development. In the September 2021 meeting, a public commenter stated that there is a lot of misinformation being spread by the community so it would be helpful to have the Lithium Valley Commission share truthful information to the community and the environmental impact that it will have. Commissioner Ryan Kelley of Imperial County responded to this comment, explaining that there would be a geothermal demonstration

happening the next day that would be open to the press, but not to the public. The goal in only making the demonstration available to the media was to “stomp down the misinformation that is being spread.” I argue that including the community in these demonstrations is necessary to create a relationship of understanding between and among community members, government functionaries, and lithium developers. Community members that do not follow local media, who do not speak English, and who do not know how to read, and/or do not have access to the internet will not be able to access information that is presented to the media. It is important that these demonstrations are made easily accessible so that community members have hands-on experiences with the development that is already underway. Allowing community members to participate in demonstrations will encourage the community to be included in the decision-making process.

Taking a participatory planning approach is critical to build a relationship of trust and understanding between developers and the local community. By utilizing participatory planning, Lithium Valley could create a space in which the community receives its knowledge directly from the source, providing them with a sense of empowerment (Sandoval & Rongerude, 2015). The community forum had limited success in empowering the community. After the forum, several comments were submitted to the docket that criticized the format of the forum. Many responses suggested that there needed to be more localized forms of community engagement, in which the industry and legislators listen to the concerns and questions of community members. Others criticized the forum for not disclosing information relating to the concerns surrounding public health and the continued recession of the Salton Sea. Several

comments also pointed out that community members are not familiar with the jargon that is used in the lithium industry and government processes, which makes it difficult to understand the information that has been given to the public.

In Lithium Valley Commission meetings, there is often a disconnect between what developers and the state envision compared to the vision of local community members and community organizers. When the state discusses the potential of lithium extraction in the Salton Sea region, they envision it as critical development - development that is necessary to improve the economy, national security, and achieve carbon emission goals. Although the Lithium Valley Commission was created by the California Energy Commission with the forethought to include local community organizers in the commission, there has not been adequate community involvement, causing public commenters and interview participants to feel that the commission is only there to “check a box,” as one interview participant phrased it. Developers and supporters of geothermal DLE frame lithium extraction as being a panacea for the region, in which it can solve all previous environmental and economic damage that has plagued the region. They insist that the focus be placed on developing the lithium and geothermal industry first before addressing environmental and public health concerns. Commissioner James Hanks from the IID asked the question in the March 2021 LVC meeting wondering why God would make a place like Imperial Valley, where geothermal and lithium is readily available if we were not supposed to extract it. He went on to discuss that lithium is necessary to help the economy recover and overcome recession. These values are contrasting to the belief of community organizers who would like to see the community improve before or at the same rate as lithium development does. In the same meeting, Commissioner Luis Olmedo

from Comité Civico del Valle explained that past developments of solar power and clean water were promised, but were never delivered. He continues to say that Imperial Valley envisions the future of a thriving economy, however, negotiation needs to occur with the community. We need to create policies that protect the disadvantaged communities in the region so that we do not continue the same cycles as previous development.

Misinformation on Job Creation

Table 1: Number of estimated jobs reported by Controlled Thermal Resources in their Lithium Valley Commission presentation vs. their estimate in the initial environmental review

Source of information	# of full time jobs	# of temporary construction jobs
Controlled Thermal Resources Lithium Valley Commission presentation	4,000	220, up to 1400 jobs at the completion of stage 3, over the span of 8 years
Controlled Thermal Resources initial environmental review	112	N/A, 25 months, 7 days a week

One of the primary benefits of implementing geothermal DLE development in the region is the promise of an influx of jobs, which the area desperately needs as the unemployment rate exceeds the national average (Parvini, 2019). During the February 2022 LVC meeting, Controlled Thermal Resources presented the number of expected jobs that would be created from the development of their lithium extraction site and geothermal power plant. At first glance the number of jobs that were presented during the LVC meetings seems very promising at a staggering 4,000+ jobs generated. However, with further observation of the presentation, it can be determined that over half of these estimates are from predicted ancillary jobs, which are jobs that are anticipated to be

created outside of the industry, like teachers and administrators. This is contrasting to the 112 full-time employees that were presented in the Initial Study & Environmental analysis for Controlled Thermal Resources’ Hell’s Kitchen PowerCo 1 and LithiumCo 1 (County of Imperial, 2022). In their easily accessible presentation, Controlled Thermal Resources inflated their estimated number of jobs by including jobs that will be created only if the industry can reach its full, predicted potential. This inflated number is concerning because it is critical that development does not create new false promises like the false promises made by previous solar and wind developers if they want to create the greatest benefit for the local community.

Misinformation on Water Use

Table 2: Water use for Controlled Thermal Resources’ Hell’s Kitchen geothermal and lithium extraction site based on development phase.

Development Phase	Approximate gallons of water used per year
Construction	18,250,000 gallons
Fully Constructed	2,183,204,594 gallons

Direct lithium extraction is depicted as being a less water intensive method of lithium extraction. While DLE does not require as much water as the brine evaporation method, there is still a significant amount of water required. In CTR’s initial study, they explain that construction of the plant will require 50,000 gallons of freshwater per day for the duration of 25 months, which is equivalent to over 18 million gallons per year (County of Imperial, 2022). Once the lithium and geothermal sites are fully constructed and operating, the project will require 6,700 acre-feet per year of freshwater, or over 2 billion gallons per year. This is concerning, as lithium and geothermal will gain access to

freshwater resources via the Imperial Irrigation District, which is already limited on water usage by the QSA - which requires a transfer of 200,000 acre-feet to San Diego each year - and the decreasing flows of the Colorado River due to increased drought.

Water is a major concern in a region that only receives three inches of rain per year, especially when the community is facing the ecological collapse of the Salton Sea, which requires water inflows to prevent further harm. When asked the question of what the environmental impacts will be from DLE during LVC meetings, the lithium industry talked about the process being close-looped and clean. They encouraged community members to read a 1,000+ page environmental impact report, despite developers knowing that the education level is low in the region and that it would be very difficult for the average community member to read and understand the content in the report. Although factsheets were provided, they did not represent important details of the report, like impacts to seismicity and accurate representations of data related to fresh water use. In order to increase transparency between industry and community, it is critical that estimated impacts are presented to the public in a manner that is easy to understand, while still ensuring that the numbers are accurately represented.

In conversation, the Lithium Valley Commission presents lithium extraction in the region as inevitable. From interviews and observations, the Imperial Irrigation District has already provided industry with permits for water and energy use. This contradicts the values of community members who have been waiting since the early 2000s for the environmental cleanup of the rapidly receding Salton Sea. Eric Reyes explained that we cannot support an industry that allows public health to remain in the current state or further decrease it. Community members often ask the question of what

good job availability is if communities are still suffering from poor air quality. It is difficult for some to support this industry when they see the Imperial Irrigation District rip up restoration infrastructure for a project that has been proposed since 2015 in order to make way for lithium extraction that has only been in serious discussion over the past year.

Misinformation on Seismicity

Recent Earthquakes in California and Nevada

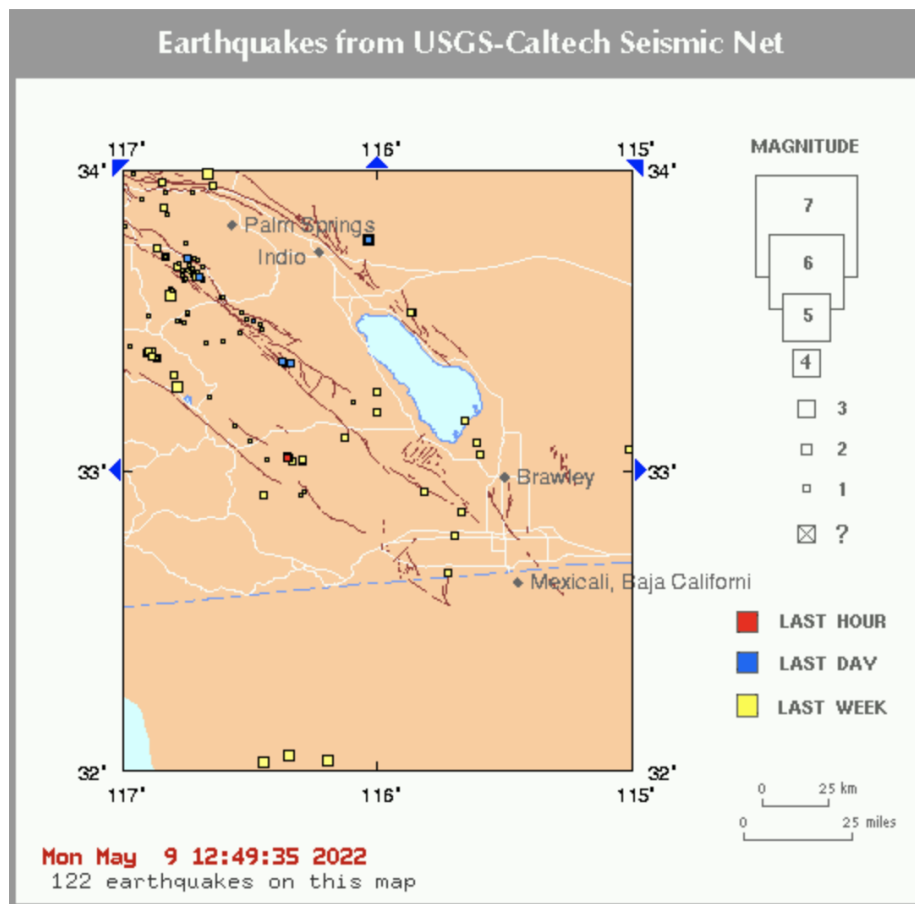


Figure 5: Earthquakes in the Salton Sea Region 05/02/22-05/09/22 (USGS-Caltech, 2022)

There are several seismically active fault lines in Imperial valley including the Brawley Fault Zone, the Imperial Fault Zone, and the San Andreas Fault Zone (Trugman

et al., 2016). The area is prone to earthquake clusters, which has caused damage to buildings in the past. Within the week of May 2nd, 2022 through May 9th, 2022, the region has experienced 122 earthquakes. Although these earthquakes are small, it is only a matter of time before there is a larger one that will cause significant damage to the region. Loera explained that some community members are worried about the ground becoming more unstable and causing the sinking of homes and other infrastructure. This concern comes from homes that have been impacted by the process of liquefaction. Liquefaction occurs when soil becomes unstable as a result of ground shaking and seismic activity (McCrink et al., 2011). Since soils in the region are loose and granular, (and has a high-water table) they are more susceptible to liquefaction events (McCrink et al., 2011). In the Initial Study, they explain that development lies on the Brawley Seismic Zone, but since this fault line is not an Alquist-Priolo fault zone⁵, they do not have to follow procedures that prevent construction on the fault line. Despite discussion of seismic activity in interviews and in the Initial Study, there has not been discussion of concerns relating to seismicity in LVC meetings.

⁵ Alquist-Priolo fault zones are regulations placed on/near active fault lines that prohibit development across the trace of active faults. The San Andreas is an Alquist-Priolo fault, and it resides near Bombay Beach in Imperial County (Parrish, 2018).

https://www.conservation.ca.gov/cgs/Documents/Publications/Special-Publications/SP_042.pdf

Imperial County Economic Opportunity Investment Plan



Figure 6: Word clouds representing common themes in community responses and the Imperial County Economic Opportunity Investment Plan

In February 2022, the Imperial County published their economic opportunity investment plan (EOIP) to the Lithium Valley Commission docket. The investment plan focuses on ensuring that the geothermal lithium industry can successfully develop in the Salton Sea region. The main goal of the investment plan is to gain the support of the state of California and the federal government to fund infrastructure projects that would speed up the development process. One of the requests of the EOIP is to exempt lithium development from the California Environmental Quality Act or CEQA (Imperial County BOS, 2022). Imperial County seeks to create instead a county based programmatic environmental review. According to the National Institute of Justice, programmatic environmental reviews are used for “actions done repeatedly and therefore are likely to have similar impacts that can be evaluated at a broad scale” (NIJ, 2019). This is concerning because this is the first time that the industry will be combining direct lithium

extraction with geothermal power in the United States⁶. There is not currently a consensus of what the true, long term environmental impacts will be; therefore, programmatic review completed by the county is not sufficient. The EOIP also seeks to create funds through taxation at the federal, state, and local level in order to increase infrastructure, like roads and railroads, as well as access to education. Although the report mentions wanting to support education from kindergarten up to a bachelor's degree, the report only goes into depth about collegiate education, stating that they want a California Polytechnic state school that would support the development of Lithium Valley. Imperial County is the local form of government, and therefore has connections with local community members; however, the economic opportunity investment plan falls short of incorporating local concerns.

Document analysis of submitted comments to the Lithium Valley Commission docket and observations of the Q & A chat feature during the November community forum were conducted due to the community's strong criticisms of the forum. These responses were then compared to the goals of the EOIP. The reason for doing so was to determine if the EOIP addressed the concerns of the local community. In the Q & A feature during the community forum, community members consistently brought up the

⁶ Or perhaps the world. There are other projects in development in Cornwall and Germany (Lithium, 2021; Richter, 2021). Cornwall:

<https://cornishlithium.com/projects/lithium-in-geothermal-waters/direct-lithium-extraction/> Germany: <https://www.thinkgeoenergy.com/geothermal-lithium-extraction-pilot-plant-set-up-in-germany>

concern about the consequences geothermal DLE could have on the surrounding communities. They discussed the limited access to clean water and air as a result of the “toxic dust from the Salton Sea.” They voiced their concern about the language barriers that exist and the limited education opportunities available to engage in STEM fields. Comments submitted to the docket after the community forum demanded responses to questions surrounding the environmental impact of lithium extraction. They requested that the LVC meetings proceed in a manner that is community-centered and accurately reflects the values of community members. After analysis was conducted on the EOIP, it was determined that community members were very critical of the community forum. The community was primarily focused on concerns surrounding community engagement, public health, environmental impact, and language barriers that make it difficult to fully understand the geothermal lithium extraction industry in the Salton Sea region. Despite these concerns, the EOIP focused on concerns surrounding economics, resource nationalism, and streamlining the development process of lithium development in order to reach its full potential in the region. The EOIP was published to the LVC docket in English, but not in Spanish or Purépecha, which concretizes the community’s concern about the language barrier. The EOIP’s idea to exempt the lithium industry from CEQA review also goes against the community’s concerns about transparency surrounding the possible environmental impacts. Although Imperial County had the opportunity to review the Q & A and comments published to the docket relating to the community forum, the EOIP does not adequately represent the primary concerns of Salton Sea community members.

Conclusions

The Salton Sea region, riddled with environmental concerns, faces many disconnects in communication between governing bodies, industry, and the local community. These disconnects in communication can make the community feel that lithium extraction will occur regardless of their concerns. There are many ways in which the Lithium Valley Commission, industry, and Imperial County can improve accessibility to certain materials. Some examples include transcribing meetings in Spanish, ensuring all important documents are available in Spanish and Purépecha, and disclosing accurate statistics in presentations to the public. In order to prevent further disconnections from occurring, it is critical to create spaces for conversations that are community centered. Community-centered conversations allow for transparency between what the community is concerned about and the goals of the industry. These conversations can help shape Lithium Valley into a development project that addresses the concerns of the community, while providing well-paying jobs.

CHAPTER 7. CONCLUSIONS

My research, focused on lithium development in the Salton Sea region, which is composed of the Coachella and Imperial Valley, aims to shed light on the importance of community engagement in the decision-making process. Historically, community members have not been included in these conversations, resulting in the current ecological crisis of decreasing air quality and a rapidly receding Salton Sea. My goal was to create a space in which the community was free to voice their concerns on geothermal lithium development without having to abide by the rules of a government-based public meeting. Through interviews, document analysis, and participant observation, it was revealed that for the lithium industry to be successful in the region, there needs to be adequate accessibility to information for the public, as well as addressing the current public health concerns.

While it was my intention to focus my research on community engagement specifically, I quickly realized that conversations surrounding the historic and current issues surrounding the Salton Sea needed to be discussed. Community engagement is critical, yes, but in order to discuss how to improve community engagement, we must look at the wrongdoings of the past, which have caused the community to feel separate from the decision-making process. Concerns of the community and improving community engagement can be accomplished through the concept of emergent strategy, in which development occurs at the speed of the community's trust (Brown, 2017). In this manner, the government works to serve the community members (not the industry), creating spaces for conversation that are made easily accessible to the general public, and

transforming the economy to serve the community members and the environment first before corporations (Powell et al., 2019).

The Salton Sea region is faced with severe public health concerns from a rapidly receding sea, polluted soils, and polluted water. Despite these severe issues, there has not been appropriate restoration to the region, as funding is often allocated to San Diego or Riverside County due to their larger populations. However, since the discovery of extractible lithium, the Salton Sea region has been placed in the spotlight. Instead of discussing how to address the crisis of the sea, industry, the state, and the federal government are more focused on bringing the geothermal lithium extraction business to full fruition. The Imperial Valley has been depicted in the media as barren, abandoned, and exploitable, allowing policy makers to dismiss the damages done by industrial agriculture and the possible environmental damages of geothermal lithium extraction. Instead, policy makers focus on the economic benefits of creating a localized supply stream. This has caused the community and the species that have made this place home to be ignored.

As policies continue to be crafted focusing on reducing emissions, it is critical that they do not simply replace one form of extractivism for another, just for the sole fact of it being a greener and cleaner form of extractivism. For a just energy transition to occur, there must be a focus on the needs and concerns of the communities that live in the regions where extraction will occur. Even though electric vehicles do not emit carbon from tailpipes, there are still environmental harms affiliated with the extraction of materials required to manufacture them, including, but not limited to water use, seismic activity, habitat destruction, and hazardous waste creation. These harms need to be

acknowledged and mitigated in a way that does not cause further damage and maximizes potential community benefit. There has been discussion in Lithium Valley Commission meetings about the potential of creating community benefit agreements, severance taxes, or sovereign wealth funds to provide the community with funding to improve the region; however, these benefits come with their flaws. In South America, these benefit agreements can cause community members with opposing opinions to become excluded from the conversation. Benefit agreements can also result in state abandonment, in which the state can end up removing their responsibility for the underserved community of the Salton Sea region (Peterson & Le Billon, 2015). When extractivism occurs in regions that are already experiencing disadvantages, it is critical that extractive industries work to repair historic damage so that communities can be successfully prepared for the industry, and do not remain sacrifice zones.

The first concept of my research, *The Community and their Concerns*, focused on shedding light on the local community of the Salton Sea, as well as the current and historical concerns that they are facing. The population of the Salton Sea region is dominantly Latinx farm workers. Many of the Latinx farm workers in Imperial Valley make the commute from across the border to the United States every single day. The community experiences very high rates of poverty and unemployment. They fill their lungs with toxic air from a receding, polluted sea as a result of industrial processes. Reclamation of the Colorado River provided water to the region to achieve year-long growing seasons, but these agricultural practices resulted in the death of migratory birds and fish, as well as disease amongst community members, now in desperate need of restoration efforts. The Quantification Settlement Agreement was established in order to

provide more water to the urban areas of drought-prone states; however, this was at the cost of the public health of the Salton Sea Region. Playa is now exposed at a rate of 1-foot per year, creating even more toxins to inhale.

Chapter 5, Areas of Improvement, focused on the areas that are lacking. Here, lacking refers to the limited infrastructure, education, and outreach that currently exists in the Salton Sea region. No children's hospital can be found here. There is little housing availability, as farm workers who choose to live on the Mexican side of the border are not accounted for in the Census. Education opportunities are limited here as well. There are only two high schools in Imperial County that have STEM opportunities, and the university has none. Many community members only speak Spanish and do not know how to read or write. As for working in positions related to the development of increased geothermal and direct lithium extraction, the community is currently ill-prepared to obtain these jobs. Limited outreach to fenceline communities relating to lithium development has caused skepticism, a lack of understanding, and the feeling of being kept separate from the decision-making process.

Chapter 6, Disconnect in Communication, focuses on the historic and current ways stakeholders in the region have communicated with one another on the implementation of industrial development. One difficulty is that the region spans a large portion of land, making it difficult to conduct in-person outreach. However, limited access to the internet and technology also makes it difficult to conduct remote outreach opportunities. Historically, community members have simply been left out of the decision-making process. The county allowed industrial agriculture to harm communities in order to turn a profit. Although the creation of the Lithium Valley Commission is an

improvement from the historic planning process, there are still many unanswered questions surrounding the environmental and public health impacts. Transparent information relating to predicted jobs is another concern, however, and the industry reports very different predictions on job creation based on for whom the presentation is prepared. This is also seen when discussing water usage in relation to direct lithium extraction. In public meetings, the industry will say that the process is “close-looped” and requires very little water, however, in depth review of the initial study shows that just one lithium extraction site will require over 2 billion gallons of freshwater each year. In interviews, the concern about increased earthquakes and liquefaction events was discussed. This concern was also seen as being a potentially significant impact in the initial study. Despite conversations surrounding this concern being brought up in my interviews, as well as in the initial study, there has not been extensive conversations about seismicity in the Lithium Valley Commission meetings, which is where the community is meant to absorb and engage with information. Despite Imperial County’s ability to listen to the concerns of the community during the Lithium Valley Commission community forum, their economic opportunity investment plan did not accurately reflect the voices of the local community. Spaces for community-centered conversations need to be created in order to adequately communicate with residents.

Although lithium extraction is a new industry for the Salton Sea, it is important to consider the historic and current harms that the community is facing. If the industry chooses not to do so, it could end up being another failed attempt to revitalize the region, like the housing and resort developments of the 1950s. If lithium extraction is being phrased as recovery, then that means there needs to be a recovery for all aspects of the

region, not just for lithium. This requires the industry to have transparent conversations with the community about what their concerns are and how the industry can address these concerns. However, it is important to understand that lithium extraction is not a permanent industry, and there will need to be considerations about ensuring that the community remains strong even after lithium extraction is phased out in 50 years (Imperial County BOS, 2022).

The Salton Sea region is home to a diverse community, not only in the anthropocentric sense, but also in the natural world. There are endangered, migratory birds, Desert Pupfish, owls, lizards, tortoises, and more. The conversation in the media needs to shift its perspective on what the Salton Sea Region is in order to understand the issues that are at stake if lithium extraction reaches its full potential. Simply finding commercially available lithium in Imperial Valley and declaring that the region is now Lithium Valley risks “silencing the past” (Trouillot 1997). To do so would mean to deny the presence of the current community and ecology. Development must be regenerative and harness the concept of whole-systems thinking, in which both the current state of the community and the environment is improved (Ajilore, & Willingham, 2020; Gibbons, 2020; Du Plessis et al., 2015; Mang et al., 2012).

It is highly likely that we will continue down the path of transitioning towards electric vehicles and renewable energy. However, it is important that we acknowledge that just because a source of energy is renewable, and just because an electric vehicle does not emit carbon, that does not make development of critical materials beneficial for the environment, or for the people that live near resource extraction sites. To do so would continue to uphold a framework of injustice and inequality. The goal of transitioning to

cleaner resources is not to simply reduce emissions and ensure our national security.

Transitioning is rather beginning to repair our relationship with the environment. The transition requires a regenerative studies approach, in which the term “recovery” applies to improving all aspects of the human and non-human environments (Gibbons, 2020).

This regenerative cycle begins with listening to the voices of historically disenfranchised communities and including them in the decision-making process.

APPENDIX A. LITHIUM VALLEY COMMISSION MEETINGS ATTENDED

List of Lithium Valley Commission meetings attended:

1. Convening of the Lithium Valley Commission. February 25, 2021. 1:00 - 5:00 PM. https://energy.zoom.us/rec/share/gll3GIhB-BdLqjxSrOzoTlO8_5e6cHCg3Z8JHM5veuJ02c5u5guliqueAO4FvaEsv.VUooiNp_cuihQd445
2. Lithium Valley Commission Meeting. March 25, 2021. 1:30 - 5:00 PM. <https://energy.zoom.us/rec/share/-2YZsUAn-z8bs3k5FU7KWw28RqHdTkW-HRKT-ymRghRUH4yuMJh3IozUB7rJX0-n.hqH76Oo2EpEqFNab>
3. Lithium Valley Commission Meeting. April 29, 2021. 1:30 PM - 5:00 PM <https://energy.zoom.us/rec/share/BRao5ay7vQMEvCZxfRcFc5TzORq7ymXal836V0zLgDS9R5v3WNXGg4li0FKZ5dui.9rQ8dwm5CKwL58Ji>
4. Lithium Valley Commission Meeting. May 27, 2021. 1:30 - 5:00 PM <https://energy.zoom.us/rec/share/A-7tGxcBGuBMO9eIjzX4b314Vcg5VdJoszMKbI5FJSU6F2po2orgj03j1Ajj8wIy.XaQF7hI3rVe3xU85>
5. Lithium Valley Commission Meeting. June 24, 2021. 1:30 - 5:00 PM https://energy.zoom.us/rec/share/rOKnOBCP5R_AGLsXt4v9xW8DZeWYRr41QU7aWmltVgwbhQHo5DmRxiiq_cO-Be0n.HLaINONQyBfG0ReQ
6. Lithium Valley Commission Meeting. July 29, 2021. 1:30 - 5:00 PM https://energy.zoom.us/rec/share/U77LX4v3-Zs4Gy4n1g-noP5_lbfIBT_XbYbRbTPxm9Mui5OfztpFI7dD94p9DLhE.3vtmUW6qWTqDxFj

7. Lithium Valley Commission Meeting. August 26, 2021. 1:30 - 5:00 PM
<https://energy.zoom.us/rec/share/kudwLPEZfIUUyERG81qVV6nWVwbzO0qMDk0BT-CGC0Z0YVyudYtXutgtU7udfAbB.hZjII5lnjHvsp-Bk>
8. Lithium Valley Commission Meeting. September 30, 2021. 1:30 - 5:00 PM
https://energy.zoom.us/rec/share/irxpi4y1juQb63i86jLRG_xwwUjyP11EdJFiK0rNXXUafto5km5kiPQP0YAgYaz-.kLs0IGa4m91yUyq0
9. Lithium Valley Commission Meeting. October 28, 2021. 1:30 - 5:00 PM
<https://energy.zoom.us/rec/share/eWXYN9Q-iKJ2f1mwedHJXJVCJErL9XIFsJmjAwF1i5X3n-RbbQhvdmoNdriniZWw.6jUXGvwX1pWgN-oV>
10. Lithium Valley Commission Community Forum. November 17, 2021. 6:00 - 9:00 PM. <https://www.energy.ca.gov/event/2021-11/lithium-valley-commission-community-forum>
11. Lithium Valley Commission Meeting. December 16, 2021. 9:00 AM - 12 PM
https://energy.zoom.us/rec/share/Oxo7MLJbSUu8PkOo5IqhdqoSCHqVBeFhQxABNR2XdwFU5KoNahkR1cnYnWAZAT4.P9vPEWF3sx7q2_kX
12. Lithium Valley Commission Meeting. January 27, 2022. 1:30 - 5:00 PM
<https://energy.zoom.us/rec/share/Od8K3x8xqQcKhVcDvs0RQq-hzF8w0lkJOhYooCDp2zeWaB1WRyHb-QB34FQx49L9.ZwwfwaY3Y5hn1jMC?startTime=1643319058000>
13. Lithium Valley Commission Meeting. February 16, 2022. 9:00 - 11:00 AM
<https://zoom.us/rec/play/Ycn7YVkiqsS2BnH3Gc8etEI29iHfNPdDdKrARTn5q5>

zkqMYtOEUWu_RqbcRWITQb3qcAtkXSOFFcW7f.p871pMDp97lrrhuJ?autoplay=trueom

14. Lithium Valley Commission Meeting. February 24, 2022. 1:30 - 5:00 PM

https://energy.zoom.us/rec/share/XUXeby5AsEBZUChvLiDmqviEnDqJC3dbOs
Ceexu6HETItna5aHnHwF18Ck0AtJWq.cZQry_-
KLSLJNTHM?startTime=1645738435000

15. Lithium Valley Commission Meeting. March 24, 2022. 1:30 - 5:00 PM

https://energy.zoom.us/rec/play/b3mhbzJZxid936Z8wH81K-0XIJmt7QXbrJn-
TOUYLx4cjVWeFjfkfR0B4flfKeXpYKQye85KVsisvIh04.tkDkhlK9hkqWEKyl

APPENDIX B. SALTON SEA MANAGEMENT PROGRAM MEETINGS

ATTENDED

List of Salton Sea Management Program Meetings Attended:

1. Salton Sea Management Program Long Range Committee Meeting. December 14, 2021. 9:00 AM - 12:00 PM.
2. Salton Sea Management Program Community Engagement Committee Meeting. February 9, 2022. 2:00 - 4:00 PM
<https://www.youtube.com/watch?v=Bcq4UMbXewA>
3. Salton Sea Management Program Long Range Committee Meeting. March 2, 2022. 10:00 - 1:00 PM
4. Salton Sea Management Program Independent Review Panel Meeting. April 11, 2022. 5:30 - 7:00 PM. https://www.youtube.com/watch?v=N83JKJbk3_8

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