UNIVERSITY OF CALIFORNIA

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Water, Power, and Development in Twenty-First Century China:

The Case of the South-North Water Transfer Project

A dissertation submitted in partial satisfaction of the

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by

Brittany Leigh Crow-Miller

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ABSTRACT OF THE DISSERTATION

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Through a mixed qualitative approach, this dissertation injects politics into an otherwise apolitical discussion of the largest water management project in human history, China's South-North Water Transfer Project (SNWTP). The SNWTP, which transfers water from south-central China to the country's political and economic heart on the North China Plain (NCP), is being pursued as a means to transforming water management into a space in which the Chinese Communist Party (CCP) can assert its power, rather than a space in which that power may be undermined. I demonstrate how the SNWTP is fundamentally underpinned by the CCP's need to maintain continued economic growth in this critical water-stressed region, which serves as a key factor in its ability to maintain political legitimacy. In pursuing this ultimate goal, the government is presenting the SNWTP in

apolitical terms by putting forth what I call "discourses of distraction," or alternative stories about an environmental controversy that serve a particular political agenda. These discourses, I argue, are being employed as a strategic tool to depoliticize the SNWTP, mask its social and ecological impacts, and deflect attention away from three major anthropogenic sources of water stress on the NCP, because to address them would undermine economic growth. In addition to demonstrating how discourse can serve as a political tool, the dissertation illustrates the utility of scalar constructions in political maneuvering around the South-North Water Transfer Project. It also illustrates the ways in which the SNWTP has necessitated a range of temporal, spatial, and sectoral trade-offs, which both reflect and reinforce existing power discrepancies and set in place a pattern of inequities that is likely to persist for decades.

The dissertation of Brittany Leigh Crow-Miller is approved.

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This dissertation is dedicated to my dad, Michael, for his steadfast support, encouragement, and confidence in my work. I was listening. Thank you for everything.

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BIOGRAPHICAL SKETCH

Britt Crow-Miller holds a B.A. in History and Asian Studies from Bard College in Annandale-on-Hudson, NY and an M.A. in Regional Studies—East Asia from Harvard University. Prior to her time at UCLA, Crow-Miller served as the Editor-in-Chief of *Harvard Asia Quarterly* and as a research associate at Harvard Business School and the Consortium for Science, Policy and Outcomes (CSPO) at Arizona State University.

NOTE ON RESEARCH SUBJECTS

In an effort to protect their identities, I have used a pseudonym for each of my interview subjects and omitted potentially identifying details such as their precise bureaucratic position and office.

CHAPTER ONE:

Introduction

Introduction

Freshwater is a unique and powerful resource. It is the foundation of ecosystem health and the primary actor in the hydrologic cycle, one of the earth's most important system-regulating cycles. Freshwater habitats cover just one percent of the earth's surface, but sustain more than 40 percent of known fish species and 12 percent of known animal species (Conca 2006: 87). Freshwater is also the most fundamental prerequisite for all plant and animal life, regardless of whether or not they live directly in freshwater habitats.

In addition to serving as an essential building block of the natural world, water is central to the physical, cultural, and economic well being of humanity. Water makes up about 60 percent of the adult human body and, while a human may survive well over a month without food, most will die after roughly a week without water. It is also an important factor in human cultures, playing a central role in many spiritual traditions and religions. Among many Native American groups, water is believed to be a living entity with a spirit, while also serving as a source of power and purification and as a medium for meditation (Blackstock 2001: 5). Water has replaced wine in the Eucharistic cup in

several Christian traditions (Daly-Denton 2007), it figures centrally in purifying rituals such as baptism, and Catholics anoint themselves with holy water for protection. To draw on but one of many other examples, water is also vital to Hindus, again serving as the medium for ritual cleansing and with rivers (such as the Ganges in south Asia) constituting the most sacred of places.

Economically, water is a basic input for growth, helping to generate many forms of energy, facilitate industrial production, and produce the material inputs fundamental to the physical expansion of cities and the human built environment. It is a decisive factor in shaping how and where humans interface with the natural world through our built environment, carrying in its flows the power to make or break places with its scarcity or abundance. Where water flows, in what amount, and for what purpose, however, is not entirely determined by biophysical factors. Human decisions, institutions, and technologies have played a critical role in shaping the geography of freshwater resources through water management and control. Power and politics shape the geography of water and thereby help to shape society.

The appearance of early advanced human civilizations—including along the Nile River in ancient Egypt, in the Tigris-Euphrates region in Mesopotamia, and along the Indus and Yellow Rivers in Asia—was closely related to water control.[1] In his seminal but controversial 1957 publication, *Oriental Despotism: A Comparative Study of Total*

[1] Molligna defines water control as, "Any human intervention in the hydrological cycle that intentionally affects the time and/or spatial characteristics of water availability and/or its qualities" (Molligna 2008: 10).

Power, Karl Wittfogel contended, "Of all tasks imposed by the natural environment, it was the task imposed by a precarious water situation that stimulated man to develop hydraulic methods of social control" (Wittfogel 1957: 13). While this argument may be critiqued as deterministic—environmentally, geographically and technologically, it does hint at an important bit of truth. While water stress does not inevitably give rise to certain modes of governance or social control, people living in semiarid riparian regions where rainfall could not meet agricultural demand were indeed forced to innovate, to find ways to control and manipulate water to ensure a stable supply. In these areas, elaborate irrigation and flood control systems were built up around technologies like the shadoof[2] and nooria,[3] and early dams helped to enable year-round agricultural production. These

[2] The shadoof and nooria are two of the earliest pump devices used for irrigation purposes. The composition and functioning of the most basic shadoof, originating in Egypt, are described in *Pumping Machinery* as follows: "A leather, earthen or woven bucket is attached to an arm by means of ropes or tree branches and ropes. This arm is tied to a crossbeam supported in crotches of tree trunks planted in the ground at the edge of some river or well. The arm supporting the bucket is counterweighted by a stone or mud ball, so there will be practically no weight to lift. A man then pulls on the bucket support, putting the bucket beneath the water, and then allows the counterweight to lift it to the proper level, where he empties the water into the canal or basin" (Greene 1911: 2-4).

[3] The nooria, dating back to at least 1000 BCE and found in China as well as along the Nile and Euphrates, was an early waterwheel. Greene describes one as "…consisting of

innovations in water control contributed to grain surpluses and in turn allowed the population in these regions to swell and begin specializing in non-agricultural trades. Solomon emphasizes the significance of water control to the agricultural revolution of roughly 5,000 years ago, at which time, "[S]ocieties […] began mastering the hydraulic arts of controlling water from large rivers for mass-scale irrigation, and in so doing unlocked the economic and political means for advanced civilization to begin" (Solomon 2010: 2). Water control as a crucial prerequisite for advanced human civilization has a long and entangled history with politics, power, and political economy. As the waxing and waning of empires in these ancient civilizations demonstrated, those who had the technological and political means to control water were in many cases those in control of society more broadly (Solomon 2010).

In modern times, water management is still centrally linked to politics and power, especially as freshwater resources become increasingly stressed by factors like population growth, pollution, and rising use rates in our industrializing world. Prominent examples that demonstrate the central role of politics in water management can be found in the American Southwest (Hundley 2009; Worster 1992), the Rhône River in France (Pritchard 2004), across the Middle East (Feitelson and Fischendler 2009; Harris and Alatout 2010; Weinthal et al. 2005), Latin America (Zimmerer 2011), and Southeast Asia

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eighteen or twenty arms with paddles, to the periphery of which is attached a number of buckets. At the lowest limit of the motion of the wheel these buckets dip below the water and are filled. The motion of the wheel thus raises the water to a higher level" (Green 1911: 4-5).

(Lebel et al. 2005; Sneddon 2003). As I will argue, water control is particularly important—and its political dimensions under-recognized—in China, the world's most populated nation and a country where stress on the environment and natural resources has intensified significantly since rapid economic reform and urban development began in the late 1970s.

This chapter serves as an introduction to my dissertation. It begins with a brief discussion of the North China Plain (NCP), a region where the dramatic impacts of post-reform socio-economic change on water resources are being targeted for improvement by the world's most ambitious inter-basin transfer project[4] to date— the South-North Water Transfer Project (SNWTP, 南水北调工程). Next, the primary research questions of the dissertation are introduced, followed by a discussion of research design and methodological approach. The introduction concludes with a brief sketch of the remaining chapters of the dissertation.

[4] Inter-basin water transfers (IBTs) involve physically diverting the flow of water from one river basin (the "donor" basin) to another river basin (the "recipient" basin) through the use of various technologies such as canals, tunnels, and sometimes water pumps. Internationally, we have seen other IBTs including the Central Arizona Project in the American Southwest, South Africa's Lesotho Highlands Water Project, and the Telugu Ganga Project in southern India.

The North China Plain and the SNTWP

Although China's water supply is vast in absolute terms—ranking sixth globally in terms of total national water resources—it is among the most water scarce countries in the world when population is factored in (Chen 2011: 85). Average annual per capita water availability is around 2,000m^3, less than one quarter of the global per capita average (Yang and Zehnder 2005: 3; Chen 2011: 85).[5] But low per capita water supply does not burden all of China equally. The situation is especially critical on the North China Plain (NCP), the semiarid region in which ancient Chinese civilization was born through the technological control of water (see *Figure 1.1*).

Today, as the backyard of the Chinese Communist Party, home to more than a quarter of the country's 1.3 billion person population and as the source of more than 25 percent of its gross domestic product (GDP), this region constitutes the political and economic heartland of modern China. But due to a combination of natural and anthropogenic stresses of water resources, the average annual per capita water supply in

[5] To put this figure into perspective, 2,000m^3 is equivalent to 528,344 gallons, which figures out to an average supply of roughly 1,450 gallons per person, per day. Three bowls of rice with a modest portion of vegetables and pork, what would be considered a standard day's worth of food in much of China, requires roughly 1,000 gallons of water input, excluding energy for cooking. A single hamburger requires upwards of 4,000 gallons (USGS.gov).

this critical region is less than 500 m^3 (or 362 gallons per day—roughly the amount of water necessary to produce a single meal), just half of the United Nations' 1000 m^3 standard for "water shortage" (Berkoff 2003; Probe 2010). In Beijing, the region's most populated city with approximately 20 million inhabitants, per capita supply has dropped below 240 m^3, making it one of the most water-stressed mega-cities in the world at about one thirtieth the global average (Probe 2010).[6] This number also places the city's supply below UNESCO's 300 m^3 per capita standard for the absolute minimum water supply necessary to support a modern and productive social life (Wei et al. 2010).

To alleviate increasing water stress on the NCP, in 2002 China's central government launched the South-North Water Transfer Project, a monumental feat of engineering and the largest water control project in human history. Through a series of canals (*Figure 1.2* and *Figure 1.3)* and tunnels (*Figure 1.4)* and operating primarily on the basis of gravity rather than pumps, the project will transfer roughly 45 billion m^3 per year (about 36.5 million acre feet or 12 trillion gallons) from the Yangtze River and its branches in south-central China to the Yellow River and its major tributaries in the

[6] Estimates by the Beijing Water Authority place this even lower, at around 100m^3 per person (Gu 2011). This is likely part of a larger (constructed) discourse of drought and water scarcity in and around Beijing that helps to justify water diversions from the city's surrounding provinces. See Chapter Four for further discussion.

north.[7] The project plan includes three routes: the Western, Eastern, and Middle Routes (see *Figure 1.5*).

The Western Route, which would divert water directly from the Tibetan plateau in Western China, has been indefinitely delayed (WikiLeaks Cable 8/30/2011) due to growing concerns about its impact on water flows in the Brahmaputra River and other major South Asian rivers whose headwaters are located within the immediate donor basin of the proposed branch (Edmonds 2011: 25). As the controversy intensifies, particularly in India and Pakistan—attesting further to the centrality of politics in water management— it is becoming increasingly unlikely that the Western Route will ever be built.

[7] To put the scale of this project into perspective, the annual volume of diverted water will be nearly thirty times greater than that of the Colorado River Aqueduct, which transfers Colorado River water from the Parker Dam at Lake Havasu on the California-Arizona border almost 400 kilometers across the Mojave desert and in to Southern California (CLUI 2010). The total volume of water transferred by the SNWTP will be roughly 174 times greater than the water transferred into L.A. via the Los Angeles aqueduct system each year.

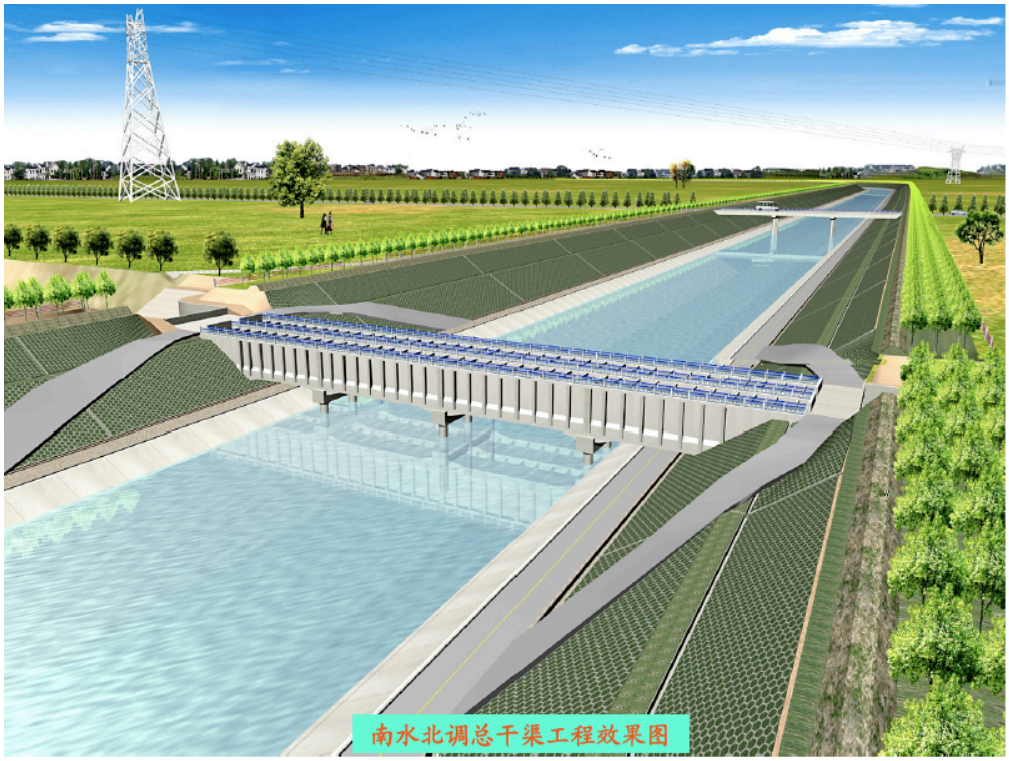
Figure 1.1- Map of the North China Plain

Source: McVicar et al. 2002

Figure 1.2- SNWTP Middle Route Canal Under Construction

Source: Author, Henan Province, December 2011

Figure 1.3- Middle Route Canal Design



Source: Henan SNWTP Office presentation, Zhengzhou, December 2011

Figure 1.4- Inside the SNWTP Yellow River Tunnel (pre-inundation)

Source: Author, December 2011

Figure 1.5- Map of the South-North Water Transfer Project

Source: Circle of Blue

Figure 1.6- Cities along the Middle Route

Source: Xinhua (In order, from South to North: Danjiangkou Reservoir, Nanyang, Pingdingshan, Xuchang, Zhengzhou, Jiaozuo, Xinxiang, Hebi, Anyang, Handan, Xingtai, Shijiazhuang, Baoding, [Tianjin], Beijing)

The Eastern Route, currently in the final testing phase and scheduled for completion in late 2013, runs the course of the ancient Grand Canal, the main branch of an inland waterway shipping and transport network built in the early seventh century to link north and south China. The Middle Route is the most significant of the three in terms of the volume of water to be transferred, cost, and social-ecological impacts. Once fully operational in early 2014, this route will run from the Danjiangkou Reservoir on the Han River (a major tributary of the Yangtze River) more than 1,200km north to Beijing, delivering water to around a dozen of the NCP's growing cities along the way (*Figure 1.6).*

Together these routes (even assuming the Western Route never comes to fruition) will make up the world's largest water control project yet (Liu and Wang 2012: 649). The cost of the project is estimated at approximately $62 billion USD, funded primarily by the central government through debt in the form of bonds and loans, and supported to a lesser extent by provincial and municipal governments along its routes (Webber 2012). Unsurprisingly, the South-North Water Transfer Project's potential social, economic, and environmental impacts are commensurate in size to its price tag. Among the social impacts is the relocation of more than 330,000 people who have been displaced near the Middle Route's Danjiangkou Reservoir alone (International Rivers 2013).

Other impacts include shifts in long-established patterns of ecosystem service distribution, including changes in the availability and quality of drinking water, and changes in spatial patterns of economic growth urbanization, livelihoods, agricultural productivity and inequality (Chen and Xie 2010; Wei et al. 2010). Ecologically, changes in river runoff and water levels are expected to have a particularly serious impact on the

Yangtze River Basin, which serves as the project's donor basin. This region is already struggling with maintaining its own water supply (WikiLeaks Cable 8/30/2011), as well as with biodiversity loss in the wake of other large water control projects like the Three Gorges Dam (Wu et al. 2004).

Research Questions

Why, despite the significant trade-offs it entails, is the Chinese government pursuing this kind of high-modernist, supply-side solution to the North China Plain's severe water stress issues? The answer, I argue, has to do with the enduring links between water control, power, and politics. The South-North Water Transfer Project, however, tends to be presented by the Chinese government (and generally accepted by Chinese and international publics) as an apolitical project, intended to fulfill the laudable goals of ensuring sustainable development and relieving ecological stresses in North China. But, as this dissertation demonstrates, the project is not only far from being apolitical, it is fundamentally underpinned by broader political-economic interests at multiple scales within an administratively complex and fragmented bureaucracy (see Lieberthal and Oksenberg 1988).

In order to get a more robust picture of the challenges—which are not purely biophysical— that must be overcome in order to mitigate the social and environmental impacts of rising water stress in North China, we must inject politics into the discussion surrounding the South-North Water Transfer Project. While a comprehensive analysis of the politics of this water transfer project would involve a critical discussion of both

government politics and the popular politics engaged in by a range of stakeholder groups from across the project area, this dissertation focuses its attention on the former. By taking "official" politics as a starting point for exploring the broader context in which the SNWTP is being constructed, we are afforded a view of the complex forces driving the project and pushing China forward on a consciously crafted (though perhaps narrowly and haphazardly so) path of development and change in the twenty-first century. Exploring the popular discourses surrounding the project will be critical to understanding how the "top-down" forces driving the SNWTP are being pushed back against, especially in a country with a civil society[8] struggling to develop in a restrictive environment (Hsing and Lee 2010; Teets 2009). However, at present political sensitivities prevent scholarly engagement in this space.

In addition to the official politics surrounding the SNWTP, the technology of the water transfer is itself political. As Winner argues, projects like the SNWTP have human politics and values embedded within them:

> …the machines, structures, and systems of modern material culture can be accurately judged not only for their contributions of efficiency and productivity, not merely for their positive and negative environmental side effects, but also for the ways in which they can embody specific forms of power and authority (Winner 1980: 121).

[8] Yang offers a useful definition of civil society as, "…the intermediate public realm between the state and the private sphere. Citizens and citizen groups participate in organized or unorganized discursive or non-discursive activities in civil society. This definition includes the public sphere, voluntary organizations, and social movements as key components of civil society" (Yang 2003: 406).

Accordingly, the primary question driving this research is: What are the political-economic interests embedded within the SNWTP? I argue that the South-North Water Transfer Project is fundamentally underpinned by the Chinese Communist Party's (CCP) need to maintain continued economic growth and improvement in material living standards, a major basis of its claim to power, especially on the North China Plain which constitutes the country's political and economic heartland. In other words, the transfer of water from south to north is not only about developing the physical infrastructure of water control, but it is a material reflection of the CCP's legitimacy and it demonstrates how water is being wielded as a political tool to maintain and enhance the power of CCP. The case of SNWTP alerts us to the oft-overlooked fact that water resources and how they are controlled are central to Chinese power and politics in the twenty-first century and will be a necessary (though insufficient) factor in the ability of the CCP to maintain legitimacy over the long-term.

Related to the first question, I also ask: what discourses are being mobilized by government stakeholders to justify the SNWTP? How is the SNWTP (and water, more broadly) linked to larger projects of legitimacy and political power? I argue that nature and natural factors are serving as a pretense for the human-led geographic redistribution of water resources as a means to serve the broader political-economic interests of the Chinese government. In order to serve these interests, the government is presenting the South-North Water Transfer Project in apolitical terms by putting forth what I call "discourses of distraction." These depoliticizing discourses, which include, for example, narratives about natural water scarcity (as opposed to human-exacerbated water stress),

environmental benefits, and the supremacy of science and engineering, draw attention away from what I have identified as the key anthropogenic sources of water stress on the NCP. I demonstrate that in order for the government to address these stresses—population, production and pollution— it would have to sacrifice the high economic growth rates that have underpinned its legitimacy since the early 1990s. The SNWTP, in other words, is not being pursued to ensure sustainable development or relieve ecological stresses in North China (as the government contends), but ultimately to transform water management into a space in which the Chinese Communist Party can assert its power, rather than a space in which that power is undermined.

To arrive at a more focused inquiry into these questions, this dissertation takes as its focus the Middle Route of the South-North Water Transfer Project. Focusing on this route has enabled in-depth fieldwork along the course of the project in North and Central China. Moreover, as the longest and most voluminous, most expensive route with the broadest reaching social and ecological impacts, this route is the backbone of the entire water control scheme, delivering massive amounts of water directly to Beijing and lesser amounts to several other key cities on the North China Plain, including Tianjin, Henan's capital city of Zhengzhou, and the capital of Hebei Province, Shijiazhuang.

Methodological Approach

Methodologically, I designed my approach to reveal and analyze the "stories" being told by government officials about the region's water issues and about the project. In particular, the approach was designed to target those involved in water management

and development in North China and, more specifically, in the development of the Middle Route of the South-North Water Transfer Project. To this end, I employ a mixed qualitative approach that includes discourse and content analysis, interviews, participant observation, and a thorough literature review surveying multiple subfields and contributing to a rigorous theoretical framework.

As Fischer and Forester note, bureaucratic policymaking is, "…a constant discursive struggle over the criteria of social classification, the boundaries of problem categories […], the conceptual framing of problems, and the definitions of ideas that guide the ways people create shared meanings which motivate them to act" (Fischer and Forester 1993: 2, cited in Weldes 1998:217). Accordingly, discourse and content analysis offer a particularly powerful window for examining the bureaucratic politics and policy issues surrounding the SNWTP and for delving into the underlying political-economic interests involved in the world's largest water transfer project. In their widely cited discourse analysis of environmental politics, Hajer and Versteeg define discourse as "…an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices" (Hajer and Versteeg 2005: 175).

Again, while popular discourses are an important piece of the story of the SNWTP and present a fruitful area for future research, the focus here is on government-propagated discourses related to the water transfer project. By looking at the stories being told, the ideas, concepts, categories and official language used by government officials and offices in China to discuss the SNWTP, we may gain insight into the broader political-economic interests by which the massive water control scheme is being shaped

and driven. Moreover, by exploring and making explicit the government discourses surrounding the SNWTP, we have a chance to expose its politics before they are "settled" into the built environment in future water management projects.

For the discourse and content analysis components of the project, I translated and analyzed key government documents related to the project issued by the main government entities involved in the project—including the State Council (the top administrative authority of the Chinese government), Ministry of Water Resources, and the SNWTP Construction Committee Office—between 2002 and 2013. These documents were available online in their original Chinese versions through various Chinese government websites, including a handful of sites devoted specifically to the South-North Water Transfer Project. While there are likely many classified government documents associated with the SNWTP that I was not able to access in the course of my research, focusing exclusively on publically available documents is sufficient for an analysis of the discourses being projected outside of government bounds.

In addition to official government documents, my research included the compilation of more than 120 articles (published in both Chinese and English) from local, regional, and national state-run newspapers related to the project, water resources, and development between 2003 and 2012. Given the tight control of the media by the government (Hassid 2008) and the reputation of newspapers like *China Daily* (中国日报) and *People's Daily* (人民日报) as mouthpieces of the Chinese Communist Party, these sources offer valuable additional insight into government discourses surrounding the South-North Water Transfer Project.

Interviews served as an important part of my research approach of documenting government narratives surrounding the SNWTP and working to understand how they connect to broader political-economic interests held by government actors. For the interview component of my research, I engaged in several dozen informal preliminary interviews and attended events and meetings across the United States and China over a ten-month period between September 2010 and June 2011. These preliminary interviews enabled the establishment and cultivation of initial relationships with key informants, who consisted primarily of Chinese academics engaged in research on environment, water resources, and development, as well as government officials involved in water management, development on the North China Plain, and the management of the Middle Route of the South-North Water Transfer Project.

During the main fieldwork phase of my research, between June and December of 2011, I was based in Beijing and made several extended fieldtrips to multiple cities along the Middle Route, including Shijiazhuang, Zhengzhou, and Nanyang. An affiliation with the Institute of Geographic Sciences and Natural Resources Research (IGSNRR, 中国科学院地理科学与资源研究所) at the Chinese Academy of Sciences (CAS, 中国科学院) served as a platform for some of my initial interviews, as did participation in a government training program hosted by the China-US Center for Sustainable Development (中美可持续发展中心). A large majority of my interviews, however, were conducted independently. A Chinese research assistant in Beijing was instrumental in assisting with meeting arrangements and with the challenges of navigating through bureaucratic hurdles.

In total, I was able to conduct semi-structured interviews with 25 senior government officials across Beijing, Hebei, Henan, and Hubei provinces in various water- and urban planning-related departments at multiple scales of the governance structure. This included high-ranking officials in the Henan Province South-North Water Transfer Project Middle Route Leaders Group Office, Henan Province Environmental Protection and Migration Department, Henan Province Water Conservation Survey Planning Research Company, Nanyang City South-North Water Transfer Project Middle Route Leaders Group Office, Nanyang City Government, Xichuan County Environmental Protection Bureau and Xichuan County Municipal Government. I also conducted several interviews with officials at the Beijing Municipal Institute of City Planning and Design and the China Academy of Urban Planning and Design. These interviews were particularly important because, as Oksenberg notes, "The [government's] vision of modernity is embodied in the urban and regional plans (*chengshi guihua*) produced by the various architectural design institutes and provided to local governments around the country" (Oksenberg 2001: 23).

Interview subjects were identified through snowball sampling, but came from specific government offices and entities identified in advance as being centrally engaged in work on the Middle Route of the SNWTP and/or on water and development on the North China Plain. The interviews, all but three of which were conducted in Mandarin, were semi-structured, which enabled consistent questioning across subjects while still allowing for flexibility and for the introduction of new and potentially unanticipated discursive framings by the interview subjects themselves. While additional interviews with non-governmental stakeholder groups such as farmers, relocated migrants, and

urban residents impacted by the Middle Route would have helped to strengthen this research, they were not possible due to the political sensitivity of the project. This is a symptom of the government's efforts to control the discursive space surrounding the South-North Water Transfer Project and it presents a fruitful area for future research should that climate become more relaxed.

While in the field I also engaged in participant observation at a handful of meetings at the SNWTP Middle Route Headquarters in Zhengzhou, Henan. As a methodological choice, participant observation is a non-positivist approach, allowing for "…a strong emphasis on exploring the nature of particular social phenomena, rather than setting out to test hypotheses about them" (Atkinson and Hammersley 1994: 248). These meetings, while not open to the public, included formal presentations by government officials from a range of backgrounds—including public administration, engineering, and geography. Presentation and panel discussion topics included the history of water transfer in China and internationally, the environmental necessity of the South-North Water Transfer Project, and government strategies for dealing with "migrants" (移民)[9] displaced by project construction. By observing these meetings on the progress, challenges, and projected outcomes of the Middle Route, I was able to gain insight into the various ways in which government actors are framing the project and the broader discourses into which it fits. Whether or not the content of these meetings was affected by

[9] Here, the word "migrants" is placed in quotations because it falsely implies that such people have moved of their own free will, when in fact they are without choice in the matter. "Environmentally displaced peoples" would be a more appropriate term.

my presence is irrelevant, given that my research focuses on the public face being put on the South-North Water Transfer Project.

Finally, following a circuitous path of contacts, I was able to gain privileged access to several of the Middle Route's key restricted sites, including the Danjiangkou Reservoir in Hubei province, the Yellow River tunnels northwest of Zhengzhou, the Taocha sluice, and several of the new communities to which more than 330,000 migrants have been relocated to accommodate project construction across the North China Plain. On these multi-day site visits, during which I was escorted by government officials working on the Middle Route, I was not only able to engage in insightful informal conversation about the project with engineers and construction workers, but I was able to gather dozens of photographs of unpublished government slogans related to the water transfer project. The slogans, primarily in the form of roadside propaganda signage and billboards across the North China Plain, reveal several previously undocumented government narratives about the South-North Water Transfer Project, addressed in subsequent chapters. Additional primary data on economic, population and urbanization indicators were gathered from World Bank data sources as well as the Chinese government's national-, provincial-, and municipal-level statistical yearbooks.

While this methodological approach would not be appropriate for ascertaining "truths" about, for example, the ecological impacts or governance challenges of the SNWTP, it is well-suited to uncovering the discourses at play in the case of the South-North Water Transfer Project. This is because discourse is often performative (Bakker 1999). It is about the stories actors are telling about the project, whether grounded in truth or fabricated, to justify and strengthen their position and move their interests forward. As

a researcher—particularly a foreign researcher—operating in a relatively guarded political space, it is unlikely that my interview subjects were speaking frankly with me. Likewise, the project sites I was taken to and the government meetings I was able to attend were likely carefully selected in order to give me a positive view on the SNWTP. Rather than diluting the utility of my methods, this actually worked to my advantage as it allowed me direct access to the stories being told about the project not within the opaque boundaries of the Chinese government, but across those boundaries into public discourse. This is precisely what I aimed to uncover and subject to critical analysis.

Project Outline

Following this introductory chapter, the dissertation proceeds in four body chapters and a conclusion. Chapter Two provides the broader theoretical context for considering key questions related to water politics and power in today's increasingly water-stressed world. Engaging with several relevant strands of the water politics literature, it provides a critical overview of the key debates on water politics, including the links among water control, legitimacy and political-economic power; the politics of water discourse; water governance and scale, and; the multiple uses of and values placed upon water.

Building on the first subtheme addressed in the theoretical chapter in the Chinese context, Chapter Three explores the political-economic underpinnings of the SNWTP and links them to the Chinese Communist Party's broader project of legitimacy. It delves into the historical background of north China's current water situation, beginning with the

onset of economic reforms in the late 1970s. In this chapter I identify three primary anthropogenic sources of water stress on the North China Plain—population, production, and pollution. The origins, institutional factors, and broader bureaucratic arrangement that have helped to shape these stressors are discussed in depth and an original analytical assessment of the complex reasons why dealing with each of them would undermine the power of the Chinese government is put forth. Through a discussion of economic growth as a critical factor underpinning the legitimacy of Chinese Communist Party, I argue that it is in the political-economic interest of the CCP to launch a supply-side water management scheme like the South-North Water Transfer Project and rely on "discourses of distraction" to depoliticize the project, mask its social and ecological impacts, and deflect attention away from the root causes of water stress in North China.

Chapter Four brings the second and third themes of water politics addressed in the theoretical chapter into the context of the SNWTP, detailing the politics of discourse and scale surrounding the SNWTP. Supported by empirical data gathered in the field, I identify two primary "discourses of distraction," one that naturalizes water scarcity in North China and another that focuses on the supposed environmental benefits of the project. These alternative stories about the drivers of water stress and justifications for the SNWTP, despite its many social and environmental impacts, serve as a mechanism to steer the conversation away from policy solutions that might actually make a difference in mitigating water stress on the North China Plain. Drawing on several examples and backed by empirical evidence, Chapter Four also demonstrates the strategic use of scale and rescaling in framing water management problems and solutions in the Chinese context.

Also drawing heavily on my empirical work, Chapter Five addresses the fourth theme of the water politics discussion in Chapter Two, focusing on the multiple uses and values of water in the project zone. I argue that the Middle Route of the South-North Water Transfer Project both reflects and reinforces broader spatially articulated power discrepancies between "legitimate" and "illegitimate" users and values. The project also necessitates temporal, sectoral, and spatial trade-offs, prioritizing resource needs of the present over future needs and quality of life, ranking water demand for industry and urbanization above other water uses, and addressing the demands of Beijing and the north over other localities and regions. The relative lack of social organization in response to the SNWTP and the relationship between government and non-governmental organizations in the context of water management are also discussed.

The final chapter revisits the main arguments made in chapters one through five and offers synthesis and conclusions, including a discussion of what the South-North Water Transfer Project tells us more generally about how freshwater resources are increasingly tied to political-economic power. The case of the SNWTP is also linked to broader questions about the complex machinations regimes are willing to undertake to retain control and the strategic power of nature as a political force in the twenty-first century. Along with the identification of several important theoretical contributions to ongoing debates on water politics, resource management, and Chinese development, some ideas on the unintended consequences of the South-North Water Transfer Project, including its impacts on socio-economic inequality and development prospects for different kinds of cities, are also put forth in the conclusion.

CHAPTER TWO:

The Politics of Water

...[W]ater is not an inert 'backdrop to politics', but a substance that is both produced by and productive of political relations (Barnes and Alatout 2012: 486).

Mechanisms of access to and exclusion from water lay bare political economic power relationships and positions of social and cultural power […]. The circulation of water combines political and economic power at the international, national, regional, and local levels with a social and economic struggle for the control over and appropriation of water (Swyngedouw 2004b: 2).

As the ideals of modernization and development have been pursued throughout the world and as the human population has soared since 1800, stress on global freshwater resources has increased dramatically. Despite the fact that usable, accessible freshwater makes up less than one percent of the planet's total water resources (UN Water Statistics 2013), on a per capita basis there is still plenty of water to meet human demand, even at

relatively high rates of consumption.[10] But, "water, which is ironically the most fluid of substances, is fixed in place" (Agnew 2011: 466) and, inevitably, the geography of freshwater supply and demand do not always match up. In other words, water is a "geographically 'located' resource," and as such it often needs to be "spatially relocated" (Swyngedouw 2004b: 54) in order to remedy the spatial mismatch between supply and demand and to ameliorate water stress in undersupplied regions. [11]

The World Resources Institute estimates that by 2025 nearly 50 percent of the world's population—more than 3.5 billion people, most of them in Asia— will live under water stress[12] (cited in Conca 2006: 90). Water stress is typically defined as a situation in

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[10] While the total amount of freshwater resources on the planet is roughly 35 million km^3, only 200,000km^3 is available to meet the needs of freshwater ecosystems and humans (UN Water Statistics 2013). Even leaving 50 percent of this to fulfill ecosystem needs, more than 3.7 million gallons would remain for each of the seven billion people on the planet, far more than even an extremely wasteful person would consume in a lifetime.

[11] Whether a region is considered "undersupplied" is not only a matter of regional supply, but also of demand. An area can have abundant water resources, but if demand is exceedingly high (due, for example, to a large urban population or the prevalence of water-intensive agriculture) it may still be characterized as "undersupplied." The term is relative rather than absolute.

[12] Although WRI estimates do not make the distinction, it is important to recognize the difference between water stress and water scarcity, which many scholars use interchangeably. As a term, water stress better captures the fact that water resource issues

which the annual per capita water supply falls under 1000m^3, or 723 gallons per person, per day.[13] As water stress intensifies across the globe, so too does the competition for control of water resources between countries, between cities and regions, and between users in different sectors or communities, each of which may be in pursuit of different and perhaps conflicting political, economic, and social agendas. The key question, then, is one of water management, which, in addition to dealing with water quality issues, includes the process of deciding how water will be spatially redistributed, in what amount, for what uses, and to whose benefit. Zimmerer argues, "Water resource management—which ranges across scientific, engineering, and environmental projects to access and use rights of groups and individuals—is a paramount social-environmental challenge" (Zimmerer 2011: 168). Although the amount of attention this challenge receives seems to increase alongside its severity, the politics of water management, a key element, is often neglected.

Water management, particularly when it involves physically moving water from one place to another—as is the case in interbasin water transfer projects like the South-North Water Transfer Project— is fundamentally and inherently political (Bakker 2012: 618; Mollinga 2008: 8; Sneddon 2012: 567).

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often exist not only due to natural factors (e.g., natural aridity in a particular region), but because the supply is placed under pressure by a range of anthropogenic factors including population growth and unsustainable rates of use. This is further discussed below.

[13] To put this volume into perspective, this is roughly the amount of water required to produce a cotton t-shirt.

> As it flows, water transgresses geopolitical boundaries, defies jurisdictions, pits upstream against downstream users, and creates competition between economic sectors, both for its use and for its disposal (invoking intertwined issues of water quantity and quality). Water is thus intensely political in a conventional sense: implicated in contested relationships of power and authority (Bakker 2012: 617).

Thus, when we see freshwater resources in places other than their natural depositories (e.g., natural lakes, rivers, streams, etc.), like the waters of the Colorado River resting in the canals of the Central Arizona Project or flowing through the faucets of Los Angelinos, we must ask ourselves: why is it here and how did it come to be here? Answering these questions requires that we think about the policies and technologies that have brought the water there, the preferences they express, the normative goals they have embedded within them, and the motivations of those making the decisions. In other words, we must look at politics.

But, as Agnew argues, political dimensions of water management are often overlooked in favor of more simplistic approaches that emphasize the physical and natural aspects of water provision (Agnew 2011: 467). While factors such as climate and topography are undoubtedly important in determining where freshwater concentrates on our planet, more attention must be paid to the negotiations, institutions, and decision-making processes that so often determine how water is spatially relocated, to where, in what amount, and for what purposes. These aspects of water management are all the more important given the "…material imbrication [of water] in the socio-technical formations through which political processes unfold" (Bakker 2012: 618).

The neglect of, or, at best, insufficient attention paid to politics in water management has frequently resulted in misguided attempts to solve water issues without

addressing their actual root causes or exacerbating factors. For example, as Sneddon argues, "There has been a tendency to direct attention to the lack of supply of water due to natural forces rather than look at human-induced land and water use practices and at socio-political implications. Real causes of scarcity can be obscured leading to inappropriate solutions" (Sneddon 2003: 2025). By placing politics at the forefront of considerations of water management, we can achieve a far more robust and realistic picture of the challenges that must be overcome in order to mitigate the social and environmental impacts of rising water stress in particular parts of the world.

Looking at water, moreover, provides a unique opportunity for examining the interplay between physical (i.e., natural) and social (including political) processes in resource management schemes, which are too often considered discretely instead of interlinked as part of the coupled human-natural system[14] in which we live. The course of a river, for example, both shapes and is shaped by the human communities with which it interacts. Unlike other natural resources such as land or mineral deposits, freshwater is absolutely critical to many key facets of human life and culture, as well as to plant, animal and ecosystem well-being. It is a non-substitutable resource at the center of everything. As Gandy argues, "Water forms part of the complex web of relations between society and nature […]. Yet water is a multiple entity: it possesses its own biophysical

[14] Coupled human-natural systems are "…integrated systems in which people interact with natural components" (Liu et al. 2007: 1513). For more on coupled human-natural systems, see the following: Berkes et al. 2003, Gunderson and Holling 2002, Liu et al. 2007.

laws and properties but is simultaneously the focus of political, cultural and scientific discourses surrounding its inter-action with human societies" (Gandy 1997: 339). In turn, these biophysical laws, properties, and ecological characteristics of water—its very materiality—play a role in shaping how humans perceive and respond to water (Bakker 2012: 617).

Furthermore, where water flows reveals not only a physical geography and a material reality, but also a geography of social power (Swyngedouw 2004b: 29). The modern geography of freshwater reflects not only the patterns and rhythms and spatial penchants of nature, but also the politics of the humans who have come to manage the resource for their own purposes. As Agnew reminds us, "Attention to politics provides a way of mediating between the arguments and the evidence about the physical geography of water, on the one hand, and the workings of socioeconomic and administrative institutions that manage and provide human access to that water, on the other" (Agnew 2011: 464-465). By looking at water management through a multi-prism lens, one that includes politics, we are able to capture a fuller picture of the challenges that must be overcome and the terrain that must be navigated in managing this increasingly stressed resource.

This chapter provides a critical overview of the contemporary water politics literature, which spans several fields and subfields including political geography, political science, political ecology, science and technology studies (STS), and resource management. Particular attention is paid to four subthemes, which both figure prominently in the water politics literature and guide the discussion of China's South-North Water Transfer Project that follows. These subthemes include: 1) the links among

legitimacy, water control, and political-economic power; 2) the politics of water management discourses; 3) the scalar politics of water governance, and; 4) the multiple uses of and values placed upon water. Each of these subthemes will be delved into here, together serving as a review of the relevant water politics literature and laying the groundwork for subsequent chapters.

Water Control, Legitimacy and Political-Economic Power

Engaging with politics not only gives us a more robust picture of the challenges of twenty-first century water management, but it lays bare the broader political economic power relations (Swyngedouw 2004b: 2) that are critical for understanding all of the complexities that help to shape how decisions about water management are made, how negotiations play out, and the broader context within which all of this actually happens. As Solomon suggests in his sweeping history of water and civilizational change, patterns of water distribution read like a map of the underlying power structure in any given society (Solomon 2010: 87). This power structure, which makes the flow of water possible, is an enmeshment of "…institutional, economic, and ideological conditions at national, state, and local levels" (Agnew 2011: 468). In other words, water and its control are wrapped up in questions related to the goals and interests of various social and political stakeholders, governance and topographies of power, and state policy at multiple scales.

Legitimacy is one area in which the links between water and power are particularly evident, with water control as a space in which legitimacy can be displayed

and garnered by states. Like most significant concepts, arriving at a definition of legitimacy is neither simple nor uncontroversial. Gilley defines legitimacy as "…the degree to which citizens treat the state as rightfully holding and exercising political power" (Gilley 2008: 261). Similarly, Lipset describes it as, "…the capacity of the system to engender and maintain the belief that the existing political institutions are the most appropriate ones for the society" (Lipset 1959:77, quoted in Dogan 1992: 116). In other words, some degree of legitimacy is conferred upon a government when a citizenry submits to its rule or accepts the goods and services the state provides.

As Mukerji argues, "… [S]ound resource management and infrastructural development remain backbones of political legitimacy" (Mukerji 2003: 675). Additionally, Vincent identifies resource control as one of a handful of key formal characteristics intrinsic to the state: "The state also embodies the maximal control of resources and force within a territory. Its monopoly is not simply premised on force: most states try to claim legitimacy for such a monopoly, namely, they seek some recognition and acceptance from the population" (Vincent 1992: 44). By delivering services and fulfilling needs that cannot easily be met beyond the state—such as laying the infrastructure for urban water provision, for example—the state garners legitimacy through "infrastructural power" (Mann 1996).[15]

[15] Mann defines infrastructural power as, "…the capacity of the state to actually penetrate civil society, and to implement logistically political decisions throughout the realm" (Mann 1996). This form of power is deployed in various ways, including through the standardization of money, weights and measures, through efficient systems of

In particular, large engineering projects—including water control schemes like interbasin transfers, dams, and other river control projects—often serve as physical displays of political legitimacy, establishing the power of one ruling group over another or fortifying an already powerful regime. Through the construction of the built environment, "The physical world has been politically more than a repository of resources with politico-economic value. It has been a place to demonstrate intelligence, a collective cognitive capacity to dominate that has been a foundational and legitimating principle of power" (Mukerji 2003: 656). Resource management— particularly water management, which is often infrastructure heavy (e.g., dams, reservoirs, pipelines, canal systems, etc.) and intrudes centrally and visibly into the daily life of citizens when it fails to deliver as expected[16]—is one key area in which the infrastructural power of the state can be particularly evident.

Solomon argues that, "…provision and control of sufficient water has conferred political legitimacy in all forms of human society" (Solomon 2010: 18). From

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communication, and through the transport of people and resources, which require roads, pipelines and other basic infrastructural groundwork.

[16] A failure would be, for example, if an urban resident turned on a faucet in their home and water failed to come out. The failure of such infrastructural systems is evident, but when such systems function correctly, they tend to be invisible. When one takes a shower in Los Angeles they are unlikely to think of the sophisticated and politically imbued water management system and physical infrastructure responsible for delivering Colorado River water to their home.

seventeenth century France, for example, we observe the case of the Canal du Midi (*Figure 2.1*), which runs from the Mediterranean along the northern edge of the Pyrenees Mountains to Toulouse, connecting the sea to the Garonne River, which terminates in the Atlantic Ocean. This massive project—seen as a wonder of the world at the time of its construction— served not only as a physical manifestation of the power of the French government, but also attested to the government's ability to "…claim its legitimacy through moral engineering of the natural world" (Mukerji 2003: 672). In the case of China's Three Gorges Dam, the world's largest dam project to date, it is not only the mass mobilization required by such a project that legitimates the state, but also the fact that a project of such massive proportions could only be possible through the actions of the state (Blaikie and Muldavin 2004: 540).

In addition to the links between water control and legitimacy, we find numerous examples from throughout history and across the world that demonstrate how intrinsically linked water control is to broader, underlying political-economic factors. "Just as those who have power control the water, those who have water manipulate those who have power, those who have no power have no water" (Swyngedouw 2004b: 61). For example, in North China during the late Imperial period, the authority of rich and powerful communities was often physically manifested in large temples for *Longwang*, the Dragon God of rivers and rain. In this key agricultural region where rainfall is highly variable both seasonally and from year to year, irrigation systems have long been critical to productivity. The hierarchy of irrigation communities in pre-modern China ran parallel to the ritual hierarchy of Longwang temples, linking water control and power very closely (Duara 1988: 32).

As Pritchard (2012) demonstrates in nineteenth and twentieth century North Africa, water management and hydrologic studies served as both manifestations and agents of French colonialism in the region. In what she dubs "hydroimperialism," the French colonial administration conducted hydrologic surveys of its newly acquired territory in order to establish a network of wells with which to supply its military with freshwater as it moved about the Maghreb (Pritchard 2012: 595). The French also established a series of reservoirs and dams that were to serve a significant function in realizing their vision for North Africa as an extension of European settlement and as an agricultural asset to the motherland (Pritchard 2012: 596, 605). In other words, establishing various technological systems of water control and management played a significant role in France's ability to exert control over North Africa and its people.

To draw on another European example, it is not coincidental that modern Spain experienced its most radical transformation of the hydraulic landscape under the dictatorial hand of General Francisco Franco. During his rule (1939-1975), all ten of Spain's mainland river basins were completely reorganized by means of hundreds of new dams and other "techno-natural" projects like irrigation infrastructure and interbasin water transfers (Swyngedouw 2007: 10). This case also demonstrates how water resources can be mobilized as a political force, with water resources being "socio-physically" constructed in the 1930s as the primary source of Spain's—then embroiled in the drama of the Spanish Civil War—situation. By presenting the country's problems as derivative of so-called "hydrological disequilibrium" and the uneven spatial distribution of water, Franco was able to position large techno-natural water management projects as the solution (Swyngedouw 2007: 12), thereby justifying the projects that ultimately

served to enroll new populations in centralized government rule and consolidate the power of his regime.

Figure 2.1 Canal du Midi, France

Source: Mukerji 2003: 672

These examples also speak to another important point on the links between water control and power: state resource management policies and large engineering projects (water specific and other) are frequently linked to government efforts to enroll particular landscapes—and the people who inhabit them—in state power. Whiteley et al. note, "Water policies are related to the larger repertoires and natural resources policies of the

state" (Whiteley et al. 2008: 17). Again, to cite the example of France's Canal du Midi, not only did the canal increase the value of land in the region by expanding the number of markets to which it was connected and making it more accessible from both the Atlantic and Mediterranean (Mukerji 2003: 670), but it also, in a sense, tamed the landscape itself, reflecting the civilizing powers of the government: "In this region of wild rivers and heavy winter flooding, this placid waterway also displayed the marks of good stewardship and embodied the orderliness of an Edenic nature" (Mukerji 2003: 671). This monumental project was also seen as a way for the French government to assert power in a region of dissidents following the Wars of Religion (1562-1598 CE) (Mukerji 2003: 667, 672). By "taming" the land and waters of this region, the project also served the political end of asserting the power of the French government in the country's southern fringe through the engineering of nature.

Jean-Baptiste Colbert, Minister of Finance to Louis XIV and the visionary behind the canal project, sought what Mukerji characterizes as an "increase in orderliness" in key arenas including canals like Canal du Midi, water supply, forests, roads, and other "engineered places" (Mukerji 2003: 673). Mukerji's notion of increasing orderliness is similar to James Scott's widely cited concept of "legibility" (Scott 1998). According to Scott, states work to make their territory and population legible through simplification, organization, and classification systems. The natural world, including rivers, lakes, forests and other entities that can be transformed into "natural resources," is ultimately understood through the lens of a selective reality, in which the state comes to see, for example, a river only as a source of hydropower or drinking water and not for any of its other many social or cultural values. The process of bureaucratically simplifying the

natural world ultimately makes it easier for the government to exert its power over resources and the people who rely on them. In the forthright words of Scott, "Legibility is a condition of manipulation" (Scott 1998: 183), just as increasing the "orderliness" of space and resources within that space is a means to exerting the authority of the state.

The Politics of Water Discourse

Discourse as a site of analysis offers a window into the broader political-economic interests behind resource management policies and projects and helps to illuminate how those interests are translated into material consequences. In their widely cited discourse analysis of environmental politics, Hajer and Versteeg (2005: 175) define discourse as "…an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices." The ideas, concepts and categories of a given discourse are assembled and woven together as pieces of a narrative that carries with it political-economic baggage.

For example, in their assessment of the politics underlying the management of Asia's transboundary Mekong River Basin, Lebel et al. demonstrate that in negotiating their positions vis-à-vis water control and access, stakeholders use "stories" (i.e., discourses) to assert claims that support their broader political, economic, or social agendas (Lebel et al. 2005: 10). Lipschutz elaborates on this, arguing that politics is primarily about "negotiating over the terms of the story that will prove most compelling" (cited in Conca 2006: 386). Similarly, Hajer purports that "…actors group around

specific story-lines that they employ whilst engaging in environmental politics" (Hajer 1995: 13).

As Bakker demonstrates in her work on water and the development of the Mekong River basin, "Discourse analysis of development […] requires an exploration of the social and cognitive bases of problem definition, and a genealogy of the institutions and practices through which actors are mobilised around specific storylines" (Bakker 1999: 211). Building on this, the way a story-line or discourse is constructed will, in turn, shape how the issue or problem around which it is built is framed, interpreted, discussed and analyzed and, ultimately, how that problem is addressed. As Dryzek describes it, discourse is "…a shared way of apprehending the world" and it "…rests on assumptions, judgments, and contentions that provide the basic terms for analysis, debates, agreements, and disagreements…" (Dryzek 1997: 8).

How a given resource management problem or project is being defined in the discourse(s) by those seeking its resolution can be revealed by looking at the language used by different groups to describe what the issue actually is.

As Agnew argues,

> …the entire discussion about water politics […] is pervaded by a language that frames issues in ways that are often not explicitly identified. Language is not a non neutral medium that reflects reality as a simple-minded empiricism might have it. It actively frames how we see and listen to the world (Agnew 2011: 473).

Importantly, however, Bakker points out that discourse is not only about what is written or said: it also has performative aspects, which, in turn, have material effects (Bakker

1999: 211). Thus, discourse is important not only in revealing how water management issues are being framed, but in helping to understand the concrete, material results of those framings.

French philosopher Henri Lefebvre wrote of space that, "Each new form of state, each new form of political power, introduces its own particular way of partitioning space, its own particular administrative classification of discourses about space, as it were, to serve its purposes" (Lefebvre 1991: 281, cited in Brenner 1997: 273). Just as states produce or embrace discourses about space to serve their own purposes, they also construct and embrace specific discourses on the use of water within that space in order to best serve their own purposes. For example, in the early twentieth century the construction of a "discourse of panic" over possible water shortages in Southern California was used strategically by William Mulholland and the other founders of the Los Angeles Owens Valley Aqueduct as a means toward ensuring that L.A. would embrace a water intensive plan for its future development (see Agnew 2011). Here we see a political debate repackaged in naturalized terms as part of an "environmental" discourse that serves particular interests. Similarly, Bakker shows how the discursive strategy of depicting the Mekong River as "under-utilized" and "undercontrolled" placed hydrodevelopment projects in the 1990s within a framework that allowed them to be seen as a solution to a water use problem, rather than as a means of reprioritizing and displacing competing uses for the river's flow (Bakker 1999: 220).

Scientific evidence and expert knowledge also frequently figure in discourses around water as a means of prioritizing particular water use values over others. Sarewitz warns, "... different stakeholders in environmental problems possess different bodies of

contextually validated knowledge" and the various discourses surrounding a particular environmental issue may each mobilize a specific scientific argument in support of these naturalized concerns (Sarewitz 2004: 386). These processes of "naturalization" and what Sarewitz calls "scientization" render opposing positions in environmental controversies apolitical, allowing them to appear value-free and factual rather than value-laden, politically motivated, and perspectival (Sarewitz 2004: 399).[17] So, as Mulholland demonstrated more than 100 years ago in constructing a science-based panic discourse on water scarcity, environmental debates are at their root often not environmental at all, but political, relating to broader political issues and sometimes validated or justified by means of or in the language of science.

This is not uncommon when it comes to framing the terms of the discussion on water management. Agnew notes the frequency with which terms like "profligacy" and "scarcity" are used to place water issues within physical rather than political frameworks (Agnew 2011: 473). The scarcity framework is particularly powerful and widespread. Scarcity may be understood as, "… the lack of access to adequate quantities of water for human and environmental uses" (White 2012: 1). In technical terms, water scarcity is characterized by an annual per capita water allotment of less than 1000 m^3 (Falkenmark et al. 1989, cited in White 2012; Pereira et al. 2002). Among the many criticisms of this

[17] This is especially problematic when it comes to environmental issues that are being dealt with through a technological approach because the technologies themselves are imbued with values and politics (Bijker 2007; Carse 2012; Winner 1980).

approach to defining water scarcity,[18] the term does not take into account the fact that water scarcity is relative to water demand and is not necessarily a natural state. The most lush and water-rich tropical rainforest on earth could be water scarce if demand was high enough. But the framework of "water scarcity"—rather than "water stress,"[19] the language of which implies that resources are put under pressure by external factors—allows water shortage to be presented as a natural phenomenon even in places where it is fundamentally driven by or greatly exacerbated by human behavior. However, as researchers at UNESCO's International Hydrological Programme point out,

> …it is important to recognise that water scarcity can result from human activity, either by over-use of the natural supply or by degradation of the water quality. This man-induced water scarcity is common in semi-arid and sub-humid regions where population and economic forces may make large demands on the local water resource, and where insufficient care is taken to protect the quality of the precious resource (Pereira et al. 2002: 7).

[18] For example, scarcity measurements often fail to take into account whether water resources are accessible or whether the quality of the water allows it to be used. Additionally, technologically produced sources of freshwater, like desalination, tend not to be included in these measurements. One alternative is to measure water scarcity using a criticality ratio, which compares water demand to available water supply and defines water scarcity as a state in which annual water withdraws are between 20-40 percent of annual supply (White 2012: 2).

[19] Water stress is defined as an annual per capita water supply of less than 1700 m^3 (White 2012). More generous characterizations place the cut off at 2000 m^3 (Pereira et al. 2002).

Moreover, the widespread adoption of the scarcity framework is also related to the fact that scarcity is both a naturalizing and scientifically credible concept that can be quantified, modeled and thus packaged as a legitimate concern (Zimmerer 2011: 184). Swyngedouw highlights the underlying political dynamic this framework so often serves in the context of urban and regional water supply:

> …[T]he discursive representation of water as being an integral part of nature permits casting 'nature' into pole position to explain scarcity. …[N]ature is the principal 'cause' of water scarcity rather than the particular political economic configurations through which water becomes urbanized in highly selective and socially uneven ways, resulting in a serious 'scarcity' for the poor and powerless and abundant water for the socio-economic and political elites (Swyngedouw 2004b: 47).

In other words, the scarcity framework can be utilized as a seemingly apolitical implicit justification for water management projects that serve the interests of those already in positions of power. This is evident in the case of Israel, where Harris and Alatout note that assumptions about water scarcity and abundance not only speak to the physical conditions of the environment. Rather, "Their significance lies in the role they played in underwriting a host of political and technical apparatuses that led to the centralization of water policymaking and consolidation of centralized Israeli state apparatuses" (Harris and Alatout 2010: 153).

The concept of scarcity has also proven to be a powerful framing tool in debates around supply-side water management schemes such as large inter-basin water transfer

projects. Sneddon alerts us to the fact that, "…[W]hile water scarcity is a 'real' enough problem with biophysical manifestations, it can also be 'manufactured' in such a way to serve the interests of powerful actors such as politicians, bureaucrats and irrigation farmers" (Sneddon 2003: 2025). The initial watering of Los Angeles in the twentieth-century again serves as an example. "The rhetoric of disaster, risk, and scarcity often provided the discursive vehicles through which power-brokers could continuously reinvent their boosterist dream" (Swyngedouw 2004b: 25). Inherited from William Mulholland and the other founders of the L.A. Owens Valley Aqueduct, the sense of panic experienced in the face of potential water shortage has proved to be an enduring discursive strategy, one that serves to, "…mobiliz[e] 'water' as the Achilles heel of proposals to move Los Angeles politics into non-water-intensive conceptions of its future" (Agnew 2011: 468).

The Sardar Sarovar Dam Project (SSP) in Kutch, India is another example of a naturalized discourse of water scarcity used to justify a large technical water project and promote the interests of powerful elites (Metha 2001; Sneddon 2003: 2026; Zimmerer 2011: 173). As controversy over the project grew in the 1980s and 1990s, climate change (as the source of increasingly lengthy and frequent droughts) became a scapegoat for the region's water woes, which included rising soil salinity, seawater intrusion, and groundwater extraction rate in excess of recharge (Metha 2001: 2029; 2033). But as Metha's research confirms, Kutch's water crisis is driven largely by anthropogenic factors.

> The story of 'dwindling rainfall' obscures the fact that water has been misused and legislation in constantly circumvented. […] The water problem is seen as 'natural,' something beyond human agency, even though rainfall and drought

> patterns are characterized by high uncertainty and variability. Projects such as the SSP are evoked as the only solution to set right what nature ostensibly disturbed (Metha 2001: 2033-2034).

Swyngeouw suggests that such a "discursive buildup of a particular water narrative […] serves specific political and economic objectives…" and the creation of a climate of water crisis (whether actual or manufactured) helps to support investment in supply-side water management schemes (Swyngedouw 2004b: 47). This is true in the case of the SSP and it is precisely what we are seeing with the "discourses of distraction" being put forth around China's South-North Water Transfer Project, to be discussed in subsequent chapters.

Water Governance and Scale

While scale is an important concept when considering water politics and governance, its meaning is often the subject of contention among scholars and a brief review of its treatment is necessary before delving deeper. Most agree that scales are socially and politically constructed, meaning they are dynamic and endowed with meaning that can evolve and be contested, rather than being ontological units with absolute meaning (Brenner 1997: 298; Brenner 2001: 592; Howitt 2007). Scales are constructed "…through political movements, institutions and networks whose activities are not reducible to political-economic processes" (Sheppard and McMaster 2004: 17). Instead, they are the outcome of sociospatial processes that regulate and organize power

relations and they become areas around which sociospatial power is enacted (Swyngedouw 2004a: 132). The social construction of scale is related to the so-called "paradox of scale," which is that while scales are often crucial to understanding and thinking about issues related to governance and politics, they are meaningless on their own; a scale only has meaning relative to another scale (Howitt 2007: 142).

Just as scale is socially produced, it is also socially generative, meaning that it produces social outcomes (Howitt 2007: 147). Additionally, because scales are socially constructed, they are spatially and temporally fluid, constantly made and remade as power shifts (Bulkeley 2005; Sheppard and McMaster 2004: 2; Swyngedouw 2004a: 132). When processes are fixed at one scale, they are unfixed at other scales (Harrison 2008). This means that scalar restructuring can be used as a strategic tool to enable a shift in power (Brenner 1997, 2001). In other words, state rescaling or scalar constructions can empower or disempower social and political actors at different scales, thereby shaping the social and political (and in some cases, ecological and environmental) impacts we see on the ground. Moreover, as Moore points out:

> Treating scales as variably powerful and institutionalized sets of practices and discourses rather than concrete things (Paasi, 2004: 537) impels us to account for the processes through which specific scalar configurations solidify in consciousness and practice, and the effects these developments have upon social, political and cultural relations (Moore 2008: 213-214).

Scalar shifts are a particularly important dimension to consider when looking at the links between water and political power, as they can offer a view of the broader political-economic landscape and shed light on whose interests are being served.

Swyngedouw (1999) offers a compelling example of scale contestation as a key facet of water politics in his work on twentieth century Spain. He argues that Spanish modernizers tried to erode the power of the provincial and state governments by relocating water management at the level of the river basin (a hydrological unit, rather than a political unit endowed with power). By shifting power away from provincial governments, the Spanish government was able to bring water under centralized control.

The enlargement of water systems or the scalar expansion of water resource governance are often driven by groups at the national level, with a specific set of interests and goals in mind. This kind of power shift in which local or regional authority is subsumed by the power of the central state through a scalar shift is often part of a larger state- or nation-building strategy. "To date, many investigations of water politics or state building in the Middle East have largely ignored the tight link […] between hydro-politics, technical and political constructions of scale, and state and nation building" (Harris and Alatout 2010: 148). Feitelson and Fischhendler prove an exception, emphasizing this link in Israel where, in order to consolidate the power of the new national government in the 1950s and early 1960s, water in certain peripheral areas was subsidized. This had the effect of erasing local and regional differences, which served to undermine the necessity of preexisting water management practices at those scales and consolidate authority at the national scale (Feitelson and Fischhendler 2009: 733). To draw again on the Spanish example, it also offers a clear demonstration of how scale-making and scale-breaking are fundamentally linked to broader power relations. In each of these cases the central state is able to use the creation of a new scale or a scalar relocation of water governance to bring resources under its direct control, thereby

devolving power away from sub-national power groups and enrolling people in its now more centralized power.

We have also seen the story of a hydrological imperative necessary for national success (through economic growth) used to facilitate a scalar shift upward to the national level. This also tends to be part of a broader project of state building and the large-scale water projects that come along with these narratives are usually built by national institutions, thus serving as symbols of national identity and helping to territorialize the state (Feitelson and Fischhendler 2010: 730). Heggelund supports this:

> A common feature among the countries in Southeast Asia and China with regard to dam building is that dam projects are perceived as giving potential for modernization and national development. It takes place in a country's modernization process, where the main rationale of building a dam is to contribute to economic growth and to satisfy the rapidly growing demand for electricity. In many countries dam building has come to be seen as a symbol of national development, as well as a barometer of development progress (Heggelund 2004: 60).

Such nationally spearheaded technological projects can also reinforce a sense of national identity. For example, in her discussion of the cultural politics of nature and nation in France, Pritchard links the Compagnie Nationale du Rhône's project of "reconstructing the Rhône" to the issue of national identity (Pritchard 2004: 767). The history of the Rhône River and its environmental and technological transformation since WWII "…demonstrates how representations of nature and technology became intertwined with debates about national identity and the process of state building in modern France" (Pritchard 2004: 767).

Not all rescaling efforts related to water support the consolidation of power at the national level. The Khong-Chi-Mun interbasin water transfer project in Southeast Asia offers an example of a scalar shift from national to transnational: "Despite this nationalist orientation, as revealed in the feasibility studies and planning documents of the 1960s and 1970s, the Thai state has consistently used a scalar narrative emphasizing the KCM as a transnational effort part of the broader plans to transform the Lower Mekong Basin" (Sneddon 2003: 2244). There have also been efforts to rescale the management of the Euphrates and Tigris from two discrete river systems into a single transboundary basin. This effort pushed for the reconstitution of these "twin rivers" as a conjoint system, which would serve, in particular, the political and economic interests of Turkey. One of several benefits to Turkey of managing the Euphrates and Tigris as a single system is that the country is cast as contributing 52.9 percent of the water of both rivers, rather than 90 percent of the Euphrates, but just 40 percent of the Tigris (Harris and Alatout 2010: 151). This is significant because the legal basis for laying claim to transboundary waters has to do with how much water volume a territory contributes. Given that Iraq contributes 60 percent of the waters to the Tigris, it would have legal claim to that river if it was considered as a discrete entity. Under this rescaling of the two basins as one, "…Turkey is able to 'offer' excess waters from the Tigris to compensate for scarcity (even as Iraq provides the majority contributions to that river)" (Harris and Alatout 2010: 151). Additionally, this case offers yet another example of a powerful naturalizing discourse, with stakeholders attempting to back their claims for joint management with hydrologic data and scientific evidence (Harris and Alatout 2010).

Competing Places and Values

In addition to the broader links between water control and power discussed above, there are also important links between concentrations of power in particular places and the kinds of water management approaches employed. In order to serve places with a high concentration of political or economic power such as a capital city or major economic region, we tend to see more physically dramatic, expensive and interventionist approaches to water management that are focused on sustaining the political-economic power of that area, even at great financial costs or social and environmental costs in other places (i.e., spatial trade-offs). These kinds of projects tend to tap into the resource bases of less powerful places, not only extending the power of the state into the periphery, but reinforcing the marginal status of such places by either depriving them of resources or impacting them negatively in other ways, such as social or cultural disruption.

Gupta and van der Zaag's insight on the link between economic heartlands and supply-side approaches to dealing with water stress is worth quoting at length:

> …[E]conomic heartlands tend to secure the continued supply of the essential resources that keep them ticking, including such a vital resource as water. Given the magnitude of the economic and political interests involved, such heartlands can afford to invest large amounts of money to ensure that the required supplies continue to flow. If the demand for water outstrips the amounts that are generated with the river basin, supply-oriented approaches will remain important and new water sources will have to be found either by desalinising sea water in coastal regions or by taking water from neighbouring river basins, i.e., through interbasin water transfers (IBT) (Gupta and van der Zaag 2008: 29).

Put differently, the water demand, uses, and values of places with large amounts of economic and political capital behind them—such as heartlands— are often given priority over less powerful places. These heartlands tend to require water for high-value uses, such as industry and urban development, rather than agriculture. In the contemporary Chinese case, the difference is clear: 1,000 tons of water used in industry has an economic yield roughly 70 times greater than the same amount of water would have in the agricultural sector. "…[T]hat economic advantage is reinforced by a political one: the need to provide jobs for some 14 million new entrants into the labor force each year. …[W]ater used in industry can also create a disproportionately large number of jobs," which also tend to have higher incomes than in the agricultural sector (Brown and Halweil 1998: 14).

The other side of this coin is that politically and economically marginalized places—a remote farming community with an uneducated and disenfranchised population, for example—often lack what Wilder refers to as "political and economic equity" when it comes to water resources. That is to say, these places do not enjoy institutionalized participation in water policy-making, that their voices have relatively less influence than that of more powerful stakeholders, and that water accessibility, productivity and affordability may present serious obstacles to a decent standard of living (Wilder 2008: 96). Thus we see that the way water is managed, where it ends up and for what purpose both reflects and solidifies broader spatially articulated power discrepancies.

We have already acknowledged that regardless of whether a given water management scheme is directly tied to broader projects of legitimacy or power in a

particular place, politics is always a fundamental part of water management. A major part of the reason why establishing water management norms is so often intensely political (Conca 2006: 162) is because water as a resource has many claims placed on it by a variety of users, each of whom may value that resource in a different way or for a different purpose. As both a social and economic good (Yang et al. 2003: 158), the same flow of water may be simultaneously important as a foundation of critical ecosystems, a source of community, livelihood and cultural meaning, and a marketable commodity (Conca 2006: 6).

In the face of these numerous potential uses and multiple values, the question of cooperation among stakeholders becomes important. Ostrom draws our attention to the collective action problem frequently encountered when dealing with common pool resources (CPRs). Some individuals are "…more willing than others to initiate reciprocity to achieve the benefits of collective action" (Ostrom 2000: 138). Panning out from the level of community resource management dealt with by Ostrom, there is also the challenge of managing water across international borders. Popular discourse, warning of impending "water wars" (Judge 2013; Shiva 2002; Ward 2003) and widespread conflict over the stressed resource, would have us believe that cooperation on the management of transboundary and global water resources is an uncommon occurrence. But, on the contrary, Wolf's research demonstrates "…the more valuable lesson of international water is as a resource whose characteristics tend to induce cooperation and incite violence only in the exception" (Wolf 1998: 251). The presence of a governance

framework—whether formal or informal— that fosters procedural equity[20] (Haughton 1999), must be in place to ensure the institutionalization of participatory mechanisms for all stakeholders, not just those with relative power and influence (Wilder 2008: 96). This holds true not only for international water resources, but for all water resources with multiple value claims placed upon them.

Another important consideration when navigating the multiple possible uses for freshwater resources and balancing competing values is whose positions are seen as legitimate in informing management outcomes. As discussed above, certain management schemes are legitimated by economic and political backing, such as an expensive, supply-side approach to a water shortage in a heartland region. Scientific evidence and expert knowledge are also frequently used to legitimate particular use values over others. "Scientific advice is [sometimes] reduced to an instrument for legitimating political demands. Scientific analysis, in turn, can distort policy disputes by masking, beneath a veneer of technical rationality, underlying concerns over the distribution of costs and benefits" (Ozawa and Susskind 1985 in Wolf 2010: 335). Agnew echoes this, arguing

> Although 'science' rarely seems to resolve policy debate, claims to expert knowledge permeate disputes over many environmental issues such as […] water provision. […]But the belief in the 'objective' and determinant character of scientific knowledge (particularly consensus views) is frequently used as a rhetorical resource to justify this or that position (Agnew 2011: 473).

[20] Others refer to this as political equity (Wilder 2008).

Sifting through the politics of managing such a multi-valued resource and successfully designing and implementing a management scheme that takes the needs and preferences of multiple stakeholders into account is no easy feat. More frequently we see water resources managed for either a single use or a narrow set of uses. Scott cautions us to beware of "…the dangers of dismembering an exceptionally complex and poorly understood set of relations and processes in order to isolate a single element of instrumental value" (Scott 1998: 21). To illustrate why his caution is so important he uses the example of "fiscal forestry" in eighteenth century Prussia and Saxony in which "the actual tree with its vast number of possible uses was replaced by an abstract tree representing a volume of lumber or firewood" (Scott 1998: 12). In resource management, this kind of simplification results in an aggregate, synoptic view of a selective reality, which enables a high degree of schematic knowledge, manipulation, and control (Scott 1998: 11). By taking such a narrow frame of reference, the state ignored "the vast, complex, and negotiated social uses of the forest for hunting and gathering, pasturage, fishing, charcoal making, trapping, and collecting food…" (Scott 1998: 13). The result was a new kind of forest, devoid of the biological diversity of grasses, trees, flowers, insects, reptiles and birds that had once characterized it and made it such a cultural and economic asset to local stakeholders, not to mention any shifts in the various ecosystems to which it was linked.

This same caution against narrow management applies to water resources, which are especially vulnerable given the unique properties of water, its simultaneous centrality to the health of ecosystems, humans, and economies, and the fact that it cannot be substituted for with other resources. "The experience of the twentieth century

demonstrates unequivocally that water management based on only one or a narrow range of principles leads to a kind of 'tyranny of the water commons,' and its governance…" (Whiteley et al. 2008: 3). We see a prime example of this kind of simplification and its disastrous results in the case of North America's Colorado River. A series of management decisions beginning with the signing of the Colorado River Compact in 1922 and based on problematic water gauge records[21] resulted in the awarding of vast volumes of the Colorado's waters to support development in the lower Colorado River Basin, particularly in Arizona, Nevada and California (Hundley 2009). This narrow management regime, in which the Colorado River has been valued primarily for its ability to support economic and population growth in the American Southwest, has not only resulted in supply issues for upstream users and rights disputes for Native American minority groups (Hundley 2009: 333-342), but the ecology of the basin has suffered tremendously (Carriquiry and Sanchez 1999; Glenn et al. 1996; Hundley 2009: 347; Tyus and Saunders 2011). Additionally, the river no longer flows to its terminal delta in the Sea of Cortez, which illuminates very serious social equity and environmental justice issues for water users south of the U.S.-Mexico border (Glenn et al. 1996).

The example of Colorado River management illustrates not only the dangers of simplifying complex resource valuation in management schemes, but it demonstrates that

[21] The water gauge data used to inform the initial allocation of water resources to users in the Colorado River Compact were collected during a period of unusually high sustained water flows and failed to take into account the severe and enduring droughts that have historically been much more typical of the basin (Hundley 2009: 308-309).

the politics of water is bound up with broad geopolitical questions as well as social divisions on the ground. This includes those based on class, ethnicity, gender, and access to political power (Conca 2006: 170). The political navigation of the multiple positions underpinned by such divisions becomes proportionally more difficult as the number of stakeholders involved in the resource management issue or project at hand increases. "As the diversity of definitions, needs, and stakeholders involved in the issue increases, the nature of the problem is likely to shift [from tame] to 'wicked', creating problems that are difficult to solve with technological approaches" (Lach et al. 2005: 4). Pacanowsky (1995, quoted in Lach et al. 2005: 7) notes that many management problems related to water are "wicked," and that these kinds of problems are not really solved, per se: "…rather we 'design' more or less effective solutions based on how we define the problem."

Therefore, looking at problem definitions, or how key stakeholders frame the terms of the debate and engage in politics around it, can be instructive for understanding why particular courses of action—such as the implementation of a certain policy or techno-natural project, or the interactions and negotiations and struggles that occur between stakeholders—are being pursued. For example, as Young and Martin point out in their study of the Central Arizona Project, a large diversion canal delivering Colorado River water to the Phoenix metro area, "…if the water problem is viewed simply in terms of groundwater overdraft, the obvious solution is to import surface water…However, if the problem is to obtain maximum economic growth for the state, this water must generate benefits in excess of costs of transporting and distributing it" (Young and Martin 1967: 18, quoted in Cummings 1974: 5).

Chapter Summary

Drawing from political geography, political science, political ecology, STS, and resource management, this chapter has offered a critical review of four main sub-strands of the contemporary water politics literature. The first of these sub-strands relates to the links among legitimacy, water control, and political-economic power. "As a result of the assemblages in which it finds itself, water can be and become a border, a resource for regeneration, a foundation for empire, a means of nation building, and a material linkage between past and present" (Barnes and Alatout 2012: 485). In other words, this sub-literature focuses on how the control of water as a material resource is linked to the agendas and interests of various stakeholders, as well as to governance and topographies of power, and state policy at multiple scales. It shows how water control can serve as a space in which legitimacy can be displayed and garnered by states and demonstrates the role of water in broader political-economic projects like nation building, colonial expansion, and power consolidation.

The second stream of the water politics literature delved into here relates to the politics of water management discourses. Problem framings are addressed, as are the ways in which discourse construction influences the framing, interpretation, discussion, analysis and, ultimately, the resolution of the issue. Particular discursive strategies, including naturalization are also discussed at length. Additionally, we see how the framework of water scarcity can be utilized as a seemingly apolitical implicit justification for water management projects that serve the interests of those already in positions of

power. The third subtheme, the scalar politics of water governance, illustrates the critical links between scale, water, and politics. It demonstrates how power can be fixed to scale and how scalar shifts can be used as a tool for refocusing power when it comes to the management of water resources and linkages to the broader political-economic landscape.

The final theme addressed, focusing on the multiple uses of and values placed upon water, illuminates tensions that derive from water's importance as both a social and economic good, as well as a critical component of ecosystem health and natural vitality. This section explores water cooperation and conflict and science as a legitimizing force behind certain stakeholders and use preferences. Additionally, we see that certain kinds of water projects—inter-basin water transfers, for example—are linked to particular kinds of places. That is to say, where water resources end up and for what purpose both reflects and solidifies broader spatially articulated power discrepancies. Each of these four subthemes not only figures centrally in the broader literature on water politics, but also plays an important role in the discussion of China's South-North Water Transfer Project that will follow in chapters three, four, and five.

CHAPTER THREE:

Linking Water Stress, Power, and Legitimacy on the North China Plain

Introduction

Developing the first half of the previous chapter within the Chinese context, this chapter focuses on the links among water, legitimacy and political-economic power in the case of the South-North Water Transfer Project. The historical background of the water crisis driving the development of the South-North Water Transfer Project is established, beginning at the onset of China's transformative economic reforms in the late 1970s. This sets the stage for what I have identified as the three primary anthropogenic sources of water stress on the North China Plain—population, production, and pollution. An in-depth analysis of the origins of each stressor and the institutional factors that have helped to shape them demonstrates the underlying political-economic motivations of the Chinese Communist Party to launch a supply-side water management scheme like the South-North Water Transfer Project, despite its many downsides. In fleshing out the institutions, policies, and practices that are implicated in the CCP's choice to address water stress in North China through a costly and controversial supply-side water management project,

this chapter demonstrates the link between the SNWTP and the CCP's larger political aim of maintaining legitimacy.

Post-Reform Urban Growth and Water Demand

In 1978, following the recent end of Mao Zedong's last great political campaign—the Cultural Revolution, which threw the country into turmoil and halted growth prospects for nearly a decade—Deng Xiaoping launched the country on a new path, one of "reform and opening up" (改革开放). The reforms began with the spontaneous decollectivization of agriculture, followed by the introduction of the "household responsibility system" (家庭联产承包责任制), allowing people to sell surplus crops and other goods for personal profit for the first time since 1949. Township-Village Enterprises (TVEs or 乡镇企业) sprung up across the countryside, allowing rural populations to invest their newfound profits in small enterprises. Along the coast, Special Economic Zones (SEZs) were established to attract foreign direct investment (FDI), launching much of China's eastern seaboard into a frenzy of export-oriented growth. The days when "capitalist roaders" were ostracized and even violently persecuted for being profit-motivated had given way to a new age thriving on the mantra of "to get rich is glorious" (致富光荣).

Since the transition from a command economy to China's own brand of capitalism –euphemistically referred to as "socialism with Chinese characteristics" (有中国特色的社会主义)—began more than three decades ago, gross domestic product (GDP)

has increased at an average of at least eight percent per year (World Bank 2007: 14). Adult literacy, child education levels, and life expectancy have reached new peaks, while infant mortality rates and economic poverty have declined dramatically (World Bank, World Development Indicators 2012).

The expansion and proliferation of cities has been at the heart of much of this growth, with cities serving as an engine for economic growth. When reforms began in 1978, only about 18 percent of China's 960-million person population lived in cities (2003 China Population Statistical Yearbook). Today, after more than three decades of rapid urban growth and land use change, China has reached an urban majority for the first time in history (Berg 2011), with nearly 700 million urbanites.[22] [23] Not only have urban populations grown significantly in both absolute terms and as a percentage of the total

[22] The urban population officially passed 50 percent in January 2012. In reality, the 50 percent mark was likely passed earlier and the present figure is probably a few points higher. This has to do with significant discrepancies between *de jure* and *de facto* population in many of China's large Eastern cities, which have been magnets for migrants. Because a vast majority of these migrants hold *hukou* in their hometown (i.e., they are registered in non-urban areas through China's household registration system), they are not counted as part of the official population in the cities where they actually live for all but a few weeks out of the year.

[23] Pannell (2002) notes that the absolute increase in China's post-reform urban population has been due in part to the natural increase in the country's total population, owing to the fact that China's high birth rates were, until quite recently, well in excess of death rates.

national population, but their physical expansion has also been dramatic. China's urban areas have been at the center of the widespread and enormously profitable conversion of agricultural land, the propagation of commercial and residential development projects, infrastructure development, and increased consumption rates, all of which have infused the Chinese economy with huge amounts of capital.

As Woetzel et al. note, much of China's impressive GDP growth over the last 20 years has been driven by urban growth, (Woetzel et al. 2009: 15). At present, cities constitute the heart of the Chinese economy, generating roughly 75 percent of the country's GDP (Woetzel et al. 2009: 15). A May 2013 economic report from Goldman Sachs expects that cities will remain the country's key engine of economic growth, continuing to serve as a major pillar of the country's economic mandate for at least the next ten years (Li 2013: 3). By 2025, the share of GDP generated in cities is expected to climb to 95 percent (Woetzel et al. 2009: 15).

Just as it was during the birth of humankind's first civilizations—with cities as the centers of those civilizations—water control, power and urban development in the twenty-first century are fundamentally linked. "Water forms part of the complex web of relations between society and nature which has enabled the emergence of great cities and sweeping transformations in human history" (Gandy 1997: 339). As Swyngedouw notes "[…] the urbanization processes itself is predicated upon the mastering and engineering of nature's water. The ecological conquest of water is, therefore, an integral part of the expansion and growth of the city" (Swyngedouw 2004a: 136). That is to say, one of the primary functions of the city is to concentrate population and resources (material, natural, intellectual, cultural, etc.) in one place. Unlike in rural settings, urban individuals or

households cannot simply access water in volumes sufficient to support daily life from its natural source. Instead, "… urban water supply and access relies on the perpetual transformation, mastering, and harnessing of 'natural water" (Swyngedouw 2004b: 1). This requires managerially and technologically sophisticated systems to bring the water in from other places and, as the footprint of the city expands so too does its resource frontier (Swyngedouw 2004b: 37).

The fact that urban areas have been the site of China's most dramatic increase in water demand is partially reflective of the frenzy of urban industrialization that has characterized the country's cities since at least the late 1980s. Most Chinese cities are centers of industry, pumping out impressive amounts of steel, cement, textiles, electronics, and other consumer goods, all of which require huge amounts of water either as a direct input or as a key input for their energy source—usually coal. That China's industrial water use intensity, or the amount of water consumed per 10,000 USD of industrial output generated, is 2.6 times that of the United States and 23 times that of Japan does not help the matter (Chen 2011: 89).

Importantly, as Shalizi notes, China's dramatic post-reform growth in urban water demand is also partially attributable to changes in the urban residential sector. "…[T]he rising standard of living in urban areas, which allowed urban residents to purchase washing machines and move into apartments with flush toilets and individual showers" has played a significant role in increasing the thirst of China's cities (Shalizi 2008: 166). While the pervasiveness of these amenities signals the rise of China's middle class and a

rising standard of living for much of the country, it also contributes to a more American style thirst for water[24] and places more stress on already limited resources.

Water on the NCP

As the country thrusts itself deeper into the throes of development and water stress increases alongside the growth of its cities, there is one region in particular that warrants concern: the North China Plain (NCP). The North China Plain is a semi-arid region within the 3-H Plain, comprised of the Huang (Yellow), Huai and Hai River basins (see *Figure 3.1)*. The geographic distribution of China's water resources is highly uneven, with a majority of rainwater concentrated south of the Yangtze River, often referred to as the country's "hydraulic fault line" (Solomon 2010: 97). Along with the majority of the country's rainfall, groundwater resources are also overwhelming concentrated in the south (Wei et al. 2010). This means that the NCP is left with just eight percent of the nation's total water to support roughly 400 million people and generate more than a quarter of the country's total GDP resources (Berkoff 2003: 1).

Additionally, the region is considered the breadbasket of China, producing more than 60 percent of the country's wheat and 40 percent of its corn, as well as significant

[24] The United States ranks third in the world for national per capita water consumption among countries with populations greater than five million. Only Bolivia and Niger exceed the U.S. (Mekonnen and Hoekstra 2011: 32).

amounts of millet, sorghum, and cotton (Yang et al. 2003: 144).[25] Because of its climate— characterized by very high summer temperatures, chilly winters, and highly variable annual rainfall averages, making it prone to severe droughts and flooding—more than 75 percent of the region's agriculture relies on irrigation (Yang et al. 2003: 144).[26] In the early days of the PRC, groundwater irrigation on the NCP was exceedingly rare, but by the onset of reforms it had come to account for 10-15 percent of total irrigation supply. By the 1990s the share had risen to roughly 40 percent and recent estimates put the figure at around 70 percent in some parts of the region (Calow et al. 2009: 229). More groundwater wells have been sunk on the NCP over the last quarter century than anywhere else on earth (Calow et al. 2009: 229).

Between high agricultural demand for groundwater and rising industrial and urban use rates that cannot be met with surface water alone, the NCP's groundwater resources are experiencing major stress. "Groundwater is being depleted at a faster rate than it is being replenished, leading to 'mining' of aquifers. When aquifers are mined, they are not

[25] The urbanization and growing affluence that have accompanied China's impressive economic growth have also placed significant pressure on water resources via shifting patterns of food production. For example, as the Chinese population has become wealthier, the national diet has shifted toward higher rates of meat consumption, which requires far more water than grains (Brown and Halweil 1998: 351-353).

[26] Indeed, irrigation technologies were central to the development of the region in the first place. See Calow et al. 2009 and Duara 1988).

available as insurance in drought periods, compromising sustainable use of the resource for current as well as future generations" (Shalizi 2008: 161). Aquifer depletion also contributes to saltwater intrusion along coastal areas, the drying up of lakes and wetlands. For example, as of 2006 969 out of a total 1,052 lakes in Hebei Province, which surrounds Beijing, had been lost to falling water tables (Brown 2006: 52) and an estimated 80 percent of the NCP's wetlands have been destroyed (Gleick 2009: 86). Subsidence[27] is also an issue, resulting in higher flood risk and poor drainage in urban areas and cities like Beijing, Tianjin and Cangzhou, which have been documented to be sinking by inches and sometimes feet as the groundwater beneath them continues to be tapped at unsustainable rates (Shalizi 2008: 162; Springer 2011).

In addition to a dramatic increase in groundwater pumping in recent decades, large cities on the NCP have also taken control of many of the region's rivers, damming or diverting their flows not only at the expense of ecosystem function, but also of rural communities and smaller regional and county level cities. For example, in the early 2000s the flow of the Juma River—a tributary of the Hai—was so extensively dammed and diverted by government officials in Beijing in order to serve the city's largest industrial water consumer, the Yanshan Petrochemical Plant, that downstream users in Hebei have since been forced to turn to groundwater resources (Gleick 2009: 90), exacerbating the region's unsustainable addiction to pumping. The tale of the Juma and the kinds of

[27] Subsidence is "the loss of surface elevation due to the removal of subsurface support," such as groundwater (Probe 2010: 7). In other words, the ground surface can sink or collapse as a result of groundwater over-extraction and aquifer depletion.

tensions its management has created between different governments and user groups in the region has become typical for most rivers on the NCP.

Figure 3.1 - The 3-H (Huang, Hai, and Huai) Plain

Source: Cai 2008: 15.

In considering the dismal water situation on the North China Plain outlined above, it is important to remember that water stress is a product not only of natural supply, but also the quality and accessibility of supply, as well as demand-side factors. While some of North China's water stress is certainly related to its naturally unimpressive water endowment, it is clear that the intensification of anthropogenic sources of stress over the

last several decades of reform has seriously exacerbated the situation. Rather than aiming policy solutions at these major anthropogenic contributors—which include urban population growth, industrial production and the material inputs necessary for the rapid physical expansion of cities, and severe water pollution— in order to mitigate and minimize the region's water stress, the Chinese government is pushing these stresses to the sideline in favor of a supply-focused interbasin transfer approach.

Inter-basin water transfers physically divert the flow of water from one river basin (the "donor" basin) to another river basin (the "recipient" basin) through the use of canals, tunnels, and sometimes pumps. There is a long history of inter-basin water transfer in China, beginning with the construction of the Cheng-Kuo Canal in 246 BC, which diverted water from various tributaries of the Yellow River to irrigate the Wei Valley in present-day Gansu and Shaanxi provinces (Solomon 2010:103). In the twentieth century, the Baojixia Diversion Project, launched in 1972, began diverting about half a billion cubic meters of water per year, also in the Wei River Basin (Wu et al. 2012). Recent years have also seen the construction of several smaller water transfer schemes in Hubei Province and the area immediately surrounding Beijing, which transfer water from local rivers like the Juma into the capital (Gleick 2009: 90).

But as experience from these past projects has demonstrated, this kind of approach has its downsides. Even in China, where interbasin transfers have been used as a tool of water management for centuries, water transfer projects have not been particularly successful over the long term.

The long series of large-scale diversion and storage engineering projects in the

> nation's history to date have yielded limited benefits. They have not addressed the root cause of the problem to which they have been the intended solution. Worse still, they have brought with them a host of serious social and ecological problems (Chen 2011: 93).

While most of the world has learned its lesson after encountering these kinds of issues and has moved on from building new water transfer projects and other massive hydroengineering projects, China is moving full speed ahead with this outmoded, high-modernist era approach, as evidenced by the SNWTP. In fact, the South-North Water Transfer Project is the world's largest IBT project in terms of both the total distance and volume of the transferred water (Liu and Wang 2012: 649). So why has the Chinese government favored such a radical and costly supply-side approach, rather than focusing on addressing the root anthropogenic causes of water stress? Why have they chosen to employ what is arguably a twentieth-century approach to water management in the twenty-first century? Herein lie the political-economic motivations for the South-North Water Transfer Project and the interesting assortment of ways in which the government tries—whether consciously or otherwise— to mask them and justify the project in other terms.

Legitimize the Project, Legitimize the Party

As discussed at length in the previous chapter, water control, political power, and legitimacy are closely linked across the world. In the Chinese context, the Communist Party's ability to provide adequate water resources to the North China Plain is linked via

economic growth to its prospects for continued legitimacy. The Chinese government is comprised of several different bodies, including the State Council and the National People's Congress (NPC), the highest organ of state power. But it is the Chinese Communist Party (CCP) that ultimately controls the elite Standing Committee of the NPC, making it the true locus of Chinese authority. The Chinese government is often characterized as an authoritarian regime (Gat 2007; Harvey 2006; Nathan 2003), which raises some important questions regarding legitimacy. Here it is worth quoting Malloy at length:

> …contemporary authoritarian regimes have found it particularly difficult to legitimate themselves because the concept of democracy (however disputed) has today become so pervasive that it has all but monopolized legitimacy throughout the world. Thus authoritarian regimes are immediately perceived as illegitimate, especially in the long term. By this argument contemporary authoritarian regimes are only able to create a transitory sense of legitimacy linked to an immediate crisis at hand; a legitimacy rooted in exceptional circumstances and destined to fade as the crisis either fades or else proves intractable to authoritarian measures as well (Malloy 1992: 230).

From the founding of the People's Republic in 1949 until the death of Mao Zedong in 1976, the memory of the Communist Revolution served as the basis of the CCP's legitimacy (Gilley 2008: 270). Under the new leadership of the post-Mao era the political-economic landscape began to shift away from an embrace of the traditional ideals of the revolution and the historical basis of party legitimacy began to weaken. By the early 2000s, the Party had come to acknowledge that the idea of "continuous revolution" and the regular radical political campaigns helped create a sense of ongoing

crisis in the decades following the Revolution could no longer serve as an effective basis for legitimacy (Gilley 2008). Following this shift, the party has come to recognize its dependence upon popular legitimacy and, accordingly, has "… gradually repositioned itself as a 'governing party' responding to social demands instead of a 'ruling party' reshaping social demands" (Gilley 2008: 269).

In order to do this, I argue that the party has had to create a new crisis of sorts. To replace the ongoing post-revolution crisis, the CCP is hinging its legitimacy on a crisis of underdevelopment, a "catch up crisis," premised on a conception of development as a staged process (Kuznets 1973; Rostow 1956) in which China lags behind the U.S., Europe, and many of its East Asian neighbors on a teleological continuum. To overcome the "catch up crisis," the Chinese economy and the country's material standard of living must catch up with the world's more developed countries, and China's record shows that the government is willing to work toward this aim at any cost.

In line with this, the CCP's legitimacy has come to be based largely, though not exclusively, upon its ability to deliver high rates of continuous economic growth and a sustained rise in the standard of living for a majority of those it governs (Yu 2013: 77).[28]

[28] To be sure, there are other important factors at play in the CCP's ability to maintain legitimacy. Gilley identifies economic growth and development as one key set of sources of post-1989 legitimacy, in addition to other factors including political and civil rights (Gilley 2006; Gilley 2008: 271). In other words, while continued economic growth is a key factor, it is not the only factor contributing to the Party's legitimacy. In addition to

Oksenberg suggests that economic growth is one of three major pragmatic pillars on which the Chinese Communist Party and its leaders justify their claim to power: "…they have protected the sovereignty and territorial integrity of the country, they have maintained China's unity and domestic stability, and they have achieved rapid economic growth and a higher standard of living for the overwhelming majority of their people" (Oksenberg 2001: 31). Downs and Saunders (1999: 119) argue, "The CCP's economic claims to legitimacy lie in its ability both to develop China into a powerful modern economy and to raise individual living standards." As Ma notes, "There is little question that China's top leaders have always understood that sound economic performance leads to enhanced legitimacy" (Ma 2009: v). A recent poll conducted by the Pew Research Center indicates that 86 percent of Chinese are satisfied with the direction their country is heading in and 82 percent are satisfied with the current state of the Chinese economy (see Ma 2009). These numbers, Ma argues, offer a strong economy-based endorsement of government leadership and confirm the importance of economic growth to CCP legitimacy (Ma 2009: vii).

The development of the Chinese economy enhances the legitimacy of the CCP not only by raising the living standards of the Chinese citizenry and increasing their buy-in to the regime, but also by tapping into nationalist aspirations by raising China's position on the global economic stage. Ma notes the importance of

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economic stagnation, food safety, environmental pollution, human rights violations, and land use issues could pose a threat to CCP legitimacy.

> …the ability of a regime to raise the nation's global status, a longcherished and strong national aspiration formed by China's tragic history of semicolonialism in the nineteenth century and foreign invasions before the end of the Second World War. [...] China's ballooning economy has greatly enhanced the nation's global position. This is a highly important bonus outcome in China's development, and has enabled the CCP and the top leaders to enjoy greater political legitimacy (Ma 2009: v).

Related to this Lampton warns, "…the Chinese system's appeal, at home and abroad, rests largely on the country's economic success. If China's economic performance falters, the system's weaknesses will become more apparent" (Lampton 2007).

As Woetzel et al. (2009: 15) confirm, three quarters of the vital economic performance on which rising national incomes and global economic power rest is generated in cities. However, as Bao and Fang note, when water resource use approaches or exceeds the threshold of natural supply, water becomes "…an important endogenetic variable and one of the dominant exogenic forces of urbanization and economic growth. If water resources are scarce and water resources constraint force is large, urbanization and socio-economic development will slow down…" (Bao and Fang 2009: 274). The impressive economic record of the North China Plain, derived in large part from its urban centers, has in recent years come up against regional water shortage as a growth-constraining factor. Without additional water resources, urbanization and the economic growth it generates will certainly decline in the Chinese heartland.

As attested to by a Chief Planner at the Beijing Institute of City Planning—a key branch of the Beijing City Government that deals with decisions and planning related to

development and water management— the links between economic growth and water in the cities of the NCP are both critical and direct.

> […] The question is not just how to deal with water […], but how to support economic activity. You can't stop economic growth. If you stop it […] social problems will arise. So if we don't have enough water then we must find a method to get more. […] Maybe [the SNWTP] is not the best method, but we *must* use it. […] If we don't solve the water problem, the city will die. It won't have water, it won't have people and it won't generate growth… (personal communication with Li Dong, 11/21/2011).

By delivering additional water to the North China Plain the South-North Water Transfer Project enables continued urban and economic growth in a region of key strategic and material importance. As such it is fundamentally wrapped up in the Chinese government's ability to maintain power and legitimacy. This is an absolutely crucial point when considering why the government has chosen the SNWTP as its favored water management approach in north China, rather than developing policy measures that target the key anthropogenic sources of stress in the region. The next sub-section focuses on the specifics origins of these stresses, the institutional factors that have helped to shape them and provides a critical analysis of why dealing with each of them would undermine continued economic growth and thereby threaten the continued legitimacy of the Party.

Anthropogenic Sources of Stress

The breakneck pace of industrialization and urbanization that has characterized the three river basins of the NCP— Huai, Huang, and Hai—since China's reforms began, have given rise to what I have identified as three primary sources of anthropogenic water stress in the region: population, production and pollution. After fleshing out these more structural or root sources of water stress, I will demonstrate how dealing with each of them could potentially weaken or undermine the Chinese Communist Party's claim to power by slowing down economic growth. Understanding these sources of water stress will help render clear the political-economic motivation of a big, supply-oriented infrastructure project like the SNWTP and the reliance on alternative narratives or "discourses of distraction" to justify and propel the project forward, as discussed in the following chapter.

Population

As discussed briefly above, urbanization has been a key feature of China's development trajectory since Deng Xiaoping set the country on a path of economic reform in the late 1970s. Urban population growth has translated into greater resource demand, particularly when it comes to water.[29] Some of this population growth can be

[29] According to Ministry of Water Resources data, between 1999 and 2006—already more than two decades into reform—urban water demand increased between 30 and 40 percent (Zhang 2011: 238).

attributed to a natural population increase. Despite the so-called One-Child Policy (独生子女政策), which has restricted the number of children born to couples since 1978 and been very effective at slowing China's rate of total population increase, the country's population has nearly tripled since 1950, growing from 500 million to roughly 1.3 billion. The One-Child Policy has been effective in achieving its objective and it would be difficult for the government to take measures stricter than the current policy to control population in this way without encountering resistance from the population. So, we must turn to the other key driver of China's urban population growth—rural-urban migration—and evaluate whether or not it can be reigned in as a way of controlling population in order to help relieve water stress.

Recent estimates place the number of rural-to-urban migrants working in Chinese cities between 150 and 211 million with roughly a 10 percent increase each year (Chan 2009). The dramatic demographic shift resulting from the influx of these migrants into China's cities in recent decades is directly related to the nature of China's reforms, which have emphasized foreign direct investment concentrated in Eastern cities and the development of industry and export-oriented growth, both of which are labor intensive (Baek 2005). The rapid introduction of this labor force into China's urban population has contributed to a dwindling per capita water supply in many urban areas. While further control of natural population increase is not a viable option, the option of more strictly controlling rural-urban migration would undermine economic growth in urban areas, thereby threatening the CCP's legitimacy. A critical examination of the household registration system or *hukou,* a key institutional factor in China's rural-urban migration, renders this clear.

The hukou system was established under Mao in 1958 as an institution primarily aimed at keeping rural peasants on their farmland in order to produce enough food to support the urban population that was to facilitate China's industrialization process in its cities. During this period the government was able to use hukou as a way of controlling labor and production in the command economy. Rural residents were given collective hukou and urban residents were given individual hukou, with a further division into two additional types (户口类别): agricultural (农业) or non-agricultural (非农业). Those with agricultural hukou—predominantly rural peasants—were given land by the state to farm collectively and were expected to meet all of their own needs by working their allocated plot. In contrast, those with non-agricultural hukou (i.e., the urban population) were provided with grain rations, housing, medical care, access to education, employment, and a range of other social services. Without non-agricultural hukou status it would have been very difficult, if not impossible, to survive in a city in Maoist-era China, as one would have no access to food, work or housing of any kind. Thus, this arrangement served as a mechanism to patrol grain rations and to keep agricultural workers from burdening the cities.

Hukou reforms and shifting Chinese labor markets accompanied the onset of economic reforms and decollectivization in the late 1970s and early 1980s. "With the introduction of economic reforms, creating space for domestic and foreign capitalists, state-directed allocation of labour had to gradually give way to a less rigid labour market in which people could attempt to secure jobs on an individual basis" (Alexander and Chan 2004: 617). A surplus of rural labor developed alongside the introduction of the Household Responsibility System and other reforms that allowed laborers to seek out

their own employment, rather than being assigned a specific job by the government. Tens of millions of people were suddenly free to "float" away from the place in which they held hukou.

Alongside this dramatic shift in mobility was a sectoral shift from primary to secondary and tertiary industries as the main employers in the Chinese economy. This meant that jobs became increasingly clustered in more urban areas and rural agricultural workers began leaving the countryside en masse in search of work in urban or peri-urban manufacturing, construction and service industries. As this "floating population" (流动人口) began to swell, the growth of China's cities began to accelerate (see *Figure 3.2)*.

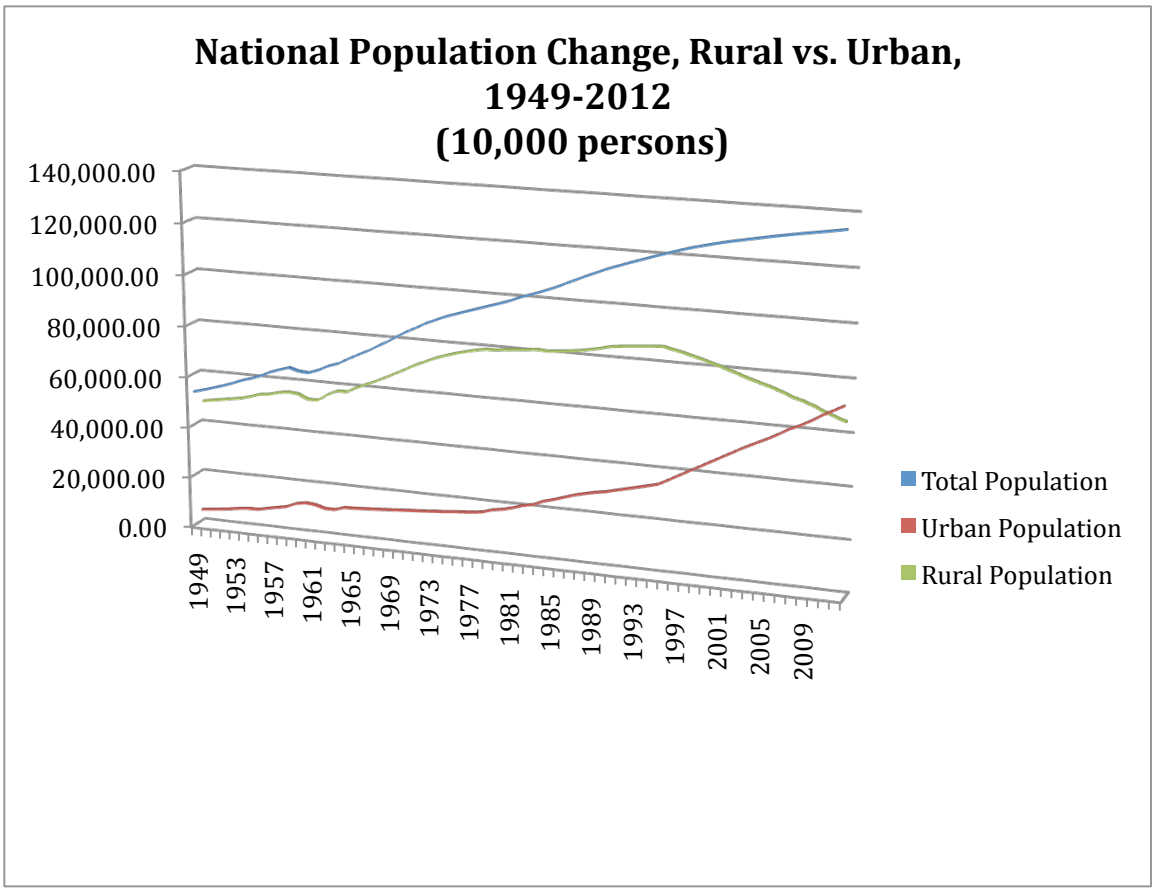
Despite increased mobility and recent reforms of the hukou, access to many services in China's cities is still determined by one's hukou status. As an opportunity structure (Solinger 1999), hukou places non-local workers in a marginalized position in cities even today, more than 50 years after its establishment. A majority of post-reform China's rural-urban migrants are denied access to what Solinger calls the "urban public goods regime," including subsidized housing, state-provided jobs, healthcare, and education for their children. It is precisely because rural-urban migrants in the city have been denied the benefits enjoyed by formal urban citizens (i.e., those with urban hukou) that they have been funneled into the very low-wage jobs in the non-state sectors that have been central to China's economic growth (Huang 2007: 248). Chan argues that the hukou system has fundamentally underpinned China's economic success over the last several decades. "Without such a system, China would not have been able to have achieve the paramount goal of the command economy—rapid industrialization within a short time" (Chan 2009: 206). In other words, the mass rural-urban migration of low-

wage, disenfranchised workers enabled by the hukou system has been part and parcel of China's urbanization process, helping to grow the country's cities and serving as a vital foundation for its sustained economic growth.

Beijing, the largest city on the NCP, exemplifies the pressure put on the region's water supply by the growing trend of rural-urban migration. According to official statistics, Beijing's population has grown from around 8.7 million at the onset of reforms to just over 20 million in 2011. During that same period the percentage of the city's population made up of migrants grew from 2.5 percent to more than 36 percent (2011 Beijing Statistical Yearbook) (see Figure 3.3) and the per capita water supply declined from roughly 1,000m^3 to less than 270m^3 (Probe 2010).[30] A similar trend of dwindling per capita water supply alongside rapidly growing migrant populations and can be found in several other cities across the North China Plain, including Shijiazhuang, Tianjin and Zhengzhou (China City Statistical Yearbook 1995, 2001 2008). One Beijing government official describes the allure of the city for migrants: "Because there are more jobs and the environment is good, people from my home area [in southern Henan] hope to live in Beijing. It is the capital and has many good hospitals and schools, so there are many people living here. […] This is an economic choice" (personal communication with Wang Hongwu, 11/21/2011).

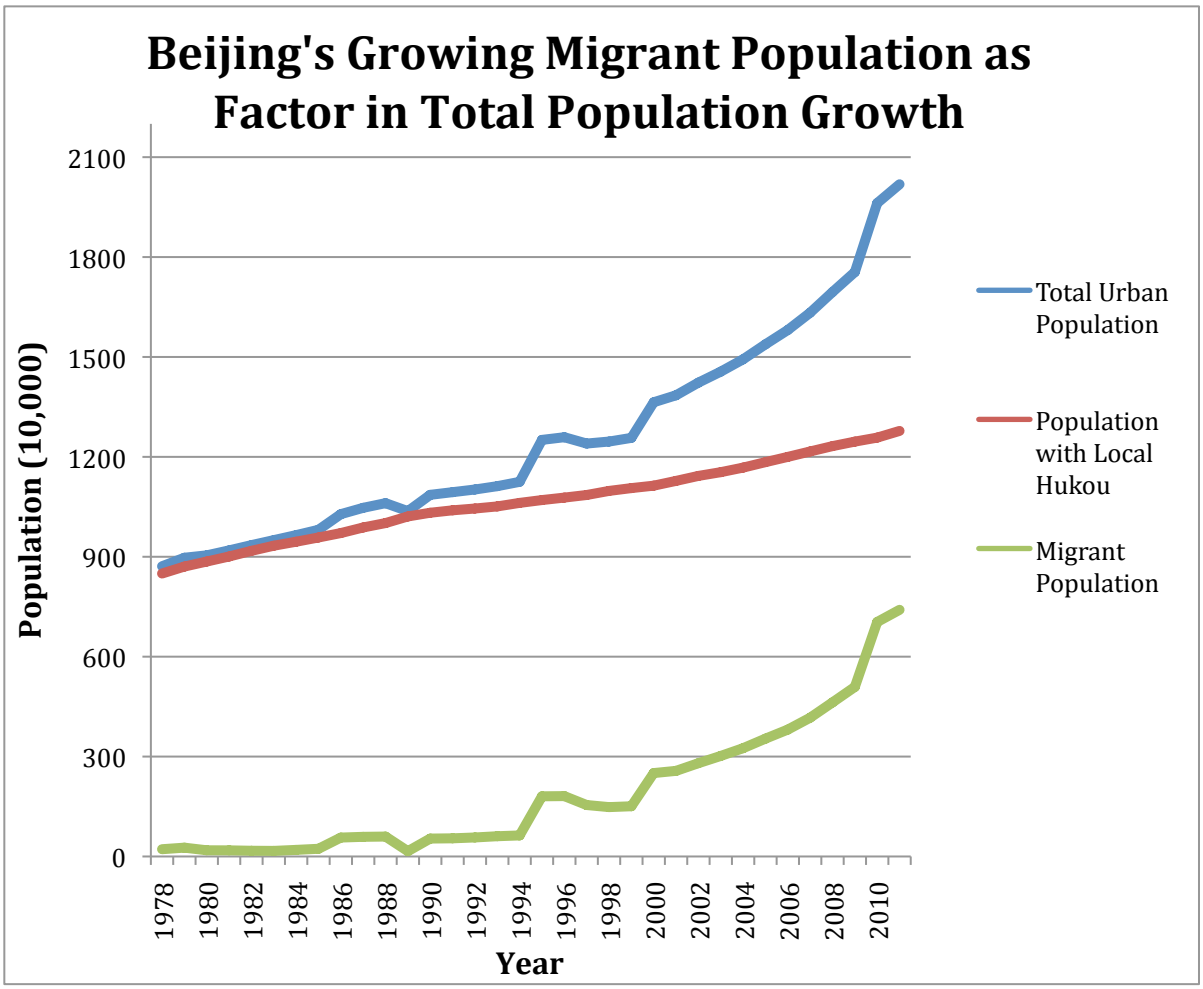
[30] Data for 2012 and 2013 are not yet available.

Figure 3.2- National Population Change, Rural vs. Urban, 1949-2012



Source: China Yearly Macro-Economic Statistics (National), All China Data Center 2013

Figure 3.3- Growth of Beijing Population, Migrant and Total, 1978-2011



Source: Data from Beijing 2011 Statistical Yearbook

While stricter control of the number of rural-urban migrants flocking to North China's cities as a way of checking urban population growth would certainly relieve some of the stress on urban water supply, it would also deny these economic hubs the cheap, exploitable work force essential to sustaining high growth rates. Likewise, any

further loosening of hukou regulations would likely give rural-urban migrants more rights in the city, including the right to higher wages, which would also have a significant impact on growth rates. In sum this means that while rural-urban migration is to some extent already controlled and monitored via hukou, this system does not provide an avenue for effectively controlling the *number* of rural-urban migrants making their way into China's cities. It has been and will continue to be effective primarily as a means of keeping the rural labor force exploitable.

What may be more important than hukou in shaping rural-urban migration patterns are rural-urban and regional inequalities. The disparity between the left-behind countryside and interior and the relatively more opportunity-rich cities and eastern seaboard (Fan 1995, 1997, 2008; Helig 2006) serve to both push migrants from their homes and pull them into new locales (Lin et al. 2004), allowing migration to act as an equalizing force (Chan and Wang 2008). In addition to granting migrants agency in making active choices about their mobility, this perspective also notes, contrary to the prevailing assumption that rural migrants wish to remain in cities permanently but are barred from doing so by the hukou structure, a majority of migrants would in fact prefer to return to their home in the countryside to settle down (Fan 2008; Zhu and Chen 2009).

Either way, reforming hukou to increase the rights and wages of migrants in the cities or investing vast sums of money in campaigns to decrease the rural-urban and regional inequalities that push migrants into overburdened cities would significantly undermine steady economic growth. Clearly, there is no incentive for the government to direct policy measures at rural-urban migration (or its underlying drivers), a major source of anthropogenic stress on the region's water supply.

Production

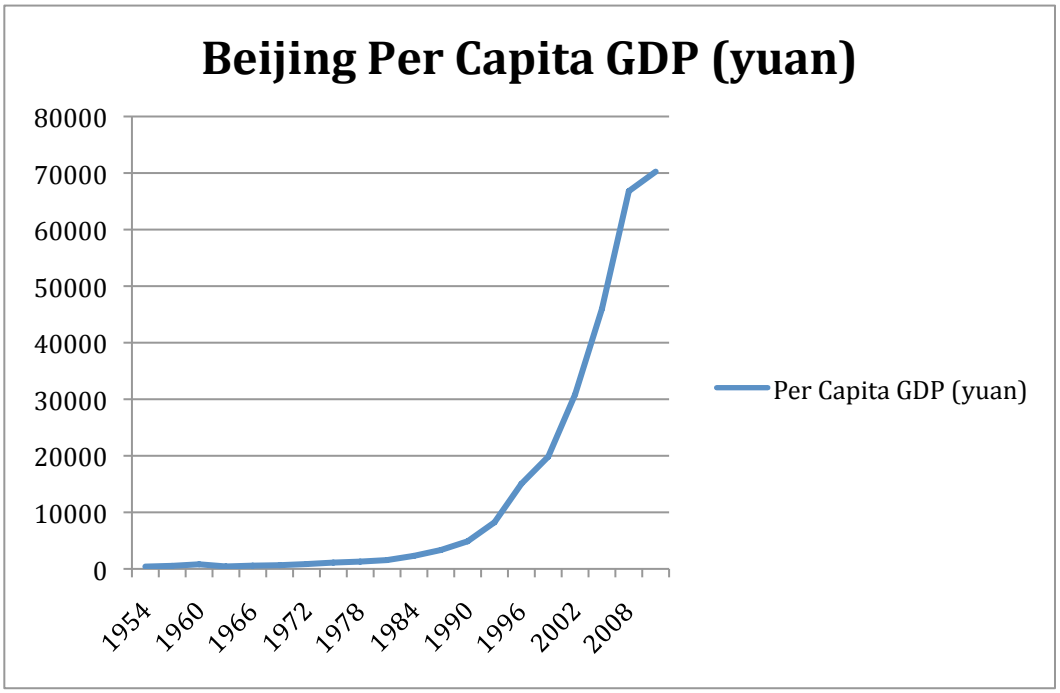
The second major source of stress on water in China is production, in which I include the manufacturing of the goods and processing of materials (i.e., industrial production) that contribute to the growth of the economy and the expansion of the built environment. This includes the many export-oriented consumer goods for which China is known, such as textiles and clothing, shoes, toys, and household electronics. It also includes the physical production of new spaces and the links between them, including the construction of office and apartment buildings, airports, road networks and railways, all of which require massive amounts of concrete, steel and other basic material inputs.

The production of these goods and materials and the building up of the urban environment place heavy demands on water resources, particularly due to the fact that as of 2012 roughly 80 percent of China's annual industrial output is achieved by means of coal-fired electricity (IAE 2012), which requires substantial amounts of water for cooling, processing and cleaning. The generation of 500-megawatt hours of coal-fired power typically requires about 2.2 billion gallons of water per year (USCUSA). With a coal-powered electricity generation capacity of 650,000 megawatts per year and expectations for significant expansion in the near future (Bryce 2012), China's coal industry requires, at minimum, roughly 2.8 trillion gallons of water per year, roughly 470,000 times the volume of all of the United States' Great Lakes combined. Production also requires huge amounts of steel and cement, of which China is the largest global consumer of the former and producer of the latter (World Steel 2012). In 2011, for example, more than 45 percent of finished steel products, 52 percent of global iron ore, and nearly 59 percent of global pig iron were consumed in China (World Steel 2012: 17-

19). Given these numbers, it is no surprise that China's industrial water demand dominates overall water demand growth, which is unusual for an economy of its size (2030 WRG 2009: 45).

Again, Beijing serves as an example, illustrating the clear link between production and water demand growth on the North China Plain. Accompanying Beijing's population growth has been dramatic economic growth, much of which has been driven by production. The per capita GDP at the start of reforms in 1978 was 1,290 yuan and as of 2009, it had reached 70,452 yuan, an increase of 55 times (see *Figure 3.4)* (Beijing 2010 Statistical Yearbook). Production, including construction and the physical and infrastructural development of the city, has been a central part of Beijing's impressive economic growth. A few numbers illustrate this. In 1978 the total amount of floor space in Beijing was approximately four million square meters. As of 2011, this number had increased to 60 million square meters with another 295 million under construction (Beijing 2011 Statistical Yearbook**)**.

Figure 3.4- Beijing Per Capita GDP Growth 1954-2010



Source: Data from Beijing 2010 Statistical Yearbook

Construction on this scale requires massive amounts of material input (steel, cement, etc.), the production and movement of which requires energy, which of course requires water. While industrial water consumption data are difficult to obtain at the sub-provincial level, a dramatic rise in the annual gross industrial output value in several cities on the NCP between 2000-2010 suggests that industrial water consumption in the region was likely to have risen alongside it. For example, in Zhengzhou, the capital of Henan Province, gross industrial output value rose from roughly 26.8 billion yuan in 2000 to roughly 600 billion yuan in 2010 and in Nanyang, Henan it increased from 27.5 billion yuan to approximately 250 billion yuan during the same period (Henan, Main

Indicators of Industrial Enterprises, All China Data Center). With respective increases in industrial output value of 22-fold and nine-fold, even a gross underestimate of doubling industrial water consumption between 2000-2010 would put significant stress on water resources in Zhengzhou, Nanyang, and other rapidly growing cities across the NCP

Because of the essential link between water consumption and industry, which helps to drive economic growth on the North China Plain, it is clear that regulating production as a source of water stress would also undermine economic growth rates and thereby threaten the future of the CCP by undermining a key piece of its legitimacy foundation. Production is also directly linked back to population, both in terms of manufacturing and construction jobs and the physical growth of the city. According to Li Dong, an urban planner in Beijing's main government planning branch tasked with working on the Beijing Master Plan,

> …[I]n China the urbanization rate is about 50 percent. In the next five years the goal is to increase that by about three percent, so the central government will have to provide more housing and jobs in many cities. What this means for urban planners is that the government needs to provide us with more land for buildings that can offer the space for jobs. Building is a very significant need for us (personal communication with Li Dong, 11/21/2011).

The Twelfth Five Year Plan (2011-2015) projects an even more ambitious annual urban growth rate of four percent and calls for "actively and steadily promoting urbanization" (积极稳妥推进城镇化) (see Chapter 20, Twelfth Five Year Plan). It is clear this ambitious urban population growth target will necessitate the further conversion of

collectively owned land to urban and industrial uses[31] in order to keep pace with job and housing demand. Construction, particularly projects that involve the conversion of non-urban land, which facilitates commercial development, is highly profitable for government officials at the sub-national level (Shin 2009: 2833). This kind of urban-entrepreneurialism (arguably a modern reiteration of Wittfogel's agro-managerialism, see Wittfogel 1957) in which local government officials in China's major cities seek profit from commercial land sales is, "…largely supported by the local power to dispose of urban land use rights, which in fact makes the local governments *de facto* landlords" (Shin 2009: 2817). In other words, in this land-centered form of urbanization (Lin 2007), there is a direct personal disincentive for government officials to rein in their ambitions to

[31] Under Mao the market transaction of land was not permitted. Beginning in the 1980s a new market track opened up for land use rights and in 1988 the Constitution was amended to allow for the transfer of land use rights (distinguished from outright ownership) to commercial users with different users (ex. commercial, industrial, residential) permitted to purchase rights for different fixed periods of time (Lin and Ho 2005). Following this policy shift, three new processes of land development came about. The first entails supplying land to listed companies, which can then be converted into shares. The second involves permitting developers to obtain land directly by taking over collectively owned rural land. The third requires the re-designation of rural administrative regions as urban, thus changing collective land into state land (Wu 2009: 885). It is this third avenue that can be most profitable for local government officials.

build, which contributes to the industrial stress on water resources on the North China Plain.

Pollution

Pollution, the third major source of pressure on water on the North China Plain, is directly related to production. Production, particularly industrial production, has been a primary source of water pollution in China for the last 30 years and the current quality of China's freshwater supply is abysmal.[32] Gleick provides a vivid description of the country's waterways:

> …[V]ast stretches of rivers are dead and dying, lakes are cesspools of waste, groundwater aquifers are over-pumped and unsustainably consumed, uncounted species of aquatic life have been driven to extinction, and direct adverse impacts on both human and ecosystem health are widespread and growing (Gleick 2009: 79).

A majority of surface water across the country is contaminated with such high levels of chromium, cadmium, and other pollutants that it is considered by the Chinese government to be unfit for human consumption, irrigation, or aquatic life (Cann et al. 2005: 6). This is largely the result of unregulated effluent discharge from local industries,

[32] There is also evidence of severe industrial water pollution dating back to the Maoist period and efforts—such as the Great Leap Forward—to grow the country's economy through rapid, dirty, industrialization (see Shapiro 2001). For an even longer-term historical perspective on the tensions between growth and resources in China, see Elvin 2004.

including chemical factories, tanneries, and paper mills (Heggelund 2004: 148). In recent years, factories in the supply chain of internationally owned companies such as Nike, Adidas and Apple have also come under the scrutiny of environmental watchdogs for their alleged water polluting practices in China (Greenpeace 7/12/2011; Meng 8/31/2011; Xie 10/14/2011). Other common sources of pollution include animal waste, agricultural runoff, and domestic sewage discharge due to a lack of adequate water treatment facilities (Chen and Wang 2003: 69). Water pollution due to these and other factors is giving rise to serious public health issues, including the deaths of more than 30,000 children per year (Freeman and Liu 2008: 7) and the development of so-called "cancer villages" along the shorelines of polluted rivers (BBC 2/22/2013; Gilbert 2009). It also poses a serious threat to the livelihood of tens of millions of farmers and fishermen.

Pollution is particularly serious on the NCP, home to some of the most contaminated rivers not only in China, but in the world. First, because the north has a heavy concentration of industry and the natural flow of many rivers in the region has been interrupted or stopped all together by damming and desiccation (Brown 2006), water quality issues are exacerbated by a lack of sufficient water to dilute pollutants (Cai 2008: 21). In the Hai and Huai River systems, roughly 80 percent of the water has been designated by the government as grade IV quality—the worst possible grade— meaning that it is completely unusable for any purpose, including industrial, due to pollution (Shalizi 2008: 162).

While these waterways were by no means pristine prior to reforms (Shapiro 2001), the decline in North China's water quality has been dramatic over the last three decades. According to the annual water resources bulletins issued for each of the major

river basins on the NCP, from 1980 through 2004, "…sewage water discharge doubled in the 3-H basins, and it increased by 160% and 140% in the Huai and Huang River" (Cai 2008: 16). That 80 percent of surface water is contaminated beyond usefulness places a major strain on the water supply of the North China Plain. However, like urban population growth and production pressures, dealing with the region's severe water pollution would undermine economic growth and is not being seriously pursued by the government as part of the solution to North China's water stress.

Contrary to what most people outside China might assume, the Chinese government has had an environmental protection apparatus in place for more than three decades, but its effectiveness has been minimal. At the onset of reforms in 1978, *Document #79* was published, acknowledging for the first time that environmental pollution was a serious problem for many of the country's citizens (Heggelund 2004: 146). Following this admission, the Chinese state formally acknowledged its role in managing pollution—including water pollution— declaring in Article 11 of the 1978 Constitution that, "the state protects the environment and natural resources and prevents and eliminates pollution and other hazards to the public" (cited in Heggelund 2004: 146).

Since this formalization of the Chinese state's environmental responsibility, several steps have been taken toward developing a system of environmental governance to help minimize and eliminate many of the environmental issues brought on by rapid development. Related to water pollution specifically, there are numerous regulations, including the *Water Law of the People's Republic of China* (中华人民共和国水法), and the *People's Republic of China Law on Prevention and Control of Water Pollution (*中华人民共和国水污染防治法). Despite the promulgation of these laws and regulations,

water pollution is still arguably the country's most pressing environmental concern due to a lack of enforcement and several other complex issues that warrant attention.

First, although progressive environmental laws and regulations are frequently issued by the central government, they are generally issued in response to episodes of severe environmental pollution (Heggelund 2004: 153). On the NCP this can be seen in the 1995 case of *The Provisional Regulations for Water Pollution and Prevention and Control in the Huai River Basin* (**淮河流域水污染防治暂行条例**). These regulations were introduced following a major pollution incident in July of 1994 in which 29 million cubic meters of contaminated water were released into the Huai River, affecting drinking water supplies in Anhui and Jiangsu provinces (Heggelund 2004: 148). This example speaks to the fact that new policy and legal measures are often instated to clean up the mess left in the wake of industrial expansion, according to the government's modus operandi of "pollute first and clean up later" (Freeman and Liu 2008: 2). In other words, China's approach to environmental regulation and water pollution management is reactive rather than proactive and as such, it is removed from the social and politico-structural causes of environmental degradation (Muldavin 2000: 245). As Muldavin argues, the transformation of Chinese society in the wake of economic liberalization has been so profound that the state is unable to keep up in identifying and mitigating the causes of environmental problems like water pollution (Muldavin 2000: 245).

Additionally, the complex, multi-tiered, and fragmented bureaucratic structure of the Chinese government makes it exceedingly difficult to ensure that centrally issued environmental laws and regulations are enforced at the local level (Gilbert 2009: 1; Sun 2007: 12). This bureaucratic arrangement, coined as "fragmented authoritarianism" by

Michel Oksenberg, David Lampton and Kenneth Lieberthal in the late 1980s, is succinctly described by Mertha. The fragmented authoritarianism heuristic,

> …asserts that policy made at the centre becomes increasingly malleable to the parochial organizational and political goals of various vertical agencies and spatial regions charged with enforcing that policy. Outcomes are shaped by the incorporation of interests of the implementation agencies into the policy itself. Fragmented authoritarianism thus explains the policy arena as being governed by incremental change via bureaucratic bargaining (Mertha 2009: 996).

Within such a system, the power of government cells at the local level is often limited (Heggelund 2004: 135, 229) and there tends to be a high degree of variation in power between local governments. That said, even if local officials are genuinely interested in trying to protect the environment, they may not have the resources or authority necessary to do so. For example,

> A county government cannot resort to administrative penalties, such as imposing fines or shutting down facilities, to punish industrial polluters if they are beyond its administrative jurisdiction. In these situations, the power of administrative punishment, as written in environmental laws, is rendered useless (Jing 2000: 158).

One of the primary obstacles to enforcing pollution regulations has to do with the way in which the fragmented bureaucratic system incentivizes certain kinds of policies and behaviors over others and allows for a mismatch in the signals given by central and local government offices. Local officials are simultaneously expected to protect the environment, deliver high rates of economic growth, and fulfill production quotas

(Muldavin 2000: 250). As Sun notes,

> […] the living conditions and salary levels of local government officials are directly determined by the local financial situation. Because the financial income of the local government has a direct relationship with the speed of economic growth, only through the realization of rapid growth can the local government's financial situation improve, can the salary levels of local officials rise, can one achieve more in their career as an official…. (Sun 2007: 12**)**.

Put differently, local officials are torn between the conflicting interests of sustaining economic growth in order to advance their own careers and obeying environmental regulations imposed on them by the central government. Heerink et al. (2007: 35) point out that there is a much higher incentive for such officials to reach their production targets due to the fact that, "they receive almost no rewards or punishments for success or failure in executing environmental laws." Sun (2007: 12) echoes this: "[…] from the stance of institutional capacity and implementation, the problem is that genuine solutions for enforcement [of environmental regulations] have a high cost and violating them has a low cost." In other words, the incentive structure is skewed away from enforcement in favor of economic growth.

In sum, not only would it be exceedingly difficult for the government to rein in water pollution given the serious enforcement and incentive issues that pervade the current fragmented regulatory framework, but to do so would also require the government to moderate its emphasis on economic growth. The stakes for slowing economic growth are high not only for the government, but for Chinese citizens as well,

many of whom are likely unwilling to jeopardize their employment status or change their consumption habits and lifestyle to curb water pollution.

Chapter Summary

China has undergone a remarkable social, economic and physical transformation since economic reform and opening up began more than 30 years ago. Urban and urbanizing areas have served as the vital engines driving this metamorphosis forward, generating a vast majority of the country's dramatic economic growth through industrialization, the physical expansion of the built environment, and a growing service sector. But the vast changes China's cities have undergone in recent decades have placed enormous pressure on the water resources required for this process to continue. Of China's 668 cities, roughly 400 are currently experiencing water shortage, 200 in which it is considered severe (Chen 2011: 85). The reliance of urban areas on managed systems of water also makes them sites of particular vulnerability to the decline in water supply they are helping to drive. This vulnerability is particularly serious on the North China Plain where water shortage now presents a serious obstacle to the endurance of rapid economic growth in the region's cities, including the nation's capital. On top of a naturally semi-arid climatic regime, I argue that the region's water stress is largely result of three primary sources of anthropogenic water stress: population, production and pollution.

Rapid urban population growth in the cities of the North China Plain has brought with it rising water demand. As a source of water stress population is not an easy factor to control, despite the country's household registration system, which ostensibly regulates

the movement of Chinese citizens between rural and urban locales. The hukou system is more effective at keeping China's massive migrant labor force exploitable, which helps to drive the production of the cheap export goods that have fostered rapid and impressive growth in the Chinese economy in recent decades. One avenue that could potentially help to relieve population pressure on the NCP's cities is to decrease rural-urban and regional inequalities, a driving force of rural-urban migration. Like hukou reform, however, investment in the Chinese countryside would—at least in the short term—undermine the economic growth on which the legitimacy of the Chinese Communist Party is largely balanced.

Like urban population growth, reining in production, another major source of water stress in north China, would require sacrificing economic growth rates. Industrial production and the physical expansion of cities are fundamental drivers of the economy, especially on the North China Plain. Working to control these factors in would not only result in a drop in growth rates, but it would extinguish opportunities for government officials to profit from rural-urban land conversions. Controlling this source of water stress on the North China Plain would not only go against the interest of the Chinese Communist Party at the national level, but it would infringe upon the personal economic interests of the local government officials who manage the situation on the ground.

Pollution control, the lack of which has rendered a majority of surface water in north China useless, is one area in which policy reform could make a significant difference for the region's increasingly stressed water resources. The fragmented system of governance, however, helps give rise to a skewed incentive structure and conflict of interests for local level officials who are torn between delivering economic growth and

enforcing environmental regulations. The kind of structural reform necessary to address these issues would also require stepping back from the government mentality of "growth at all costs" and slowing down economic growth in order to focus on resource quality. Again, this approach would undermine the CCP's basis for continued economic growth and potentially threaten the Party's legitimacy. These three major sources of anthropogenic stress are not only compounded by the fact that the region's climate is naturally semi-arid, but an overemphasis on natural factors has come at the expense of recognizing and working to address the human sources of stress that have accelerated in the last three decades and could potentially be mitigated by the government.

We now understand the important links between water resources and economic growth on the North China Plain, the origins of anthropogenic stress on the region's water supply and the institutional factors that help to shape these stresses. It should be clear that to deal with urban population growth, production, or pollution would undermine continued economic growth, a foundational element of the Chinese Communist Party's legitimacy. This shows the true motivations behind the construction of the South-North Water Transfer Project, which are not, as official documents and interviews suggest, related to sustainable development, but are instead about pure political-economic interests. Along with the use scalar constructions as a political tool , the "discourses of distraction" that serve to depoliticize the South-North Water Transfer Project and draw attention away from the anthropogenic sources of water stress on the North China Plain will be the focus of the following chapter.

CHAPTER FOUR

Constructing Stories:
Discourses of Distraction and Scalar Maneuvering

By examining the politics of the discourses surrounding the South-North Water Transfer Project, this chapter delves into the specific ways in which water is being wielded as a political tool in twenty-first century China. I demonstrate how, in order to draw attention away from the anthropogenic sources of water stress on the North China Plain discussed in Chapter Three, government documents, government officials and government-run media outlets are putting forth "discourses of distraction," or alternative stories about the drivers of water stress and justifications for the South-North Water Transfer Project. Supported by empirical data gathered in the field, the two primary discourses of distraction I have identified are: 1) the naturalization of water scarcity in north China and, 2) the SNWTP as environmentally beneficial. Underpinning both of these is a pervasive assumption of the supremacy of science and engineering in water management schemes.

I argue that these alternative discourses are being employed as a political tool to depoliticize the South-North Water Transfer Project and steer the conversation away from policy solutions that might actually make a difference in mitigating water stress and improving water management on the North China Plain. This is because, as argued in the

previous chapter, to address population, production and pollution as major sources of water stress would undermine continued economic growth in the country's heartland, and threaten to weaken the legitimacy of the Chinese Communist Party.

This chapter also deals with the strategic use of scale and rescaling in framing water management problems and solutions in the case of the South-North Water Transfer Project. I demonstrate the political utility of scalar construction using two primary examples. First, government media sources, officials, and maps represent the Middle Route as geographically disembodied from the Yangtze River basin, which provides the water for northward transfer. What is presented instead is a scalar construction bound by provincial and municipal boundaries and centered on the Danjiangkou Reservoir as the source of the MR's water. This construction, I argue, serves to exclude stakeholders in the water donor region (the Hanjiang and Yangtze River Basins) from the conversation. The second scalar construction emphasizes the South-North Water Transfer Project as a national water management scheme, recasting regions that have made significant sacrifices to support an increased water supply in and around Beijing as beneficiaries of a national development project rather than victims of a regional resource equalization effort.

Discourses of Distraction

As Gee reminds us, discourses—or the ways problems are talked about, written about, and framed— are central to how we as humans "…make and break our world, our institutions, and our relationships through how we deal with social goods. Thus,

discourse analysis can illuminate problems and controversies in the world. It can illuminate issues about the distribution of social goods, who gets helped, and who gets harmed" (Gee 1999: 9-10). The discourses or storylines used to frame the discussion of a given issue can also be an especially powerful political tool, not only illuminating who gets helped and who gets harmed, but actually helping to shape material consequences on the ground. Discourse, in other words, is not just a reflection of power, but a tool by which power may be wielded and, in some cases, garnered. In terms of the role of discourse in water management, we have seen discursive tools—such as the social construction of scarcity and the historicization of particular water narratives—used across the world to help justify controversial or politically driven water management schemes. This is especially true for interbasin water transfer projects like the South-North Water Transfer Project, which are often presented as the solution to the kinds of water shortage situations that tend to give rise to natural scarcity narratives.

In the case of the SNWTP, I have identified two primary discourses, which I argue are being used as a mechanism to deflect attention away from the major anthropogenic sources of water stress on the North China Plain. These "discourses of distraction," propagated in government documents, by government officials across north China and in government-run media outlets, are alternative stories about the drivers of water stress and justifications for the South-North Water Transfer Project. They serve to depoliticize the transfer project, deflect attention away from the root causes of water stress in north China, justify and reinforce the supply-side "lifeline" approach of the SNWTP, and mask its social and ecological impacts. These discourses, moreover, frame the water issues of the north in such a way that the solution would not undermine

continued economic growth in and around Beijing, which would threaten the legitimacy of the Chinese Communist Party.

Naturalization

The dominant discourse used in the official literature and discussions of the South-North Water Transfer Project is one in which the North China Plain's situation of severe water stress is construed as a predominantly natural phenomenon, rather than the result of increasing anthropogenic stress on a naturally unimpressive regional water endowment. This discursive tactic has been used to justify interbasin water transfer projects elsewhere in the world, including India (Metha 2001), the Mekong River basin (Bakker 1999; Lebel et al. 2005), and Southern California (Agnew 2011). Sneddon notes, "There has been a tendency to direct attention to the lack of supply of water due to natural forces rather than look at human-induced land and water use practices and at socio-political implications. Real causes of scarcity can be obscured leading to inappropriate solutions" (Sneddon 2003: 2025). The use of discursive constructions to obscure the actual drivers of scarcity, such as high demand or supply stress due to pollution, may be used as a political tool in some cases. By naturalizing water scarcity the problem frame relieves humans and their behaviors from the burden of blame and pushes the solution space beyond the influence of government. It allows human actors to play the role of victims of nature, rather than agents whose choices and decisions have material consequences.

As a mechanism for justifying the SNWTP, the naturalization of water stress on the North China Plain is largely premised upon a well-known saying on the geography of

China's water resources traced back to Mao Zedong in the early 1950s: "Water is abundant in the south and scarce in the north, so why not borrow a little from the south if possible" ("南方水少，北方水多，如有可能借点水来也是可以的"). In fact, Mao's use of the phrase in a 1953 conversation with the head of the Yellow River Basin Commission is popularly seen as the genesis of the SNWTP (Chen et al. 2002; Liu and Zheng 2002; Ma et al. 2005). This phrase presents the water scarcity of the north as a material fact, not as the result of human behavior (and indeed, human behaviors had not, at that point, driven the situation to its current severity). At that time, water in the north was, relatively speaking, naturally scarce in comparison to the south.

But now, the limits of what north China's naturally semi-arid environment can support have been stretched way beyond what even Mao could have imagined. Despite the fact that the natural scarcity argument is no longer valid, it has been carried into the present day. Six decades later, the first half of the phrase, "water is abundant in the south and scarce in the north, so why not borrow a little from the south if possible" was repeated as dogma by nearly all of my government-employed interview subjects when asked to characterize the state of water resources in north China. Another official echoed this in his own words, "Of course [Beijing's water supply] situation is not very optimistic. Beijing is a very water stressed city and its resource situation is *naturally poor*" (personal communication with Chen Shuai, 12/8/2011, emphasis added).

In addition to this phrase comparing north to south, there are several key words used to describe regional water resources as part of the naturalization discourse. Most commonly, the North China Plain is presented as an "arid" or "dry" (干旱的), and drought-prone region by government officials and in the popular Chinese media. For

example, "[…]Through this engineered control [of water] it is possible to solve the urban development problem in the *arid north*..." (personal communication with Sun Mingsheng, 12/8/2011, emphasis added). Similarly, an article from *China Today (今日中国)* describes the SNWTP as, "…a large-scale trans-basin water diversion project designed to take water from China's *water-rich southern area* to the *dry north*" (*China Today* 6/13/2011, emphasis added). One *China Daily (中国日报)* article describes the SNWTP as, "…designed to divert water from the *water-rich south* of the country […] up to the *dry north*" (*China Daily* 9/29/2008). Another article from *Xinhua* identifies the project as intended to, "…transport water from the Yangzte River to the country's *drought-prone northern regions*, including Beijing" (Xinhua 1/22/2012, emphasis added).

The use of technical climatic terms such as aridity and the emphasis on climatic episodes such as droughts are pervasive (*China Today* 6/15/2011; Xinhua 12/20/2011; Zhu 10/30/2012; Zhu and Chao 4/6/2012). As a climatic term, aridity is typically used to describe areas failing to receive sufficient water to support plant and animal life. Examples of places with arid climates include Phoenix, Arizona; Death Valley, California; Cairo and Dubai. Semi-aridity characterizes regions receiving an average of 10-20 inches of rainfall per year. Semi-arid places include Los Angeles, Madrid, and Athens. Parts of the NCP are semi-arid and others, like Beijing, receive too much annual rainfall to be considered semi-arid by strict climatic standards. Narratives that present the NCP as an arid region prone to drought serve to frame water shortage on the North China Plain as a natural phenomenon, rather than a situation in which extreme anthropogenic

pressures have been placed on a naturally semi-arid region over the last three decades of rapid industrial and urban growth. Such constructions may also have played an important role in the initial approval of the SNWTP, which came in 2002, one year after the end of a four-year period of drought in the NCP and serious seasonal flooding along the Yangtze (Shao and Wang 2003: 9). The timing of the State Council's approval of the project, in the immediate aftermath of a national discussion of regional drought, is likely to have played a role in the project's relative popular acceptance, in comparison to a project like the Three Gorges Dam, which attracted significant opposition from citizen groups and environmental organizations both nationally and internationally.

In addition to the reliance on key phrases and words as part of the naturalization discourse, several interview subjects mentioned that rainfall in the north has declined over the last twenty years. For example, "Now with lower [rainfall] levels we are experiencing water problems. I have heard from some water scholars that rainfall patterns are cyclical so maybe after twenty years it will go back up" (personal communication with Wang Hongwu, 11/21/2011). The North's rainfall patterns are indeed characterized by periodicity (Tan et al. 2011), but there is no compelling evidence at present to suggest a decline in regional rainfall over the last few decades that falls beyond the scope of the normal cyclical pattern. Looking at other large-scale water management projects, such as the Sardar Sarovar Dam Project in Gujarat, India, we see that narratives about naturally declining rainfall and links to climate change are often used as a tool to justify unpalatable projects (see Metha 2001). This discursive strategy not only naturalizes water stress, but, in an interesting scalar turn, it shifts responsibility away from local and regional behavior and casts international actors such as the United States, the world

leader in per capita carbon-dioxide emissions, as the main culprits. It will be interesting to see if climate change becomes a scapegoat for the water problems of North China in coming years and decades.

The other side of the scarcity narrative is the supposed "abundance" of water in the south—the donor region of the water to be transferred northward via the Middle Route. As one Beijing official in charge of the city's water resources and urban infrastructure told me: "In contrast to the north, water resources in the south are […] abundant…" (personal communication with Sun Mingsheng, 12/8/2011). Another official remarked, "[…] The south has an abundant water supply, but in the north every province lacks water…" (personal communication with Li Dong, 11/21/2011). Similarly, an article in *China Today* reads, "The reality of the situation in the water transfer region is that the south's Yangtze River system has sufficient water resources to supply the transfer" (China Today 6/13/2011). This narrative is also supported by popular sayings about how plentiful water is in Henan and about how many lakes there are in Hubei, the so-called "province of a thousand lakes" (千湖省).

Despite these claims of profusion, water resources in the donor basin of the Middle Route have come under significant stress in recent decades. While in the field in southern Henan, for example, it was clear from the number of riverbeds crisscrossing the land that surface water was, at one point, abundant. But now most of those riverbeds are either dry or host to dwindling flows during wet and dry seasons alike. Many have become construction sites or grazing land with grass high enough to indicate several years of low water volume. Perhaps more startlingly, between 55 and 90 percent of the region's lakes have either dried up or been lost to urban development (Du et al. 2011; Liu

2012). During my fieldwork in the summer of 2011—also the time of a major construction push for the Middle Route—the donor basin suffered a severe drought in which the levels of the Danjiangkou Reservoir fell to historic lows and rural populations in the Han and Middle Yangtze Basins struggled to have their basic water needs met.

The U.S. State Department has identified insufficient water at the project's main repository of transfer water, the Danjiangkou Reservoir (which stores water from the Han River) as the primary challenge to the Middle Route (WikiLeaks Cable 8/30/2011). As Liu Changming of the Chinese Academy of Sciences' (CAS) Institute of Geographical Science and Natural Resources Research warned even before construction on the SNWTP began, "[…] in some cases at least, the water is not absolutely surplus in the exporting region. […] [F]or the middle route project, diverting water from the middle and lower reaches of the Han River will reduce the amount left for irrigation and navigation" (Liu 1998: 907). Another CAS scholar in Wuhan, Du Yun, is skeptical that the Han River has any water at all to spare for the transfer project (Watts 9/11/2011). In fact, the long-term project plan has recently been modified to include a pump connection from the Three Gorges Reservoir on the Yangtze River in order to increase the supply to the Danjiangkou Reservoir, the Middle Route's donor source that, according to the discourse, has plenty of water to spare (Middle Route Project 2013).

In sum, while the NCP is indeed a semi-arid region with average annual rainfall varying between two and 25 inches and heavily concentrated in just a few months out of the year (Cai 2008: 14; Fairbank and Goldman 2006: 5)— it has not struggled with such severe water stress until quite recently. To be sure, the region has endured major droughts throughout history, but water stress as a year-round (rather than seasonal) widespread

phenomenon of such great magnitude is in large part the result of anthropogenic stresses introduced during the reform period. But instead of paying attention to these, the "natural aridity" of the region and water "abundance" of the south are exaggerated and emphasized at the expense of addressing major anthropogenic exacerbators. While it is not possible to know whether those promoting this naturalized story line about North China's water woes and a corresponding abundance of water in the south truly believe the region's water stress to be the result of purely natural conditions, this is a "discourse of distraction" that, intentional or otherwise, serves to deflect attention away from factors that policy measures might actually be able to address.

Environmental Benefits

The second pervasive discourse I argue is being employed in the case of the Middle Route is premised upon the "environmental benefits" of the South-North Water Transfer Project. The basic narrative is that the SNWTP, particularly the MR, is an ecologically friendly water management scheme that will help improve the environment of the NCP. In my interviews, the environmental benefits narrative was employed particularly among government officials in and around Beijing as a justification for the sacrifices made in the south in support of the Middle Route. For example, "The South-North Water Transfer Project will improve the ecological situation on the entire North China Plain and be a huge benefit" (personal communication with Sun Mingsheng, 12/8/2011). Another illustrative quote comes from a high-ranking government official in Beijing:

> Increasing the speed of urbanization and economic growth is one aspect of the [SNWT] project, but I think that the more important benefit will be improving the ecological environment. At the moment, much of our water supply comes from groundwater, which degrades the environment. Increasing the water supply will allow us to reduce our reliance on groundwater, so we can say that the project will have environmental benefits (personal communication with Chen Shuai, 12/8/2011).

Surprisingly, I also heard this refrain, that the project will reduce the north's unsustainable reliance on groundwater withdraws, in interviews with a handful of local government officials in the Middle Route's donor basin in Henan province. While officials in these areas will not gain access to any of the route's water and the legitimacy of the Party on a national scale is not their primary concern, they stand to benefit from the project in other important ways.

In Xichuan County (淅川县)，for example, Middle Route construction has brought government investment to an area that has otherwise been left behind by the development efforts of the provincial and national governments. The project has brought a kind of development typical in rural China, one that is haphazard and gritty and happening so quickly that roads are literally still in the process of being built even as trucks and cars drive over them and as mosaics of corn kernels lay out to dry in the path of pavers. Even though the signs of what many in China would consider progress, coated in a thick layer of yellow dust, are hard to see for an outsider, local officials are thrilled to have this kind of minute-by-minute development going on in their backyards. The project, while affecting Xichuan county perhaps more than any other in terms of water availability and social displacement, has brought jobs and investment and local

government officials there are eager to justify the project in any possible terms, including the ecological benefits discourse, which was widely cited in my interviews with local officials in Xichuan. The example of Xichuan also demonstrates that the SNWTP is valuable to government officials not only for its ability to support and enhance legitimacy at the national level, but in bringing economic investment and development (even if it leaves much to be desired qualitatively) to county-level jurisdictions.

This discourse of distraction is also prominent in the state-run media. One exemplary article from the China News Network claims that the SNWTP is intended to "…mitigate the increasingly severe water shortage on the 3-H plain and improve the ecological environment" (China News Network 12/27/2012). Another claims that the project will, "…effectively relieve groundwater over-extraction, […] begin containing the worsening situation of aquatic ecosystems in the north, and recover and improve the ecological environment, step-by-step" (People's Daily 12/27/2012). According to an article in *China Today,*

> …the Eastern and Central route construction also bring ecological benefits. According to Shen [Fengshen of the SNWTP Commission of the State Council] depletion of the water table is obvious due to the overexploitation of groundwater in drought-prone areas, and he offers an example, 'Water is hardly ever seen while digging subway tunnels in Beijing, but the situation is quite different when digging tunnels in Guangzhou which is very rich in groundwater. "The phenomenon of a 'big funnel' is often found in northern China, where the aquifers easily become contaminated by surface sewage and seawater. That is a big problem. However, after the southern water is available to northern areas, groundwater overexploitation will be curbed and the underground 'big funnel' effect will be greatly reduced,' explains Shen (*China Today* 6/13/2011).

The last excerpt is particularly problematic in its conflation of Guangzhou, a city that receives an average of 68 inches of rain per year, the same as coastal Oregon, with the project's water donor zone. The other problem with the narrative this excerpt exemplifies is that the Middle Route will not actually relieve pressure on groundwater resources. It will indeed bring vast volumes of water to the North China Plain, but this water will be used to increase the region's supply in the face of growing demand, rather than to shift the composition of water supply away from its heavy reliance on groundwater. In other words, the transferred water of the Middle Route will be used *in addition* to the voluminous groundwater withdraws in North China, not in place of groundwater. Furthermore, the environmental impacts of the project itself—from secondary salinization to the reversal of delta formation and biodiversity loss—would certainly come as a tradeoff to the overuse of groundwater. Which path is less ecologically harmful is not immediately clear.

The environmental benefits narrative is also supported by frequent vague references to the South-North Water Transfer Project's role in supporting "sustainable development" (可持续发展). In one government meeting on the Middle Route that I observed in Zhengzhou, the SNWTP was contextualized among interbasin transfer projects of the past including early transfer projects in ancient Egypt and Ethiopia and more contemporary projects in Spain, California, and Pakistan. The many interbasin water transfer projects undertaken in "New China" (新中国，i.e., China since 1949) were then enumerated and the presenter, an official in the MR Henan office, asserted, "These projects have had a significant effect on local production, life, and the rational use of natural resources. At the same time, they have maintained the lifeblood of sustainable

development (可持续发展的命脉).” Government documents such as those issued by the State Council announcing the approval of the South-North Water Transfer Project and outlining its aims also make unsubstantiated references to the project’s contributions to sustainable development (see State Council 7/31/2003 and SNWTP Construction Committee Law 5, 2004).

Related to the narrative about the environmental benefits of the Middle Route and its contributions to sustainable development are two dictums that serve to present an alternative story to the reality of water management on the North China Plain. First, my interview subjects frequently suggested that the government is following a principle they call, “Let water supply dictate demand” (一共定需). This slogan implies that North China is striving to live modestly within the means of its tight water budget by reigning in its water demand based on the limitations of the available supply. While this approach would ensure a more temperate effect on the environment, the SNWTP is aimed precisely at *increasing* the region’s supply to meet growing demand. What is actually being put into practice with such a massive interbasin water transfer project is not “Let water supply dictate demand,” but exactly the opposite, “Let water demand dictate supply.” Another phrase in the same vein as, “Let water supply dictate demand,” is Save water first, transfer water after; Control pollution first, share water after; Protect the environment first, use water after（先节水后调水，先治污后通水，先环保后用水).” This aphorism, appearing in government documents related to the SNWTP and water management in the north (for example see State Council 12/23/2002), again gives the impression that the South-North Water Transfer Project is part of an environmentally

conscientious, policy-driven, balanced supply and demand side effort to manage the water stress of north China, when in fact it is not.

Ultimately, the environmental benefits narrative, focused on the Middle Route as an alternative water source to overly taxed groundwater supplies on the NCP, and vague notions of sustainable development, is a discourse of distraction that serves as an apolitical justification for the SNWTP and helps to mask its negative environmental and social impacts, attempting to green-wash the project and recast it in a positive light.

Scalar politics of water governance

Another major area worth exploring when it comes to the politics of China's South-North Water Transfer Project is scale. A critical consideration of scale offers insight into the broader political-economic interests at play and illuminates the important and underappreciated links between water and power in the Chinese context. As Swyngedouw notes, "The mobilization of scalar narratives, scalar politics, and scalar practices […] becomes an integral part of political power struggles and strategies" (Swyngedouw 2004a: 134). In the specific case of the SNWTP, there are several examples of the strategic political use of scale and scalar shifts in the framing of water management problems and solutions.

First, one key issue related to scale and the Middle Route has to do with the framing of the project's water source. Although the project is often discussed as a national water management project (see below), when it comes to the specifics of the SNWTP's water we have seen a different scalar construction at play. Instead of focusing

on the fact that the Middle Route draws water from the Yangtze River Basin and its largest tributary, the Han River (see *Figure 4.1)*, the project is presented as geographically disembodied from the bioregion that supports it. What we see instead is a new, regional scale bound by provincial and municipal boundaries—including Henan, Hebei, Beijing, and Tianjin—but also including the Danjiangkou Reservoir on the border of Henan and Hubei. This scalar construction, depicted in *Figure 4.2*, *Figure 4.3*, and *Figure 4.4*, is a departure from both bioregionalism and the national emphasis so often discussed by officials and in the media. More importantly, it allows the actual donor basin or transfer zone of the project to be excluded from the conversation on the impacts, both positive and negative, of the Middle Route.

Figure 4.1- The Yangtze River and its Tributaries

Source: China Environmental Law

Figure 4.2- Cities along the Middle Route

Source: Baidu (Labels, from south to north: Danjiangkou, Nanyang, Pingdingshan, Luoyang, Zhengzhou, Xinxiang, Jiaozuo, Hebi, Anyang, Xingtai, Shijiazhuang, Baoding, Tianjin, Beijing).

Figure 4.3- Cities along the Middle Route

Source: Xinhua (Cities, from south to north: Danjiangkou Reservoir, Nanyang, Pingdingshan, Xuchang, Zhengzhou, Jiaozuo, Xinxiang, Hebi, Anyang, Handan, Xingtai, Shijiazhuang, Baoding, [Tianjin], Beijing).

Figure 4.4- The Middle Route

Source: Henan SNWTP Office meeting presentation, December 2011 (From south to north, labels read: Danjiangkou, Henan, Hebei, Tianjin, Beijing)

Figure 4.5- The Three Routes of the SNWTP

Source: nsbd.gov.cn

Figure 4.6 – Chart of the SNWTP

Source: Henan SNWTP Office meeting presenation, December 2011 (From south to north, yellow labels read: Danjiangkou, Zhengzhou City, Tianjin City, Beijing City; Blue labels read, left to right, "Total length, 1277 km" and "Total length, 1156km").

A key facet of this scalar construction has to do with the Danjiangkou Reservoir, which is accepted without question as the source of the Middle Route's water by Chinese government officials across north and central China, in the Chinese media, and among many scholars. Even the American Embassy in Beijing has failed to question the Danjiangkou Reservoir as the source of the Middle Route's water (WikiLeaks Cable 8/30/2011). By identifying the reservoir as the MR source, the reservoir itself is constructed as a discrete body of water with a seemingly endless self-generating supply, free from completing claims and standing ever ready for northward transfer.

But the reservoir — as officials, media sources, and scientists are no doubt fully aware— is an amassment of water from the Hanjiang, the largest tributary of the Yangtze River. Once the SNWTP is fully operational, the volume of the Yangtze River will be reduced by more than 20 percent during certain times of the year, and by 4-5 percent on average (Zhang 2009: 1243). The human and ecological impacts of this are expected to be great, but rarely are such issues raised when talking about the project. This, I argue, is because identifying the Danjiangkou Reservoir as the source of the Middle Route's water supply allows the Yangtze River Basin to fall beyond the scope of the project. As such, the project's potential impacts on this area are not given full consideration or brought into the conversation in any significant way.

The spatial exclusion of the Yangtze Basin from the Middle Route is expressed not only through the identification of the Danjiangkou as the project's source in interviews and countless news articles, but also in cartographic depictions of the project.

For example, *Figure 4.5*, promoted on the official government website of the SNWTP and on state television, shows the courses of the Eastern, Middle and proposed Western Route in solid blue lines from right to left. The origin of the Middle Route is clearly labeled as the Danjiangkou Reservoir, with no connection at all to the Hanjiang or Yangtze River, featured just to the south on the map. Similarly, *Figure 4.6*, presented at a government meeting on the SNWTP that I observed in Zhengzhou in late 2011, plainly identifies the Danjiangkou Reservoir as the Middle Route's water source. No link at all is made to the rivers that supply the reservoir with water to transfer northward.

As Gupta and van der Zaag note, "Since interbasin water transfers connect hydraulically two or more river basins that hitherto were unconnected, they imply an increase of the spatial scale at which water is managed" (Gupta and van der Zaag 2008: 29). The visual depictions of the project above work to deny this scalar increase. In *Figure 4.2* through *Figure 4.6*, the Yangtze Basin—and therefore the interests of people and environments within the region—are cartographically excluded from discussions of the Middle Route. South-Central China, which, by all accounts, will bear most of the negative impacts of this massive water transfer, is conveniently framed beyond the scope of the project. This framing of the Middle Route dilutes any potential controversy in the donor basin and defers any significant conversation on mitigating the downstream impacts of the project.

Rather than approaching water management from a local or bioregional perspective in which hydrological units (watersheds and river basins, in this case) serve as the management unit (see Thayer 2003), the South-North Water Transfer Project locates the solution to North China's water shortage at the national scale. One interview

subject remarked that water shortage on the NCP "…is really a national problem that requires a solution in the national economic system" (personal communication with Li Dong, 11/21/2011). He continued, suggesting that the north and south should engage in a national resource exchange system in which the south shares its "plentiful" water resources with the north, which will in return share its coal in a mutually beneficial exchange.[33] Another interviewee referred to the SNWTP as "…a water use plan for the entire country" (personal communication with Sun Mingsheng, 12/8/2011).

Additionally, in presentations made by government officials on the SNWTP that I observed, it was very common for the project to be discussed alongside images of monumental projects of national (and nationalistic) pride, such as the Great Wall. Billboards and government slogans placed near the Middle Route construction zone also illustrate how the SNTWP is wrapped up in notions of national progress and achievement. The roadside billboard pictured in *Figure 4.7,* for example, displays the text, "Carry on the undertaking of Great Yu, work without rest to advance" (传承大禹，奋进不息), against images of China's high speed train, a freshly paved highway, the Three Gorges Dam, and what looks to be some kind of historical defense wall in the lower left-hand corner. Yu, as the founder of the Xia Dynasty, whose territory extended along the Yellow River into parts of modern day Shandong, Shaanxi, Henan and Hebei between 1600 and 1046 BCE, is known for his efforts to mitigate the impacts of flooding along the Yellow River through the construction of an elaborate canal system. Freeman

[33] The implications of this type of model will be discussed in Chapter Six.

describes the myth surrounding Yu: "As the legend goes, when a man named Yu heeded the dragon's instructions about how to channel flood waters, he tamed China's rivers and was made emperor" (Freeman, China Environment Forum).

Figure 4.7- Roadside Slogan, "Carry on the undertaking of Great Yu, work without rest to advance"

Source: Author, Henan Province, 2011

As discussed in Chapter Two, this is an example of how national success can be linked with the story of a hydrological imperative and, in turn, used to facilitate a scalar

shift upward to the national level. Again, cases such as these tend to be part of a larger project of state building, territorialization or nationalism. In this instance specifically, the SNWTP is placed within a genealogy of symbols that link the project to national advancement, progress, and externally directed power, while also placing it within a historical narrative that clearly recognizes the links between water control and power.

Related to this emphasis on the national scale is a pervasive "*eat bitterness"* (吃苦) narrative. In Chinese, to eat bitterness or *chi ku* means to suffer or bear hardship. It implies that hardship should not be complained about or lamented, but is simply a part of life that must be borne. The concept of *chi ku* is deeply embedded in the Chinese psyche. Woronov discusses how Beijing's elementary school curriculum works to teach children to "eat bitterness," seen as a necessary national characteristic, both in and out of the classroom.

> …[H]aving children run laps around the courtyard in the snow or having first-graders stand for hours in unbearable heat, were justified as building children's strength and ability to tolerate hardships (chiku; literally, "eat bitterness") and to teach them that attaining all worthwhile goals requires significant, focused, and sometimes painful effort (Woronov 2009: 581).

Additionally, Woronov observed that the value of learning to eat bitterness was often presented to the school children though the example of China's hard-fought victory over Japan in World War II, clearly relating the cultivation of *chi ku* to national success.

In both my interviews and discourse analysis, the social consequences of the Middle Route—from the forced migration of more than 330,000 people to mandated

changes in agricultural practices and corresponding impacts on livelihoods —are frequently brushed aside with matter-of-fact statements about how difficult sacrifices must be made for the sake of the nation and there is nothing to be done about it. The state-run media has printed dozens of articles over the last few years that exemplify the *eat bitterness* discourse, focusing in particular on the people displaced by the project and forced to migrate from their homes. These articles tend to quote migrants (whether they are real or fabricated is both difficult to determine and irrelevant) who have been relocated, recognize that they are in an unpleasant situation, but know that they must make a personal sacrifice for their country. One woman forced to move from her home said, "Although we made a sacrifice, it was for the sake of the people still suffering water shortage" (China Daily 12/20/2011). Another relocated person is quoted as saying, "I feel devoted to this land, but the project is in the national interests" (Yao and Li 2011). Another article, suspiciously featured on the SNWTP website, tells the story of a man who had lived near the Danjiangkou Reservoir for 33 years,

> 'I have lived here for decades, it is a really difficult decision to move,' says Zhang with tears in his eyes. But the former public employee felt obliged to make a personal sacrifice for the greater good. 'We responded to the government's call [to move] because otherwise construction [on the water transfer project] couldn't begin'…. (Jiao 2011).[34]

Yet another *People's Daily* article quotes the head of the Danjiangkou Resettlement Bureau, Liu Jiashun, as saying, "Villagers have accepted sacrifices for the need of the

[34] Note that the relocation of such populations was compulsory.

country" followed by a relocated migrant who remarks, "Our sacrifice is worthy as it is for the need of the country" (Li and Xiong 12/9/2009).

While the sacrificial dimension of this narrative is a propagandistic tool intended for public consumption, conversations with locals in the Nanyang area of Henan, where about 90,000 people have been relocated from the Danjiangkou Reservoir area, reveal a different story. For one, there are deep tensions between migrants and local residents, who feel that they have had to unfairly sacrifice their farmland and other resources to accommodate the newcomers (personal communication with Xu Fangqi 12/3/2011). They make no mention of a willingness or duty to bear this burden for the sake of the nation. While state media source and government officials I interviewed in Nanyang tout the benefits experienced by the relocated people, such as having access to urban facilities, air conditioning and washing machines (China Daily 12/20/2011), informal conversations with local residents suggest discontent over other issues, such as water access, which was free prior to relocation but comes at a price in the migrant communities.[35] Moreover, international media sources have reported that many of the concrete resettlement homes were shoddily constructed with collapsing floors, rooms off kilter, and cracking walls, contributing to clashes between police and migrants upset over poor housing quality and

[35] Systematic fieldwork involving migrant communities was not politically feasible at the time this project was undertaken. It is my hope that the political space around these communities will open up in the future so that migrant perspectives may be incorporated into the academic discussion of the South-North Water Transfer Project and its social impacts.

inadequate compensation (Watts 9/11/2011). Displaced communities have also been the source of burgeoning grassroots opposition to the project, based not on environmental terms but on concerns about compensation (Buckley 2009). Further exploration of this important subject presents an excellent topic for future research on competing, non-governmental discourses surrounding the Middle Route of the South-North Water Transfer Project.

Further, the *chi ku* narrative, presented particularly to the Chinese public in popular media outlets, reinforces a sense of national duty among those who might oppose the construction of the Middle Route due to its adverse social impacts. By striking nationalist chords with the public, it also helps to foster buy-in among those who live in regions and sub-regions that fail to benefit directly from the project. This *chi ku* discourse, along with roadside slogans in the water donor region, such as "The South-North Water Transfer Project benefits the country and benefits the people" (*Figure 4.8)*, help to construct the Middle Route as a national project. This scalar emphasis on the nation rather than on regions or biophysical entities, allows the millions of people who, as residents of the project's donor basin will experience some kind of negative impact on their livelihood or local environment as a result of the project, to be recast. As citizens of China rather than residents of the donor basin, they are effectively recategorized as beneficiaries of the South-North Water Transfer Project. After all, the project may hurt the Danjiangkou area, for example, but it will "…benefit the country…" (*Figure 4.8).*

Figure 4.8- Roadside Slogan, "The South-North Water Transfer Project benefits the country and benefits the people"

Source: Author, Henan Province, 2011

Chapter Summary

This chapter introduced the idea of "discourse of distraction" –alternative stories about the drivers of water stress and justifications for the South-North Water Transfer Project that work to depoliticize the project, mask its social and ecological impacts, and deflect attention away from the root causes of water stress in north China. Two such discourses were discussed. The first discourse naturalized water stress in North China, emphasizing water scarcity in the north, abundance in the south, and focusing on drought and key words such as "aridity." The second discourse rests on the argument that the Middle Route will deliver environmental benefits to the recipient basin by relieving pressure on overburdened groundwater resources. These discourses, I argue, are being

employed as a political tool to deflect attention away from the three major anthropogenic sources of water stress identified in Chapter Three because to address them would undermine economic growth, an important factor in the Chinese Communist Party's ability to maintain legitimacy.

Additionally, two specific scalar constructions were discussed, demonstrating the utility of scalar manipulations in political maneuvering around the South-North Water Transfer Project. The first construction identifies the Danjiangkou Reservoir, rather than the Hanjiang or greater Yangtze River Basin, as the source of the Middle Route's water. In so doing, this critical area and any discussion of the impacts the SNWTP may have on its people and environments are constructed as falling beyond the scope of the project. A second scalar narrative emphasizes the SNWTP as a national project, which serves to recast people in the donor region as beneficiaries making a worthwhile sacrifice for the good of their nation, rather than victims of a regional water management scheme.

CHAPTER FIVE:

Water Use Tensions and Trade Offs

Introduction

This chapter begins with a discussion of the multiple uses and values placed upon the water of the South-North Water Transfer Project, addressing the ways in which the project both reflects and solidifies broader spatially articulated power discrepancies between "legitimate" and "illegitimate" users and values. By examining which of the competing ways of valuing water on the North China Plain are incorporated into the region's overarching water management scheme, of which the SNWTP is a central component, the underlying preferences and political-economic agendas of the decision makers are made evident. We see that some uses for water, including agricultural production, fishing, habitat and other key ecosystem necessities, are rendered either low priority or entirely illegitimate as part of the region's water management program,[36] while industry and urbanization take priority. This chapter also addresses the question of why, in the face of widespread water use and user marginalization, the South-North Water Transfer Project has failed to catalyze any major civil backlash. I focus in

[36] To be sure, these are not the only other possible ways of valuing water on the North China Plain. Aesthetic, recreational, spiritual, and cultural values may also be important.

particular on the relationship between the government and non-governmental organizations, which have played a significant role in mobilizing popular response to other potentially environmentally and socially harmful projects in China in recent years.

Next, the temporal, sectoral, and spatial trade-offs of the Middle Route are addressed. I argue that rather than solving the water problems of the North China Plain, the project will temporarily ease the region's water stress by providing additional water to meet growing industrial and urban demand and facilitate continued economic growth. However, because the SNWTP fails to address the underlying causes of regional water stress it will, over the longer-term, allow the situation to worsen and defer the social and environmental consequences to future generations. Sectorally, the project gives preference to urban and industrial water use, with implications for agriculture and national food security, as well as stakeholders whose water use values are marginalized as part of the project's water management plan. Finally, in terms of spatial trade-offs, the Middle Route prioritizes North China over the Yangtze River Basin and also ranks Beijing's present and future water needs above those of its neighbors. I argue that by diverting water—the basic input for future development opportunity—away from certain areas in favor of others, the spatial power dynamics expressed in the SNWTP set in motion a pattern of inequities that is likely to persist for at least several decades. Finally, the bureaucratic fragmentation of water management and its implications are discussed.

Use Value Priorities

Water is valued for many different uses by a range of user groups across the North China Plain and interconnected regions. But these users do not hold equal power or voice when it comes to negotiating the incorporation of their use values (ex., use for industrial production, agriculture, fishing, urban development, ecological importance, aesthetic value, etc.) into water management schemes like the South-North Water Transfer Project. Instead, water management policy- and decision-makers seeking to maximize their interests prioritize certain water uses over others. According to Article 21 of the 2002 *Water Law of the People's Republic of China* (中华人民共和国水法), urban household needs take priority, but management plans shall, at the same time, take into consideration agricultural, industrial and ecological water needs. The document continues, "In developing and utilizing water resources in arid and semi-arid areas, full consideration shall be given to the water need of ecological environments." Despite this legal ranking of water uses and aspirations of having a balanced, multi-use water management system, the way things play out on the ground in semi-arid North China is quite different.

As Cai notes, "Water stress in Northern China has intensified water use conflicts between upstream and downstream areas and also between agriculture […] and the municipal and industrial sectors (M&I), which have been growing fast" (Cai 2008: 14). The ways in which the resource has been designated for use both spatially and by sector, particularly in the face of water shortage, reflects the interests of those with political and economic power. Where water comes to physically flow and what it is used for

illuminates whose use values are ultimately legitimized in management practice. At the same time, values deemed "illegitimate" by management plans are revealed when we look at where water fails to flow and which sectors and uses lack adequate water resources.

Agriculture is a high-demand sector for water use on the NCP, representing roughly 75 percent of total water consumption (Cai 2008: 16).[37] As a center of grain production, the region produces more than 60 percent of China's wheat and 40 percent of its corn. While only seven percent of the country's total rice output comes from the 3-H Plain, the region is known for a particularly desirable variety that fetches a high price on the market (Yang et al. 2003: 144). Other key crops in the region include millet, sorghum, and cotton, though there has been a shift toward commercial vegetable and fruit production in the last decade (Calow et al. 2009; Yang et al. 2003: 155). This shift has been supported by government subsidization of well drilling to ensure reliable access to groundwater as an irrigation source. Because of the climate, characterized by high seasonal and inter-annual rainfall variability, irrigation is key on the North China Plain,

[37] Agricultural consumption as a share of total water consumption has been declining in recent years (Cai 2008) and the annual growth rate is very low at 0.6 percent. Even so, the agricultural sector is expected to remain the country's largest water consumer until roughly 2030 (2030 WRG 2009: 58). Industrial and residential consumption, on the other hand, are smaller as a portion of total water consumption, but represent the fastest growing sectors of use (2030 WRG 2009: 58).

accounting for 80 percent of economic output in agriculture (2030 WRG 2009: 58). Without irrigation the region's growing season would be restricted to the summer monsoons, but with it multiple cropping is possible (Yang et al. 2003). This heavy reliance on irrigation for agricultural output comes at a high environmental cost, as groundwater accounts for a majority of irrigation water in the North. In Hebei province, for example, it accounts for more than three quarters of irrigation water and almost 80 percent of total water use (Calow et al. 2009: 230).

While agriculture is undoubtedly important to the economy of the north, it is a lower value use for water than urbanization or industry. As Brown points out, "The economics of water use do not favor farmers in this competition [for water between cities and farms], simply because it takes so much water to produce food." He notes that producing one ton of steel worth $550 requires about 14 tons of water, while the production of one ton of wheat worth just $150 takes about 1,000 tons of water (Brown 2006: 53). The discrepancy may be even more dramatic in China due to the country's relatively low water use efficiency rate (Liu and Yang 2012: 649).[38] Given the Chinese government's emphasis on short-term economic growth at any cost, Elston's (1999) characterization of agriculture as the "water user of last resort" on the NCP is not surprising. As Berkoff describes it, "… most of the time irrigation capacity (greatly) exceeds the water available…irrigation simply absorbs the balance of what is available

[38] As Liu and Yang note, water use per unit of GDP is roughly three times the world average (Liu and Yang 2012: 649).

after other needs are met" (Berkoff 2003: 21). As such a low priority use, only three- of 14-billion cubic meters of the valuable transferred water of the SNWTP's Middle Route have been officially designated for agricultural purposes (Middle Route Project 2013). Instead, the water is intended largely for urban expansion and industrialization (Geng et al. 2001: 351; Middle Route Project 2013), which fuel economic growth. Moreover, because of the cost of the project, the price of the water it transfers will be 5-10 times greater than residential water in major Chinese cities, placing it far beyond the reach of the average Chinese farmer (Webber 2012: 178). As Webber argues, "Farmers are being displaced, but there will not be any farmers benefiting from the project" (Webber 2012: 178).

In addition to failing to receive a portion of the project's waters to support their crops, many farmers along the route have been ordered by the government to plant crops that require less water, such as wheat and corn in place of rice and vegetables (WikiLeaks Cable 8/30/2011[39]). For example, as one interview subject told me, because rice farming is very water intensive, it is no longer considered feasible in Hebei province: "It has been

[39] This source, while non-traditional, is an unclassified but sensitive government document sent from the United States Embassy in Beijing to the U.S. Secretary of State, Department of Agriculture, Department of the Interior, Environmental Protection Agency, the American consulates in Chengdu, Guangzhou, Shanghai, Shenyang and Hong Kong, and several other offices involved in work on the environment, science and technology. It was leaked and made publically viewable by the controversial online non-profit, WikiLeaks.

made illegal to grow rice around Beijing, especially in the northwest and northeast around the reservoirs in Chengde and Zhangjiakou" (personal communication with Yang Qi 11/21/2011). Several articles, both scholarly and popular, confirm this (see Bai and Cao 2010; Cai 2008: 18, and; Xinhua 10/8/2011). No longer able to produce higher value cash crops, the income of these farmers has suffered as a result of this policy shift (WikiLeaks Cable 8/30/2011), but these agricultural water users lack the political power to have their voice heard or their use preferences made legitimate and incorporated into the SNWTP management plan in a way that might benefit them.

Farmers whose planting practices have not been directly affected by policies related to the South-North Water Transfer Project may not even be aware that they are being denied access to the transferred water. Over the summer of 2011 I spoke with half a dozen farmers on the outskirts of Shijiazhuang who, despite living less than a mile from the primary canal of the Middle Route—then under construction (*Figure 5.1)*, had no idea that the massive trench being dug in the earth next to their farmland was part of a 1260 km water transfer project. What was obvious to residents of Shijiazhuang, however, were numerous advertisements across the city for new commercial real estate developments offering luxury "waterfront" properties in a landlocked and severely water-stressed city (*Figure 5.2)*. Clearly, increasing agricultural water supply in the north is not a priority of the Middle Route.

Figure 5.1- MR Canal Under Construction in Hebei

Source: Author, Shijiazhuang, July 2011

Figure 5.2- Advertisement for Waterfront Real Estate in Hebei

Source: Author, Shijiazhuang, July 2011

In addition to its potential value to agricultural production, marginalized in the plans of the Middle Route, some of the waters on the North China Plain are valued by user groups for the fish they provide, both for personal sustenance and livelihood. While the region's fishing and aquaculture industries have suffered significant damage due to poor water quality, largely from heavy metal contamination (Cao et al. 2007; Wang et al. 2005), the local fishing community around the Danjiangkou Reservoir has been particularly affected by the introduction of the Middle Route. According to my interviews, a significant portion of the migrants who have been relocated from the banks of the Danjiangkou Reservoir once lived as fishermen. Roughly 98,000 of these displaced peoples were relocated to seven towns under the jurisdiction of nearby Nanyang City, including Dengzhou, Wolong, Sheqi, Taihe and Huchuan (SNWTP Leader's Conference, Xichuan).

Prior to relocation, both their livelihoods and their diets were derived primarily from the reservoir's fish, which include at least 53 species, such as the *Wenju* (*Rhinogobio typus*) and Yellowcheek (*Elopichthys bambusa*) (Zhong and Power 1996; Wu et al. 2007). The fish now appear to be caught primarily by medium-sized net vessels (*Figure 5.3*), rather than by means of the smaller-scale artisan practices (*Figure 5.4)* of the relocated population. This shift in fishing practices not only reflects the pushing of local artisanal fishers out of the market, but the netting practices of larger fishing vessels catch a greater volume of fish at once and may contribute to overfishing in the reservoir over the long-term. While some of the catch of these larger operations is sold regionally, as far away as Beijing, trucks of fresh Danjiangkou fish travel from the reservoir to

several of the migrant communities each day in order to accommodate the eating habits of the relocated fishers (personal communication with Jiang Qiushang, 12/9/2011).

Despite the fact that these migrants still live relatively close to the reservoir (within 30-90 minutes by car) and are able to continue eating its fish, they can no longer make a living by fishing and are instead migrating to the very regional cities whose water supplies are already under pressure from rapid population growth. Others have turned to local industrial factories to earn a living (personal communication with Peng Kefu, 12/13/2011). Because the waters of the Danjiangkou Reservoir are now valued almost exclusively for northward transfer, the water values of the artisan fishers that once populated its banks have been eclipsed and further pressure is being placed on the water supply of nearby cities as a result.

Figure 5.3- Net Fishing on the Danjiangkou Reservoir

Source: Author, 2011

Figure 5.4- Artisanal Fisherman on the Danjiangkou Reservoir

Source: Author, 2011

Figure 5.5- Danjiangkou Reservoir Fish Hanging to Dry

Source: Author, 2011

Like farmers and fishermen, ecosystems on the North China Plain lack a strong advocate to ensure that their water needs are met and as a result they have failed to benefit from the construction of the Middle Route. Given that construction of the Middle Route is ongoing, studies on its environmental impacts have not yet been completed, let alone published. Chapter 3, Article 22 of the PRC Water Law stipulates that no detrimental environmental impacts shall result from interbasin transfer projects in either the donor or recipient basins.[40] However, anticipated environmental impacts include

[40] "For the diversion of water across river basins, comprehensive planning and scientific demonstration are necessary and overall consideration shall be given to the need for

secondary salinization in the recipient basins, the crossing of biogeographic barriers between river basins (Meador 1992: 18), which could lead to the introduction of alien and invasive species, including disease vectors and parasites such as those that cause schistosomiasis (Zhang 2009).

Scientists also expect to see changes in the flow patterns of the Yangtze River and its main tributary, the Hanjiang. The total volume of water diverted from the Yangtze Basin via the routes of the SNWTP will be about 4-5 percent of the river's annual discharge, but could constitute more than 20 percent of river volume during the dry season from December to March (Zhang 2009: 1243). This dramatic decrease in the volume of the Yangtze River due to northward diversion is expected to accelerate the intrusion of seawater into the estuaries of the Yangtze Delta and reduce coastal sediment flows, which will either slow or reverse delta formation (Zhang 2009: 1243). Likewise, on the Hanjiang water flow downstream of the Danjiangkou Reservoir will also be reduced, compromising ecosystem function and exacerbating preexisting eutrophication issues in the area (Shao and Wang 2003).

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water by both the river basins where water is diverted from and the river basins where water is diverted to, and damage to ecological environments shall be prevented" (PRC Water Law 2002*)*.

One thing that is perhaps somewhat surprising is the seeming lack of push-back— at least on a large scale[41]— from civil society against the marginalization of these various water uses and users. China's recent history is rich with instances of environmental protest, ranging from spontaneous gatherings of a few dozen people to organized protests that draw several tens of thousands. Many of these protests are motivated by NIMBY ("not in my backyard") concerns related to specific projects that pose a threat to public health. Well-known examples include the 2007 protest in Xiamen against the construction of a petrochemical plant (AP 2007; Du 2006), demonstrations against a garbage incinerator in Guangzhou in 2009 (Watts 2009), the anti-chemical plant protests out of Kunming in the Spring of 2013 (BBC 5/16/2013; Phillips 2013), and, most recently, a successful protest against the construction of a nuclear facility in Guangdong's Jiangmen City (Economist 2013). Unlike these protests and other NIMBY-motivated events, however, the South-North Water Transfer Project does not pose an immediate or obvious threat to citizens' everyday health. Instead, the concerns are longer-term, socio-economic, and ecological.

Additionally, spanning more than 1,200km, the project lacks a clear nucleus and its affects are not concentrated in a single geographic area, which presents issue awareness and organizational challenges. This is one significant way in which the cases examined by Andrew Mertha in *China's Water Warriors*— his well-received study of the

[41] As mentioned, there have been a couple of small-scale protests against relocation efforts associated with the Middle Route, but they have not amounted to any major uprisings, nor have they been particularly coordinated events.

role of citizen action in shaping the politics around various Chinese hydropower projects, differ from the present case of the South-North Water Transfer Project. Together, these two factors—the perceived lack of immediate an immediate threat to health or NIMBY sentiments and the spatially extended nature of the SNWTP— have likely contributed to the relative lack of civic organization around the South-North Water Transfer Project to date.

In questioning the relative absence of political response to the SNWTP by affected populations and the Chinese citizenry, more generally, the role of non-governmental organizations (NGOs) is also worth examining. While the tight control of China's civil society is an important feature of the ruling party's authoritarianism, recent years have seen some opening up around the operation of NGOs. Despite significant organizational development challenges, environmental NGOs in China, "…have been active in raising the public's environmental awareness, monitoring polluting enterprises, and participating in environmental decision-making" (Xie 2011: 209). While official figures place the total number of NGOs in China at around 500,000 (Xinhua 3/20/2012), unofficial estimates—which include unregistered NGOs[42] —exceed three million (Ling

[42] All NGOs (as well as all "social organizations" [*社会团体*], which include state-run social-welfare groups) are required to have a sponsoring unit within the government—referred to as *挂靠单位* or sometimes as "mother-in-law." This sponsorship is meant to ensure that the organization operates lawfully (Saich 2000: 129). All social organizations operating at or above county level must also register with a civil affairs department. "This makes it impossible for local groups to enroll members from different areas, thus limiting

et al. 2007: 118). Regardless of which figures one goes by, there seems to be a consensus among scholars that this rapidly developing body of organizations is assuming an increasingly central and positive role in shaping outcomes, particularly around China's environmental politics (Carter and Mol 2007: 188; Heggelund 2004; Hu 2009; Mol and

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the potential for the spread of grass-roots organizations that could develop national or horizontal representation" (Saich 2000: 132). What this means is that many so-called "non-governmental organizations" are actually better categorized as oxymoronic "GONGOs", or government organized non-governmental organizations. In order to bypass government registration many organizations have chosen to register as a company under industrial or commercial bureaus (Saich 2000: 134). "This practice of registering the organization under an identification other than their true nature may result in the government's losing an overview of what organizations exist, as they will vanish from the government's view" (Heggelund 2004: 164). It is also common for such organizations to register as "secondary organizations," meaning that they will be monitored only by the agency that has agreed to supervise them (often a university) and not by the government (Saich 2000: 134). As a result of these adaptive and disguising strategies of evading strict government control—a variation of *戴红帽子* or "wearing a red hat," discussed by Tsai in the context of domestic companies disguising themselves in order to register for a preferred government status (see Tsai 2007)— the actual number of NGOs operating in China is dramatically higher than official figures suggest (Ling et al. 2007:118).

Carter 2007: 15; Yang 2003: 406). As Wang and Lin note, "Only relying on the market and government cannot fundamentally solve environmental problems. In addition to government and the market there is still a need to seek the power originating from society, the third party" (Wang and Lin 2008: 241).

One recent example in which NGO-led activism resulted in a more favorable environmental outcome comes from the Nu River in Southwest China where activists were successful in halting the construction of several damming projects being pushed for by provincial government officials (Busgen 2006; Litzinger 2007; Mertha 2008; McDonald 2007). According to McDonald, the successful anti-damming efforts on the Nu provided, "…a venue for Chinese NGOs to explore new political opportunity structures as well as new freedoms to publicly question government decisions" (McDonald 2007: 75). Mertha also explores NGO activism around the Nu River, focusing in particular on "policy entrepreneurs" (Mertha 2008). Given the number of places and large number of people being affected by the SNWTP, one would expect to see similar activist concern or, at the very least, some kind of minimal effort on the part of Chinese NGOs to engage in a conversation about the project and its social and environmental impacts. But this appears, at least for the moment, not to be the case.

In Beijing in 2011, I gave a presentation on the South-North Water Transfer Project to *Green Earth Volunteers (GEV, 绿家园志愿者),* one of the oldest and most prominent environmental NGOs in China, led by the internationally-known activist and "policy entrepreneur," Wang Yongchen. While GEV takes water as one of its primary concerns, focusing particular attention on the health of China's major rivers, it has no formally organized campaigns related to the SNWTP. Based on my interaction with the

head volunteers between September 2010 and early 2012 as a volunteer translator for GEV's Green News project, it is clear that the organization is quite knowledgeable about the details of the project and appears to be very concerned about the impacts it will have on both ecosystem health and human communities across China. However, GEV has not attempted to draw attention to these concerns in the way it pushed against dam projects on the Nu River, in whose protection the organization played a vital role (Mertha 2008; Xie 2011: 218).

Similarly, the Institute of Public and Environmental Affairs (IPEA, 公众环境研究中心), an environmental non-profit organization based in Beijing and run by one of China's most outspoken environmental activists, Ma Jun, makes no direct mention of the SNWTP on its website or in its extensive published reports. The Green Friend Association **(**绿色之友协会), an environmental NGO that has been operating out of Shijiazhuang in Hebei Province since 1996, and Huaihe River Guardian (**淮河卫士**), another prominent environmental NGO focused on the North China Plain's Huai River, also lack open campaigns and publically available documents related to the water transfer project.

Green Hanjiang (绿色汉江), the only environmental NGO dedicated to the Han River Basin and based in the city of Xiangyang on the banks of the Danjiangkou Reservoir, does express brief concern over the Middle Route project on its website: "The Han River is the 'Mother River' (母亲河) of the people of Xiangyang and after the Middle Route of the SNWTP begins transferring water, the river's total flow volume will be reduced by roughly one-third, making the water quality situation more serious"

(ghj.org.cn, 绿色汉江简介2013). Despite its concerns, however, even *Green Hanjiang* fails to contest the South-North Water Transfer Project or support civic organization against it in any substantive way.[43] What all of this amounts to is the question of why have we not seen any significant NGO involvement in or civic organizing around the South-North Water Transfer Project, which is the largest and arguably most environmentally significant project ever undertaken within Chinese borders? The answer, I argue, lies in the national scale of the project. Elaboration on the relationship between the government and NGOs is necessary to render this clear.

Non-governmental organizations are often seen as working with formal institutions toward positive outcomes (i.e. they are complementary) (Wang and Lin 2008). This is in contrast to another commonly held view that China's growing informal (or public) realm will eventually serve as a check on the power of the authoritarian regime (Tai 2007: 65; Yu 2007: 29; Zhang 2003: 1). But, as Ma and Schmitt point out, NGOs in China are, in actuality,

> …not structured as a counter-balance to power , because if they were, they would be banned. In fact, the authorities see them as non-state organizations cooperating with governmental institutions in sensitizing and informing the public, helping organize clean-up campaigns, and obtaining aid through their contacts with foreign entities (Ma and Schmitt 2008:102).

[43] Each of the organizations mentioned in this paragraph has been identified by China Water Risk as a key civic player attempting to shape the social impacts of water management in China (see CWR 2010).

Spires (2011) elaborates on the tactful relationship between Chinese NGOs and government entities in his study of "bottom-up" grassroots organizations (草根组织). These groups, formed by concerned citizens around specific issues, are not registered and as such they operate beyond the control of the Party (Spires 2011: 10). This arrangement allows them to engage in a relationship with the government characterized by Spires as "contingent symbiosis."

> …[G]round-level realities construct a relationship [between grassroots NGOs and the government) that is symbiotic in that NGOs are looking to meet social needs, while government officials, especially at the local level, seek to make sure all "problems" in their jurisdictions are dealt with in ways that do not attract unfavorable attention from their higher-ups. When cooperation on mutual goals is achieved, NGOs can continue their work, and local government officials will ignore their illegality. Yet clearly such a relationship is both fragile and contingent. If NGOs keep their operations small and make no calls for political representation or democratic reform, officials can turn a blind eye and claim credit for any good works the NGO does. But if an NGO's work draws too much attention to the failings of local officials or if it oversteps a fuzzy and frequently shifting political line, the organization can be disciplined or even closed down. […] [A]lthough the relationship can be mutually beneficial (and thus symbiotic), it is also unequal. The government always holds the upper hand because of its constant threat of repression (Spires 2011: 12).

What this means is that NGOs in China are often most effective as advocates for specific issues at lower levels of government jurisdiction because their work can support the interests of local officials without threatening their authority or crossing political boundaries (e.g., calling for political reform). On the other hand, when Chinese NGOs attempt to advocate around non-local issues, one half of the symbiotic relationship that allows them to operate is missing from the equation. In other words, higher-level

government officials cannot benefit in the same way from engaging such organizations and, in some situations, NGO participation can actually threaten their goals. While the activists and NGOs working against the damming of the Nujiang were successful in drawing national and international attention to their cause, they were ultimately not attacking the central government or its national political-economic agenda because the project was launched by the Yunnan Provincial Government and never officially endorsed by then-Premier Wen Jiabao.[44]

The case of the Three Gorges Dam, also highly publicized nationally and internationally, demonstrates that when the Chinese government either launches or makes a clear endorsement of a controversial project, it is very risky for NGOs to attempt to exert pressure, even regarding local-level impacts. This is because the ultimate authority (and potential repressor), Beijing, has already spoken. In the early 1990s alone nearly 180 people—including the well-known activist, Dai Qing— were imprisoned for speaking out on the Three Gorges Dam project (Mertha 2008: 2). With the repression associated with organizing against the Three Gorges Dam project serving as a not-so-distant reminder, groups like Green Earth Volunteers and Green Hanjiang are likely acutely aware that contesting a project such as the South-North Water Transfer Project would require contesting the fundamental goals of the central government, which is far riskier than pressuring local or even provincial-level officials to deal with environmental issues. It

[44] In fact, the Nu River Project was suspended by Wen Jiabao in February of 2004 as the NGO-led anti-damming efforts reached their pinnacle (Brown and Xu 2010: 784). As McDonald argues, the Premier's decision to temporarily suspend the project reflected an effort on the part of the central government to exert control over the fragmented and pluralized bureaucracy managing hydropower expansion (McDonald 2007: 223).

seems likely that this at least one major reason why there has not been any significant engagement on the South-North Water Transfer Project by Chinese NGOs.

Trade-Offs

Unlike agriculture, ecosystems, and other marginalized arenas of water valuation in North China, industrial and urban uses have taken top priority in the region's water management scheme, of which the Middle Route of the SNWTP is the central feature. In early January 2012, Li Keqiang—then Vice-Premier, now Premier—stated that urbanization, the development of strategic industries, and upgrading the manufacturing sector are central to increasing domestic demand in China and that the country is at a critical point of stabilizing its growth (Li 2012). The 12th Five Year Plan also identifies continued urbanization as a key engine for stimulating economic and social development (12th Five Year Plan). Bao and Fang note that water is a key restricting factor when it comes to both China's urbanization and socio-economic development (Bao and Fang 2007:509). By the late 1990s, water shortage had already begun restricting urbanization in several regions across China (Brown and Halweil 1998: 353) and the situation is beginning to reach a head, especially in the North.

In order for North China's major cities of Beijing, Tianjin, Shijiazhuang, and Zhengzhou to maintain the status quo, let alone increase the rate of economic growth, additional water resources are desperately needed. Without an adequate water supply, these cities will not be able to support rapidly growing populations, rising industrial production, or the other key stimulants of the economy. As Chen notes, the average

industrial water deficit is roughly 600 million m^3. This shortfall accounts for approximately 230 billion RMB (about 35 billion USD) in lost industrial output each year (Chen 2011: 85). Roughly 80 percent of the Middle Route's water is intended for urban and industrial use and will help fill this shortfall on the NCP (Middle Route Project 2013). The prioritization of SNWTP water for these use sectors is linked to the centrality of urban expansion and industrialization as critical drivers of the rapid economic growth that has characterized the Chinese economy for the last several decades. As detailed in Chapter Three, the maintenance of high growth rates, encouraged by continued urban and industrial expansion in North China, is critical to the Chinese Communist Party's ability to maintain legitimacy. In other words, the prioritization of water in the north for urban and industrial uses directly serves the broader political interests of the government.

Providing sufficient water to meet the rising demands of industry and urbanization on the North China Plain requires sectoral, temporal, and spatial water use trade-offs. Sectorally, "…[A]gricultural use is typically viewed as a low priority by local government agencies keen to promote industrial development and wealth creation in 'higher value' sectors. This is also apparent in the general approach to designing new water infrastructure," such as the South-North Water Transfer Project (Calow et al. 2009: 234). [45] The SNWTP as a water management approach strongly favors industrial and

[45] Much has been written on the tradeoffs required between industry, urbanization and agriculture (see Brown and Halweil 1998: 13; Cai 2008: 19 and; Calow et al. 2009: 227). Other valuations of water that may exist in North China, such as spiritual or aesthetic values, have thus far received scant attention in the literature, but present interesting and

urban sectors over agriculture. Water stress in north China has already put significant pressure on agricultural production (Yang et al. 2003: 144), and as limited water resources become increasingly funneled into higher value sectors following the completion of the Middle Route, agricultural production on the NCP will likely decline.

In tandem with increasing affluence, which brings with it a growing national appetite for meat, milk, and greater caloric intake, this will put China's policy of food self-sufficiency in jeopardy (Brown and Halweil 1998: 351; Gleick 2009: 86). Recent years have already brought land grabbing and investment in agricultural lands beyond China's borders—particularly in African countries— where water access can be easily negotiated with morally dubious governments, often at the expense of local communities (Roberston and Pinstrup-Andersen 2010; Smith 2009). In Cameroon in 2006, for example, a subsidiary of a state-owned enterprise in Shaanxi province acquired a large Nanga-Eboko rice farm along with a 99-year lease of 14,000 additional hectares of agricultural land (Grain 9/2012). This $120 million USD deal, signed with the government of Cameroon, grows water-intensive crops for export to China in a country where severe and persistent drought has left the northern half of its territory in a food crisis over the last few decades (WFP Sahel Crisis).

Temporally, the SNWTP is a kind of temporary lifeline for the north, allowing it to maintain economic growth rates over the short term, but at high longer-term social and environmental costs. In one particularly poignant interview, a subject explained that delivering water to the north is really a question of how to best support short-term

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important topics for future research.

economic activity. Everything else can be deferred to the future, but the need to support growth is immediate and paramount:

> You can't stop economic growth. If you stop it then people will lose their jobs and social problems will arise. So with water, if we don't have enough then we must find a method to get more. Maybe it is the water transfer project. Maybe it is seawater desalination. Now we use groundwater to solve the water supply problem. Maybe it is not the best method, but we *must* use it. Maybe over the next few years we can change gradually. The problem can't be solved in just one year. It will take 10 or 20 years. […] If we don't solve the water problem, the city will die. It won't have water, it won't have people and it won't generate growth… (personal communication with Li Dong, 11/21/2011).

This excerpt reveals that, rather than solving the problem of water shortage on the NCP once and for all, the SNWTP is only a short-term mitigation device. As a "band aid" approach, the project fails to address the root causes of the region's water stress and instead attempts to treat the symptoms while allowing the underlying problems to worsen over time and deferring the consequences of such a management approach to future generations.

Also in terms of timeframe issues, Gupta and van der Zaag note that interbasin transfers increase the temporal scale of water management because their physical infrastructure locks in place certain resource use practices, often for fifty or more years, despite the fact that a society's resource use values and priorities will likely change significantly over that same period of time (Gupta and van der Zaag 2008: 37). In other words, the SNWTP as a life-line not only defers dealing with the root causes of water stress in north China to future generations while allowing the situation to worsen, but it

may actually lock in place an unsustainable water management scheme that will be difficult to move away from even after management priorities shift.

There are also important spatial tradeoffs at play in the use value tensions of water on the North China Plain. Some of the use preferences expressed in the Middle Route of the South-North Water Transfer Project and aligned water management policies on the NCP both reflect and solidify broader spatially articulated power discrepancies between users. In light of the potentially serious environmental and social consequences of the project discussed above, the fact that such a project would be undertaken reflects the central government's water management priority of meeting rising industrial and urban demand in order to, but also of serving the Greater Beijing area at the expense of neighboring provinces and cities to the south. This also speaks to the spatial concentration of economic and political power on the North China Plain and of the high stakes of failing to provide this region with adequate water to support the economy.

In order to keep the cities of the north alive and minimize the potentially enormous economic losses that are beginning to result from insufficient water for industry and urbanization, the water needs of particular places are being prioritized by the SNWTP water management scheme, reflecting a spatialized power imbalance not only between the North China Plain and its southern neighbors, but also between the Greater Beijing area and its more immediate neighbors in Hebei province. Most obviously, the transfer of a vast volume of water from the Yangtze River Basin once the project is fully operational clearly reflects the prioritization of North China's water needs over those of the donor basin region in south-central China. To draw on one illustrative example, with a population of more than ten million, the city of Wuhan is built up around East Lake,

which once served as its primary source of water. Recently the lake has become very polluted and it can no longer be used to meet the water needs of the population. Now Wuhan's water comes from the Yangtze. While the SNWTP remains, for the most part, off the radar south of the Danjiangkou Reservoir, one interview subject based in Wuhan expressed concern over the future water supply of her city, "The South-North Water Transfer Project may create some problems for the south, like in Wuhan, since we have to get our water from the Yangtze River now" (personal communication with Jiang Qiushang, 12/9/2011). Supplying the North China Plain with water—a pressing concern requiring immediate attention— is ultimately more important to the Chinese government at present than maintaining a healthy water supply for a major city like Wuhan over the long term.

Another interview subject highlights the prioritization of Beijing's water needs over those of its neighbors to the south:

> Of course [the South-North Water Transfer Project] will have an impact [on the south]. For example, the water levels of Danjiangkou Reservoir will increase, flooding a large area and requiring people to relocate. It could also cause some ecological problems. Some of the cities in the south, especially in some areas of Hebei Province, have definitely made a very big sacrifice for Beijing and the North China Plain (personal communication with Sun Mingsheng, 12/8/2011).

In addition to the relocation issues and ecological impacts of the project, this excerpt draws attention to the issue of sacrifice (牺牲). By sacrificing water to meet the needs of the north, Hebei, Henan and the entire Han Basin and Middle Yangtze River Basin are actually sacrificing opportunity. In other words, because water is a fundamental

ingredient for socio-economic development, its spatial relocation also relocates development opportunity and growth prospects. This establishes a new spatial pattern of inequality, the effects of which may not be fully experienced for years to come, but which are likely to persist until water management priorities shift, which may not be for several decades. Another government official alludes to this underappreciated impact of the SNWTP, which has not been identified in any of the existing literature: "The South-North Water Transfer Project will increase the pace of urban development […] in the East. It is a major source of support for this. Without the project, China's urban development might be more balanced but the pace would slacken" (Personal communication with Wang Hongwu, 11/21/2011). Put differently, the SNWTP will support continued urban and therefore economic development on the North China Plain, rather than allowing growth in that region to naturally slow as a result of water shortage and forcing investment and growth in other regions.

On a smaller scale, water management practices illuminate power discrepancies within the north as well, particularly between Beijing and Hebei province, which, except for two small border points with Tianjin Municipality, surrounds the capital (*Figure 5.6)*. Regular transfers take place between Hebei's major reservoirs—including the Shuigoukou, Xiangshuibao, Yunzhou, and Huliu River Reservoirs—and Beijing's Baihebao and Guanting Reservoirs and at present about 80 percent Beijing's freshwater is taken from Hebei (Li and Liu 2008: 269). With an average annual per capita water supply of just $93m^3$ Hebei is also experiencing very severe water stress and is not in a position to spare water (2011 Hebei Statistical Yearbook). Cai elaborates on Hebei's water situation:

> Fifty years ago, Hebei had perennial rivers with over 3000-km long navigation channels, large lakes including the well-known Baiyangdian Lake, and widely distributed wetlands, and the region suffered frequent disasters of flooding and waterlogging (associated with land salinization). Today, rivers are dry most of the time, lakes and wetlands have shrunk and even disappeared (including the Baiyangdian Lake, ‘‘pearl’’ on the land of North China)… (Cai 2008: 21).

Despite their own concerns with severe water stress, government officials in Hebei have little choice but to accommodate the demands of the capital. As one interview subject noted, “There are lots of cities in the area, especially in Hebei province, that supply Beijing with freshwater, but there may not be enough water in the area to supply both Beijing and Hebei” (personal communication with Li Dong, 11/21/2011), in which case the needs of Beijing take precedence. For example, in 2004 a diversion dam was constructed on the Juma River south of Beijing in order to supply water to the state-owned giant, Yanshan Petrochemical. Farmers in the area protested, but little came of it and more than 120,000 people lost their ability to earn a livelihood from agriculture when they lost access to the Juma’s flow (Brown 2006: 55). Overpowered by Beijing, government officials in Hebei were unable to successfully advocate for local water interests.

Figure 5.6- Beijing Municipality and Hebei Province

Source: Google Earth 2013

In line with this, several interview subjects in Beijing noted that the municipal government often engages in creative political maneuvers in order to gain access to its neighbors' water, usually in exchange for industrial deals that relocate large factories from within Beijing municipality to Hebei.[46] For Beijing, this serves the triple interests of

[46] This tactic was also used as part of widespread efforts to reduce urban air pollution in Beijing leading up to the 2008 Olympic Games.

encouraging development as a modern, service-oriented city, reducing air pollution by moving polluting factories beyond its borders, and reducing industrial water demand within municipal borders. For Hebei, the relocated factories provide much-needed jobs, but bring with them industrial pollution and an even greater demand for the very water supply that has just been traded away.

Consider the following example in which the relative power of the capital is reflected in negotiations between the Beijing Municipal Government (backed by national level Party officials) and "upstream" (along the Middle Route) provinces and cities. On a trip to Henan to discuss the progress of the MR in November 2011, Liu Bing, the Beijing Party Secretary discussed the essential role of water supply in remaking Beijing as a "global city with Chinese characteristics (有中国特色的世界城市)" (Henan Daily 9/23/11), which again demonstrates the centrality of water to the national-level political agenda, as discussed in Chapter Four, He said,

> Beijing is a very water-stressed city and the South-North Water Transfer Project is a nationally significant strategic project. This project has the ability to mitigate the stressful water situation of the entire Northern region of the country, which is very significant. Beijing wants to strengthen its collaboration with Henan, to strengthen cooperation, to try our best to complete the project and allow the people along its course to realize tangible benefits.

Secretary Liu also spoke of the sacrifices made by the people of Henan and thanked them for their "selfless contributions" to the "economic and social scientific development of the capital (首都经济社会科学发展)" (Henan Daily 9/23/2011). The delegation from Beijing also included members of the national Central Committee of the Chinese

Communist Party, Mayor Guo Jinlong of Beijing and Lu Zhangong, Standing Committee chair of the Beijing Municipal People's Congress. While the meeting was peppered with frequent mention of Beijing and Henan's "complementary resources" as a basis for cooperation, there were no open or publically reported water negotiations. Given that the SNWTP is a national-level undertaking managed by a specially appointed subcommittee of the State Council, it seems unusual for Beijing city officials to thank Henan for its sacrifice and allude to resource exchange opportunities if indeed Henan is to receive as much water from the Middle Route as official documents claim. However, according to my interviews with government officials in Zhengzhou in the months following this meeting, the purpose of Liu's trip was, with backing from the central government, to negotiate additional water resources for Beijing from Henan's allocation of water from the Middle Route.

While official figures indicate that Beijing will receive only 1.2 billion m^3 from the SNWTP, not much more than most of the other cities along the Middle Route (Xinhua 12/27/2002; Zhu 2012), unofficial figures revealed in my interviews suggest a very different story. One particularly guarded high-ranking government official I spoke with in Beijing said the following, "For Beijing the primary benefit of the South-North Water Transfer Project will be increasing the water supply. The transferred water will amount to roughly 10 billion cubic meters, equal to about 30 percent of Beijing's current supply" (personal communication with Chen Shuai, 12/8/2011). At 77 percent of the Middle Route's total anticipated annual transfer volume, 10 billon m^3 is far more than the published figures indicate Beijing will receive. Interviews in Zhengzhou and other cities along the MR corroborate that Beijing will receive significantly more water than the

official 1.2 billion m^3. It is likely that these unofficial numbers include extra water the Beijing Municipal Government, with the backing of the national government, has managed to negotiate away from other jurisdictions along the Middle Route in meetings such at the one described above. The water values and users being served by the Middle Route of the SNWTP clearly reflect the political and economic power of the country's heartland, the North China Plain, and, more specifically, of Beijing.

Fragmented Water Bureaucracy

Related to the prioritization of Beijing's water needs over those of its neighbors, several of my interview subjects in Beijing admitted that when designing the Beijing Master Plan, which deals with water supply planning, there is not much consideration of its potential social or ecological impacts on nearby cities or on the region as a whole. For example, one official noted, "Each province and municipality (like Beijing and Tianjin) makes decisions separately" (personal communication with Wang Hongwu, 11/21/2011). Instead of cooperation and unified planning between regions and basins, as called for in the country's water law (PRC Water Law 2002), what we see instead is a fragmented system of water management (Mertha 2008: 5) that mirrors the "fragmented authoritarianism" of the government structure as a whole (see Lieberthal and Oksenberg 1988). Bradbury et al. (1996: 209) describe the arrangement as:

> ….a complex hierarchical system of agencies which operate at provincial, county and subcounty levels and has links with other government ministries. […] The influence of Beijing in the day-to-day administration at local level has declined

> markedly since the early 1980s. Presently, there is considerable local autonomy in the interpretation and regulation of many aspects of national policy.

As for water management specifically, Mertha provides an insightful account of the complexity that arises when authority is vested in multiple actors at multiple scales (Mertha 2008: 38-49). Focusing specifically on hydropower in China, he gives an detailed overview of the country's water management structure, highlighting the various, often overlapping, and sometimes conflicting roles of the Ministry of Water Resources, the National Development and Reform Commission, private and state-owned companies, provincial governments, local water bureaus, and river commissions (see Figure 2.2. on page 42). Foremost, the water management bureaucracy is multi-tiered and decentralized. At the national level there is the Ministry of Water Resources (水利部, MLR), which oversees seven national level water commissions, one for each of the country's major rivers (Heilongjiang, Yellow, Huai, Yangtze, Pearl, Songliao, and Taihu). Each river commission has a provincial water resource bureau that operates beneath it, which in turn has lower-level units or "stations" at multiple sub-provincial levels, all the way to the township and village (Mertha 2008: 40-41).

Also figuring into water management is the parallel environmental protection governance structure, again cascading down from the national Ministry of Environmental Protection (MEP), formerly known as the State Environmental Protection Agency (SEPA). Like the Ministry of Water Resources, MEP has lower level counterparts known as Environmental Protection Bureaus (EPBs), which operate from the provincial level all the way down to the township and village levels. Like the MLR and its sub-units, the

chain of command in this decentralized structure is complex, sometimes counterintuitive, and often results in contradictions between the goals and policies of units operating at different levels.

Wu et al. express concern over this fragmented water governance arrangement, which, depending upon the specific issue, often involves additional ministries and government entities. They use the case of drinking water as an illustrative example:

> ….responsibility is […] fragmented by the fact that surveillance of drinking water quality is the responsibility of the Ministry of Health (MOH, Beijing). The MOH monitors drinking water quality and waterborne diseases, primarily through the supervision and monitoring of environmental sanitation and health in public places, drinking water sources, and cosmetics. Little or no formalized coordination is in place between SEPA, the MOH, and local EPBs (Wu et al. 1999: 25).

Other ministries that often play a role in water management issues include the Ministry of Agriculture and Ministry of Land and Resources. Not only is this fragmented, multi-scaled water bureaucracy administratively complex, but policies and regulations can be made at both the local and provincial levels without any formal mechanisms to ensure that they are not in contradiction with one another or with national level environmental or resource management policies (Ferris and Zhang 2005: 73). The same goes for water allocation, meaning that a single body of water can be committed on paper to multiple uses and users without any means to ensuring that the resource is not overcommitted.

In the case of North China, while the Master Plan determines Beijing's water demand for a given time period and identifies sources from which resources may be

drawn in order to meet that demand, most of those sources fall beyond its jurisdiction. The fragmented water management structure, involving numerous overlapping ministries and agencies in areas such as irrigation, urban water supply, and groundwater management (Yang et al. 2003: 152), fails to enable coordination with neighboring city, provincial, and municipal governments to ensure that multiple claims are not placed on the same water resources. Put differently, the fragmented system allows multiple government stakeholders to claim the same water resources as part of their supply, which contributes to the region's water shortage issues.

The administrative structure of the South-North Water Transfer Project is similarly complex. At the national level, sitting on the committee that directs the project under the authority of the State Council—the South-North Water Transfer Project Construction Committee—are the Premier and Vice-Premier; officials from the National Development and Reform Commission; Ministers of the Ministries of Water Resources, Science and Technology, Finance, Land, Construction, Communications, Agriculture, and Environmental Protection; officials from the People's Bank of China and the National Development Bank; and members of the State Electricity Regulatory Commission and National Bureau of Cultural Relics. Below that, the committee also includes the mayor of Beijing, mayor of Tianjin and the governors of the provinces through which the Middle and Eastern routes travel, which include Hebei, Jiangsu, Shandong, Henan, and Hubei (State Council 7/31/2003).

Each of these bureaucratic actors, as well as those operating at institutionalized scales below the nation and province/municipality, have associated with them a range of interests and incentives operating to pull water management in multiple directions at

once. Without formal mechanisms in place to facilitate communication and coordination among the diverse assortment of bureaucratic actors, the fragmented management arrangement allows the interests of lower level governments and less powerful jurisdictions to be marginalized within the bureaucratic system and, again, the interests of already powerful places and political actors win out.

This speaks to a larger issue, however, which has to do with the ranking of the water management entities within the broader government structure. While the aforementioned ministries involved in the South-North Water Transfer Project are indeed among the country's twenty national level ministries, these apparati are outranked by the National Development and Reform Commission (中华人民共和国国家发展和改革委员会 or 发改委, NDRC). This organ, sometimes referred to as the "Small State Council" (小国务院) because of the great power it holds (Mertha 2008: 43), oversees the incorporation of large projects such as the South-North Water Transfer Project into the broader national project of economic development. As Mertha makes note:

> …[T]here has been a tendency to move an increasing number of non-experts, including ever-expanding hordes of unqualified military and CCP cadres, into key NDRC positions. Yet given their political power […] they cannot be fired for corruption, let alone incompetence or negligence. This makes it less likely that the NDRC will judge a given project objectively, on its merits. The administrative rank of these offices underscores the tremendous political power of the NDRC and its local counterparts and their ability to shape the broad counters of development policy (Mertha 2008: 43-44).

When national water management projects become a pathway for achieving development

goals, as is clearly the case in the South-North Water Transfer Project, the bureaucratic structure (with power concentrated in the NDRC in particular) fosters the prioritization of political-economic goals over basic water management and environmental concerns.

Further, as demonstrated earlier, the South-North Water Transfer Project works to reinforce national level interests, as well as those concentrated particularly in and around the capital city. The project is also a product of the "engineering as panacea" mentality that pervades the Chinese development process (Chen 2011: 92), in which large-scale infrastructure projects are constructed as "solutions" to issues of development and modernization. The training of China's national political leaders as engineers, including every Premier in office since 1988 and each of the three Presidents in office since 1989,[47] plays an important role in driving forward this mentality. As Feitelson and Fischhendler note, enlarging the scale of water management systems (as seen in the case of the SNWTP), "...is largely driven by engineers and agencies whose prowess lies at the national level" (Feitelson and Fischhendler 2010: 730). It is no coincidence that Hu Jintao—President of the PRC when the SNWTP was approved by the Central Committee in 2002—was trained as a hydraulic engineer. As Gleick points out, given this prominence of the engineering mentality among China's top leadership, "It is thus no surprise that Beijing and central water agencies have typically responded to issues of

[47] This started with the first batch of post-revolution leaders and includes Premiers Li Peng, Zhu Rongji, and Wen Jiabao, as well as Presidents Jiang Zemin, Hu Jintao, and, most recently, Xi Jinping.

scarcity with proposals for massive new infrastructure rather than new approaches to management" (Gleick 2009: 91).

While the South-North Water Transfer Project works to enhance and maintain the legitimacy of the Chinese Communist Party and supports the prowess of leaders at the highest levels, it is wrapped up with different interests and incentives at lower levels of the governance structure. For example, as discussed in Chapter Four, government officials at the sub-provincial level in the project's donor basin value the project for its ability to bring investment and short-term development opportunity to their otherwise marginalized locales, even if the project will decrease development opportunity over the long term by depriving such places of water resources.

Chapter Summary

This chapter has demonstrated the ways in which the Middle Route of the South-North Water Transfer Project both reflects and reinforces power discrepancies between a range of water users, each of whom value water differently. The broader resource management regime of which the SNWTP is a part has marginalized the water values of farmers and fishermen, as well as the water needs of the natural environment, in the name of meeting rising industrial and urban demand on the North China Plain. This is precisely the kind of narrow resource management and "tyranny of water management" warned of by Scott and Whiteley et al. (Scott 1998; Whiteley et al. 2008: 3). A fragile symbiosis between government and grassroots non-governmental organizations dissolves when national level politics become part of the picture and, which means that civil society fails

to be an effective source of advocacy against narrow water management schemes such as the South-North Water Transfer Project.

There are also important spatial dimensions at play in North China's water-power nexus and the South-North Water Transfer Project both reflects and solidifies broader spatially articulated power discrepancies. Not only is the North prioritized over the Yangtze River Basin in south-central China, but the ranking of Beijing's present and future water needs above those of its neighbors sets in motion a pattern of inequities that is likely to persist for decades, if not generations. This raises the issue of temporal tradeoffs. As a temporary lifeline or "band-aid" approach to the water issues of the north, the SNWTP enables the maintenance of economic growth over the short term, but in failing to address the root causes of the region's water stress it allows the problem to worsen over time and defers the consequences to future generations. The chapter also speaks to the bureaucratic complexity and implications of China's fragmented water management system, which includes redundant resource commitment and the marginalization of the interests of lower level jurisdictions.

CHAPTER SIX:

Conclusion

The first question this research project set out to address is why, despite significant financial, social, and environmental costs, is the Chinese government developing the South-North Water Transfer Project as a water management approach for the water-stressed North China Plain? According to the State Council, the purpose of the project, is, "…to solve Northern China's severe water shortage problem, to achieve sustainable economic and social development in the Huang, Huai, and Hai River Basins" (State Council 7/31/2003). Another document, put forth by the South-North Water Transfer Project Construction Committee, states that it is, "… a major strategic infrastructure project that will alleviate Northern China's water shortage, realize the equitable allocation of water resources, ensure sustainable economic and social development, and comprehensively build a moderately prosperous society (小康社会)" (SNWTP Construction Committee Law 5, 2004). These broad, fundamental environmental, economic and social goals sound straightforward enough, but there is more at play beneath the surface. By injecting politics into the otherwise largely apolitical scientific, official, and popular discussions of the largest water control project in history,

this dissertation has attempted to tease out the underlying political-economic interests embedded within the Middle Route of China's South-North Water Transfer Project.

First, there is a major spatial mismatch between water supply and demand in China, with precipitation and groundwater concentrated south of the Yangtze River and anthropogenic stresses driving up demand in the urban and industrial north. But in an age of technological interventions and in a country in which engineering has been a panacea for water management issues for millennia **(**Chen 2011: 92**)**, the geography of freshwater is shaped not only by natural factors, but also by the politics of the humans who have come to manage the resource for their own purposes. While the biophysical reality of the SNWTP's water-receiving region, the North China Plain, is characterized by semi-aridity, it is rising water demand for ongoing and expansive urbanization and industrial growth that has pushed the natural supply beyond its limits over the last two to three decades.

The region is frequently presented as "undersupplied" in terms of water resource allocation, but what this portrayal fails to acknowledge is that supply may be considered insufficient only in relation to demand. Using the term "water stress" rather than "water scarcity" better captures the fact that water resource issues often exist not only due to natural factors, but because supply is placed under pressure by a range of anthropogenic factors in an evolving world. The conversation on water stress, not only in north China but also in other areas across the world currently experiencing water shortage, must be shifted to focus not on the supposed inadequacies of nature, but to critically evaluating

the human behaviors and decisions that have placed such a heavy burden on natural supply.

In the case of the South-North Water Transfer Project, one barrier to moving past this widespread mischaracterization of water supply issues as absolute rather than relational to demand is the political and economic centrality of the North China Plain itself, which simultaneously serves as an agricultural breadbasket, a major population center, a key industrial region, and the historical and political heart of the country. Without democratic elections as a foundation on which to build its legitimacy, the Chinese Communist Party has tied its future in part to its ability to foster continued economic growth and rising living standards for a majority of the country's 1.3 billion people. While it has been exceedingly successful on this front for several decades now, pulling hundreds of millions of people out of poverty and delivering one of the most dramatic economic transformations in history, water shortages are beginning to threaten the status quo on the NCP. The South-North Water Transfer Project, which will transfer massive amounts of water from the Yangtze River basin northward toward Beijing each year, is primarily intended to stave off this resource related stagnation by increasing the industrial and urban water supply to meet rising demand and foster continued growth.

Not only will the SNWTP mitigate economic stagnation on the NCP (most likely on a temporary basis), helping to maintain the CCP's legitimacy and extend its lifespan (barring dramatic changes in other social and political arenas), but the project itself serves as a physical manifestation of government power. If nothing else, the 1260km canal of the Middle Route— built in just over a decade and cutting across the flats of north China,

through a patchwork of dusty plains, fields green with young millet, and massive cities of steel and concrete rising up out of the yellow earth— is a physical testament to the will and resources of the Chinese government. The links between water control and power in China are as strong now as they were when the Dujiangyan Irrigation System was built more than 2000 years ago (Li and Xu 2006), helping to consolidate the power of China's first imperial dynasty, the Qin (221-206 BCE).

While the SNWTP works to increase the odds of success for the CCP in the high-stakes game of watering the North China Plain, it also involves a formal prioritization of water use values in an area where water has historically served multiple interests in multiple sectors. As surface water supply has dwindled over the last several decades, agriculture, a major sector in North China, is now dangerously reliant on overtaxed groundwater resources. Agricultural production in this semi-arid region is very water intensive, requiring massive amounts of liquid input for minimal economic returns. In light of the project's underlying political-economic goal of maximizing economic output in and around Beijing, agricultural water demand has been marginalized in the Middle Route's management scheme. As water resources continue to bypass agricultural demand for higher-value uses, grain output on the NCP is likely to decline, putting China's food security status in jeopardy and forcing the development of creative (and not always mutually beneficial) food importing enterprises beyond its borders, particularly in impoverished African countries. This speaks to broader questions of the role China's development trajectory plays in shaping environments, resource access and social

outcomes beyond its borders, and the ways political actors outside of the Chinese system can negotiate their positions within this model.

Like agriculture, fishermen and ecosystems are losing out in the management priorities expressed in the South-North Water Transfer Project. With the taxing addition of the Middle Route's transfer needs to the donor region's water use portfolio, the waters of the Danjiangkou Reservoir are now valued almost exclusively for northward transfer. As a result of this shift toward narrow management, or what Whiteley et al. have referred to as the "tyranny of the water commons" (Whiteley et al. 2008: 3), the values of the artisan fishers that once populated the reservoir's banks have been displaced. Water on the North China Plain, as reflected in the management priorities of the Middle Route, has come to be valued only for its utility as urban and industrial lubricant, as the fundamental input for economic growth. The impacts of this narrow management remain to be seen, but if the history of past interbasin water transfer projects—such as those that have decimated North America's Colorado River Basin— is any indicator, there is reason for advanced concern.

Narrow management is all the more concerning given that China's burgeoning realm of non-governmental organizations and civil society more broadly have not voiced concerns (or have not been able to voice concerns) about the social and environmental impacts of the South-North Water Transfer Project. While there are opportunities for NGOs and government officials to work together on local-level environmental issues, activist and citizen engagement on the SNWTP remains risky given the project's

fundamental links to the Chinese Communist Party's national political-economic agenda of rapid, sustained economic growth in and around the capital.

In addition to marginalizing or rendering illegitimate certain uses for water and without a platform from which the public can engage, the South-North Water Transfer Project also entails major temporal trade-offs, making it a fundamentally unsustainable water resource management system. As Miller notes, "At the core of sustainability is a concern that current human activities and their effects on the environment are undercutting the ability of [the] environment to support the well-being of both current and future generations" (Miller 2013: 282). The SNWTP is a temporary "lifeline" approach to dealing with severe water shortage on the North China Plain. The billions of cubic meters of water it will transfer toward the capital each year will allow this key political and economic region to continue on its current path of rapid urban and industrial growth in the short term, but in failing to manage the underlying causes of water stress the project will actually allow the problem to worsen over time. Not only does the project defer the task, albeit a complex and formidable one, of reigning in the root causes of water stress on the NCP to future generations, but its physical infrastructure locks in place a management scheme that will be difficult to update alongside shifting management priorities. All things considered, the South-North Water Transfer Project is concerned only with finding ways for the country's resource base to support the needs of China's current development model and not with the impacts such a trajectory will have on the ability of those resources to support even the most basic needs of future generations.

This short-term perspective speaks to a broader point on the Chinese development model, which is that it pivots upon a "grow first, clean up later" mentality. Many of the government officials I interviewed for this project acknowledged that China faces serious environmental challenges that require attention, but in the very next breath they would grow defensive and offer a justification for the country's current path. The words of one official typify this argument: "…once our economy is bigger and stronger we will be able to give ecosystem issues more attention. This is a stage problem. We can't do as Europe and the United States do because we are in a different stage of economic development" (personal communication with Wang Hongwu, 11/21/2011). The reference to stages of development speaks to an implied acceptance of a very traditional understanding of development as a teleological process (see Kuznets 1973 and Rostow 1956 for examples), which also underpins the national sense of urgency in China's "catch-up crisis" with the U.S., Europe, and Asian tiger economies.

By implicitly invoking the environmental Kuznets curve, arguing that environmental issues may be addressed only improve when the economy has reached a certain threshold of development, officials are once again able to justify the government's path vis-à-vis the environment and defer both current issues and future problems created by this path to future generations. It is understandable that the Chinese government is concerned about very practical challenges, such as providing sufficient jobs for an increasingly large and mobile non-agricultural work force and continuing to help bring millions of people out of poverty. But it should not be a zero-sum game in which economy and environment are pitted against one another. Moreover, many of the social

and ecological impacts of the "grow first, clean up later" mentality (ex., health impacts of water pollution[48] and biodiversity loss) may be irreversible and the patterns set in place may be difficult to overcome in the future.

One such pattern emerging in the wake of the Middle Route is a reinforcement of existing rural-urban and regional inequalities. Water is a fundamental input for socio-economic development and as the precious resource is transferred away from poor rural counties like Xichuan, Henan, so too is the opportunity for future development. By sacrificing water to the SNWTP in order to meet rising demand in and around Beijing, Hebei, Henan and the entire Han Basin and Middle Yangtze River Basin are actually sacrificing opportunity and reinforcing their marginalized status (attested to by the relatively low status of their water needs) over the long-term. Not only does the water transfer project reflect existing spatialized power discrepancies, but it reinforces those inequalities by prioritizing Beijing's present and future water needs above those of its neighbors and locking them in place for decades to come.

Clearly, the water needs of the north—and particularly of the capital—take precedence over neighboring provinces and regions, largely due to the political importance of fostering continued economic growth in China's political and economic

[48] For an outstanding collection of photos depicting water pollution and health issues in China, see "China's Toxic Waters" in *The Atlantic,* March 22, 2013. Available at: http://www.theatlantic.com/infocus/2013/03/chinas-toxic-water/100478/.

heartland. In order to maintain growth in this area, certain issues that place stress on water resources are being allowed to continue unchecked. The first is rapid urban population growth. The addition of tens of millions of rural-urban migrants to North China's cities over the last few decades has caused the region's urban population to swell, pushing urban water demand upward at the same time. By denying this growing pool of migrant workers access to basic rights in the city, the country's household registration or *hukou* system keeps the urban labor force cheap and exploitable, which has been essential to China's impressive post-reform economic growth rates.

While reforming this backward system would likely work against the immediate interests of the Chinese Communist Party by allowing wages to rise (among other issues), the real issue is a lack of opportunity in the countryside as the country continues to emphasize the secondary and tertiary sectors over agriculture. Given that a considerable portion of migrants would actually prefer to settle down in the countryside (Fan 2011), government investment in basic infrastructure and job opportunities in rural China would likely help to minimize the "push" factor driving so many people to cities. In turn, this would help to relieve some of the added water demand pressure placed on cities by such extensive rural-urban migration. This, however, would require a dramatic shift from China's current path of planning and development policies that foster increasing rates of urbanization across the country. Again, we see an embrace of a traditional teleological model of development in which an end goal associated with a specific vision of what it looks like to have completed the development process (which, in this case, means being highly urbanized) is pursued without stepping back to evaluate its secondary effects or

possible alternatives. An additional factor to consider is that by transferring water away from the already marginalized areas from which migrants embark in search of work, the government is actually disinvesting in the future of such places and their residents. In other words, the South-North Water Transfer Project will reinforce the push factor that has driven so many tens of millions of people out of marginalized areas, driving even more people into overburdened cities and placing greater stress on the urban water supply it aims to supplement.

Production, which includes manufacturing of consumer and industrial goods and the physical expansion of the built environment, is another major source of stress on North China's water resources. Like urban population growth, production practices are unlikely to be targeted for reform because of the intrinsic links between manufacturing, construction and economic output. Making changes to industrial production or reining in urban and infrastructural expansion would not only necessitate sacrificing growth rates in the short-term, but it would deprive local government officials of opportunities to profit from industry deals and rural-urban land conversions. One area that might be feasible for targeted improvement is water use efficiency, which brings with it immediate economic benefits. At present industrial water use efficiency in China is exceedingly low (Liu and Wang 2012: 649), but some cities have shown improvement in efficiency rates in recent years. In Beijing, for example, the amount of water needed to produce 10,000 yuan of GDP has declined from roughly 10.5 billion m^3 in 2001 to 3 billion m^3 in 2009 (2010 Beijing Statistical Yearbook). These numbers may be somewhat deceptive, masking the city's shift toward the higher value secondary and tertiary sectors in recent years.

Nonetheless, water-use efficiency improvements represent a relatively less politically-fraught arena in which the government could work to relieve some of the NCP's water stress.

Widespread and severe pollution on the North China Plain is a third major stress on water resources that is on track to continue unchecked. Despite the existence of several water pollution prevention laws, industrial effluent, agricultural runoff, and inadequate sewage infrastructure have rendered roughly 80 percent of north China's surface water unusable (Shalizi 2008: 162). Working to improve the enforcement of pollution regulations would likely contribute to a significant improvement in surface water quality, relieving much of the pressure on the region's water supply. But, standing as a formidable impediment to this is the fragmented water management bureaucracy in which incentives are skewed and local government officials are rewarded for delivering economic growth and suffer only minor (if any) punishment for failing to enforce environmental regulations. The kind of widespread systematic change enforcement improvements would necessitate would require a slowing down of economic growth in order to focus on resource quality. Again, this approach would undermine the CCP's basis for continued economic growth and potentially threaten the party's legitimacy. It would also defy the "grow first, clean up later" mentality and force a break from the tendency of government officials to invoke the environmental Kuznets curve and the "stages of development" argument to justify their collective modus operandi as a viable method.

Instead of dealing with anthropogenic sources of stress on North China's water supply—such as population, production, and pollution— the government is putting forth "discourses of distraction" which serve to deflect attention away from these issues. This speaks to the second major question driving this research: what discourses are being mobilized by government stakeholders to justify the SNWTP? Discourses are storylines or narratives constructed and put forth by actors to support their interests, in this case, their interests related to water. In environmental politics, discourses and the problem framings embedded within them help to shape how resource issues are interpreted, discussed, and analyzed, as well as the kinds of solutions that are put forth in attempting to deal with them. "Discourses of distraction" are alternative stories about an environmental controversy that, in the case of the SNWTP, work to depoliticize the project, mask its social and ecological impacts, and deflect attention away from the root causes of water stress in north China. This shows us how discourse can be used as a political tool, not only reflecting power, but also serving as a mechanism by which certain actors may wield and garner it.

The first major discourse uncovered in this research is one that attempts to naturalize water stress on the NCP, deflecting attention away from anthropogenic stresses. This discourse, put for by government actors across North China and at multiple scales of the bureaucracy, emphasizes water scarcity in the north and abundance in the south. It makes use of key words such as "arid" to describe the north and relies on claims about drought and rainfall amounts to construct a picture of natural water scarcity in the region. By framing water shortage in the north as the product of natural factors, this

framework attempts to depoliticize the South-North Water Transfer Project as a solution to the issue, demonstrating how the discursive construction of water scarcity may be used as a political tool. Moreover, the naturalization of water scarcity on the NCP casts humans as struggling to deal with endogenously derived resource issues in creative ways, rather than as the culprits whose decisions have created the situation in the first place or, more sinisterly, actors who have knowingly pursued political and economic goals at the direct expense of the environment and marginalized communities.

The second discourse of distraction circulating around the South-North Water Transfer Project rests on the argument that the Middle Route will deliver environmental benefits to the water recipient basin by relieving pressure on overburdened groundwater resources. By presenting the project as an environmentally friendly enterprise in line with the principles of sustainable development, this narrative attempts to depoliticize the SNWTP and justify it in politically neutral terms. Rather than shifting water use away from groundwater resources, however, the transferred water will be used *in addition* to groundwater in order to meet rising industrial and urban demand.

In addition to discourse as a political tool being wielded in the case of the South-North Water Transfer Project, scalar constructions have also had a role to play in framing water management problems and solutions in the Chinese context. There are two specific scalar constructions that help to illuminate the politics underpinning the Middle Route. The first has to do with the creation of a unique scalar unit for the MR that serves as a device for placing the Yangtze River Basin beyond the scope of the project. The Danjiangkou Reservoir, served by the Hanjiang, a major tributary of the Yangtze, is

presented by government officials, in documents and news articles, and in cartographic depictions of the project as the source of the Middle Route's water. By framing the reservoir as a discrete water source, unconnected to the Hanjiang or Yangtze Basin more broadly, this scalar construction dilutes any potential controversy in the donor basin and precludes any significant conversation on mitigating downstream impacts of the Middle Route.

A second scalar construction emphasizes the transfer project not as an interregional water management scheme, but as a national project. A narrative centered on the Chinese notion of "eating bitterness" is heavily peppered with nationalist overtones, putting forth model citizens in popular state-run media publications who have selflessly made great personal sacrifices in order for the SNWTP to serve the interests of the nation. By striking nationalist chords with the public, this narrative helps to cultivate support (or at least cooperation) from residents in areas that may experience adverse social or environmental impacts in the wake of the project. By highlighting the nation rather than the regions or biophysical areas affected by the project, this scalar construction recasts tens of millions of residents in the Yangtze Basin and along the Hanjiang not as victims of the regional power imbalances expressed and solidified by the SNWTP, but as beneficiaries of a national development project that will help their country advance in its mission to modernize.

The case of China's South-North Water Transfer Project demonstrates the fundamentally political nature of water management in the twenty-first century. Where water flows, in what amount, and for what purpose is the result not only of natural and

biophysical factors such a climate and topography, but, importantly, of human negotiations, interests, and institutions. As Agnew notes, "…politics is the solution because the overall problem is political rather than natural or economic" (Agnew 2011: 464). But without recognizing and making explicit the political underpinnings of resource management challenges such as water provision on the North China Plain, effective solutions cannot be crafted. Exposing the politics at play in any given resource management issue by no means a guarantee of effective management, but it is a critical step in the right direction.

By looking at use values, spatialized power dynamics, discursive tools and scalar constructions, this dissertation has attempted to expose the politics of the Middle Route of China's South-North Water Transfer Project and of the goals underpinning water management in China more broadly. At present, water is being narrowly managed to meet the needs of rising industrial and urban demand on the North China Plain and in other important economic centers. The results of this water management approach are beginning to emerge not only within China's borders, but also internationally. Given that several of the great transboundary Asian rivers, including the Brahmaputra and Mekong, originate within Chinese territory, paying critical attention to the politics of water management as part of a broader Chinese model of development model is especially important.

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