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AN ARIZONA BORDER WALL CASE STUDY

by

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December 2017

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Illegal immigration is a popular topic. Obtaining operational control of the southwest border and adding infrastructure was deemed necessary and important when Congress voted for the Secure Fence Act in 2006. This thesis determines how much, and where, additional infrastructure should be added.

How effective can a border wall or fence be in securing the U.S.-Mexico border? Under what circumstances are walls and fences effective? When are other types of security measures more effective?

The Yuma and Tucson sectors are examined to determine the current border infrastructure's effectiveness using arrest and geographical data. Current border infrastructure, the complete wall system's cost, and results realized in reducing illegal crossings are reviewed. Government documents, congressional testimonies, and think-tank analyses are analyzed.

This thesis focused on barriers and tactical infrastructure on the southwest border. It found that a wall or fence is a viable option to improve the security of some border sections. The Yuma sector is already under operational control and is lower priority. The Tucson sector is higher priority and needs additional infrastructure. It is recommended that all urban and rural zones under 80 percent effectiveness be upgraded to modern fencing, while very remote areas below 80 percent effectiveness remain exempt if zone activity stays low.

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AN ARIZONA BORDER WALL CASE STUDY

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ABSTRACT

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LIST OF ACRONYMS AND ABBREVIATIONS

AOR	area of responsibility
CBP	Customs and Border Protection
CGAP	Capability Gap Analysis Process
CRS	Congressional Research Service
DHS	Department of Homeland Security
EGB	Executive Governance Board
FY	fiscal year
GAO	Government Accountability Office
GPRA	Government Performance and Results Act
GPS	global positioning system
HSGAC	Homeland Security and Governmental Affairs Committee
IBF	international boundary fence
IBWC	International Boundary and Water Commission
IDA	Institute for Defense Analysis
IER	interdiction effectiveness rate
IFT	integrated fixed tower
IIRIRA	Illegal Immigration Reform and Immigrant Responsibility Act
NAS	National Academy of Sciences
OIG	Office of Inspector General
POE	port of entry
RMP	requirements management process
RVSS	remote video surveillance system
RWG	Requirements Working Group
SBI	Secure Border Initiative
SFA	Secure Fence Act
TCO	transnational criminal organization
TON	Tohono O’odham Nation
USBP	U.S. Border Patrol

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EXECUTIVE SUMMARY

A recurring question regarding U.S. border security is how effective a wall is in terms of investment and utility. The comments are many, from the wall providing a deterrent and preventing illegal border crossings, to resourceful smugglers finding ways to circumvent the wall completely. The purpose of the wall is to impede or slow down illegal entries so the Border Patrol can increase arrests in that border zone. Increased arrests and subsequent consequences for illegal entries can make it bad for business and therefore lead to greater levels of security in certain border regions.

Since the Border Patrol became a member of the Department of Homeland Security, fences and tactical infrastructure have been part of the strategy to improve border security.

In the state of Arizona, case studies of the Yuma and Tucson sectors show that the building of a fence has been successful and point out areas where results have been more limited. After reviewing the data, the Yuma sector experiences more arrests, but a majority of entries still occur in zones where the wall is located. This higher number of entries supports the need to impede crossers or delay their arrival at their destinations. This delay allows the Border Patrol to respond more quickly to intercept the smugglers and make an arrest. However, deterrence is limited with structures built before 2007 (a legacy fence). Replacing the wall can improve deterrence by adding detection capabilities, as well as increasing officer safety if it is possible to see through the wall.

Controlling this nation's border is a federal responsibility, but just one of many. The Border Patrol has limited resources and must spend them wisely. Dollars for tactical infrastructure are competing with technology acquisition, staffing needs, as well as other government priorities across the Department of Homeland Security. The ability to identify the requirements needed to secure the border while having resources available for other needs across the government is critical in gaining more support to invest in the wall in the future.

The Tucson sector data show that a larger number of entries than for Yuma are deflected to more rural or remote zones. However, evidence shows that more Tucson entries are successful when crossing away from urban areas with fencing. Not being able to guarantee a greater number of arrests makes the Tucson sector a favorite location for smuggling.

As a result, some border zones in the Tucson sector are strong candidates for building a border wall. This new wall construction should include detection technology to alert law enforcement of potential and actual incursions at the immediate border, as well as allow for a more immediate and effective response close to the border as long as enough personnel are available to make arrests.

One mathematical formula that describes how fence or barriers enhance operational control can be defined as: operational control is achieved if time of crossing + vanishing time is > sum of the estimated time to detect, identify, and classify + estimated response time. In other words, if detection and response is greater than crossing and vanishing time, it is successful and is an indicator of improved operational control. The study of both sectors does show that a wall is effective in some locations but is a much lower priority in other border zones due to a lack of activity, greater response time available to agents, terrain, and fiscal responsibility. The author's recommendation is that all urban and rural zones with effectiveness under 80 percent be upgraded to modern fencing. Very remote areas below 80 percent effectiveness would be exempt if zone activity remained low.

The cost of the wall projects in Tucson is much cheaper than in south Texas or in San Diego County. Arizona can receive three miles of new fence or more for each mile constructed in South Texas. The ability to have immediate detection and improved officer safety will allow agents to respond quicker to make an arrest. Improved effectiveness rates will reduce activity and decrease detention and transportation costs for the government.

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This thesis is dedicated to my parents, especially retired Cherry Hill Police Department Investigator James M. Powell, who passed in April. He was the greatest Pop-Pop my children could have ever asked for in their lives. We miss you.

I. INTRODUCTION

A. PROBLEM STATEMENT

Illegal immigration is a popular topic in the news and has been the subject of political debate for many years. By voting for the Secure Fence Act in 2006, Congress showed that obtaining operational control of the southwest border and adding infrastructure at the border, including double-layer fencing, was necessary and important.[1] Hundreds of miles of new fence was constructed along the U.S.-Mexico border from 2006–2009. Since 2006, the number of illegal aliens arrested at the border decreased annually by approximately 50 percent, from almost one million per year in 2006 to nearly 500,000 per year in 2016.[2] The decrease in arrests appears to have accelerated further during the first 180 days of the Trump Administration and arrest numbers are projected to be well under 400,000 at the end of fiscal year 2017.[3] The Department of Homeland Security (DHS) reported 17,000 arrests were made at the border by the U.S. Border Patrol (USBP) in March 2017, a major reduction from the nearly 60,000 arrests in December 2016, and the lowest monthly figure since 2000.[4]

The biggest changes within border security in 2017 have been policy changes in terms of the Department of Justice's focus on prosecution and the perception of an increased difficulty in crossing the border illegally stemming from statements from the White House, and not the construction of a border wall. The initial change in numbers is noteworthy since seasonal increases in illegal crossings typically occur in the second quarter of the federal government's fiscal year (FY).

Even with a decrease in activity, the debate continues to center on whether operational control of the border has been improved or achieved. During the 2016

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[1] Secure Fence Act of 2006, Public Law 109–367, 109th Congress (2006).

[2] "U.S. Border Patrol Annual Arrest Statistics," U.S. Customs and Border Control, accessed April 9, 2017, https://www.cbp.gov/newsroom/media-resources/stats?title=Border+Patrol.

[3] "Southwest Border Migration," U.S. Customs and Border Protection, August 1, 2017, https://www.cbp.gov/newsroom/stats/sw-border-migration.

[4] Rich Lowry, "A Trump Victory on the Border," National Review, April 21, 2017, http://www.nationalreview.com/article/446938/donald-trump-immigration-border-security-victory.

campaign, and immediately upon taking office, President Trump prioritized the construction of a continuous barrier along the U.S. border with Mexico. However, congressional budget negotiations during the first quarter of 2017 resulted in a budget resolution through FY 2017 that appropriated no funds for new construction of the proposed wall. This thesis anticipates that during future budget negotiations, a more nuanced version of President Trump's original proposal will be debated. Senator Cornyn, as a border senator from Texas, has co-sponsored the Building America's Trust Act. This bill authorizes almost four billion dollars over four years to use existing authorities to secure the border.[5] This bill, if passed, requires many of the same enforcement tools and discretion from the Secure Fence Act of 2006 in addition to technology improvements in 2017.[6] The potential legislation also requires the DHS Secretary to use the best means possible to achieve operational control (apprehension of illegal border crossers) and situational awareness (persistent surveillance) along the southern border.[7]

This thesis seeks to contribute to this debate by drawing on USBP operational experience in two sectors and identifying costs and benefits associated with additional wall and infrastructure construction along the southern border. By identifying specific benefits, this thesis attempts to determine how much, and where, additional infrastructure should be added to the U.S. southern border.

B. RESEARCH QUESTION

How effective can a border wall or fence be in ensuring security along the U.S.-Mexico border? Under what circumstances are walls and fences effective, and when are other types of security measures more effective?

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[5] John Cornyn, *Building America's Trust Act* (Washington, DC: U.S. Senate, n.d.), accessed August 31, 2017, https://www.cornyn.senate.gov/sites/default/files/Building%20America%27s%20Trust%20Act%20-%20One%20Pager.pdf.

[6] Ibid.

[7] Ibid.

C. BACKGROUND

The U.S.-Mexico border has approximately 654 miles of fencing, including vehicle barriers.[8] Of that total, 306 miles are in the state of Arizona,[9] which the USBP divides into two sectors in terms of jurisdiction, the Yuma sector and the Tucson sector. While the USBP's Tucson and Yuma sectors neighbor each other and share some terrain characteristics near their intersection, as well as some likenesses in population-density areas, the operating environments are extremely different.

The Yuma sector has been seen as a successful use of border infrastructure, whereas the Tucson sector has seen more mixed results. Due to the environmental and geologic differences between these two sectors, Arizona provides an opportunity to study the impacts of tactical infrastructure or wall investment on security along the southwest border and presents evidence to assist policy makers in making decisions on this subject. Physical barriers in strategic locations along the southwest border support USBP operations through inherent impedance and denial traits. Generally, those intent on participating in illicit, cross-border traffic are deflected by barriers, presumably to areas or regions where the USBP has increased its law enforcement presence as a result of risk analysis. Thus, as infrastructure resources are immobile and far more finite than human or technology assets, USBP evaluations of risk indicators provide a path to the most efficient use of its assets. In ensuring the efficient use of personnel, technology, and infrastructure, the amount of each type of asset needed across Arizona fluctuates, depending on the type and volume of illegal activity.

Yuma sector's area of responsibility is located in the southwest corner of Arizona, is composed primarily of desert terrain in Arizona, and has a border of 126 miles in California near the Andrade port of entry, which is patrolled by Yuma sector agents.[10] The Yuma sector is one of the most diverse locations along the southwest border in terms

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[8] Glenn Bixler, *USBP Tactical Infrastructure Report* (Washington, DC: U.S. Border Patrol Headquarters, 2017).

[9] Ibid.

[10] "Yuma Sector Arizona," U.S. Customs and Border Protection, May 17, 2016, https://www.cbp.gov/border-security/along-us-borders/border-patrol-sectors/yuma-sector-arizona.

of geography, topography, number of ports of entry (POEs), and protected lands. However, many of the areas patrolled are flat, so surveillance technology is able to maintain a consistent view of border activity throughout much of the area. Within the Yuma sector, the Yuma station was the busiest individual station for the USBP in 2006.[11] From 2006–2009, significant investment was made in fencing, roads, and personnel to enhance the law enforcement presence in the sector. In 2006, the Yuma sector had 12 miles of fence. Today, primary, secondary, and vehicle fencing account for more than 124 total miles. The Yuma sector was the first sector designated as gaining operational control of the border.[12] Operational control was sustained for a few years until the mass influx of unaccompanied alien children impacted this area from 2014–2016.[13]

The Tucson sector was the busiest sector within the USBP for more than 15 years, including the first 10 years of DHS's existence. USBP agents there secure 262 miles from the Yuma-Pima County line to the state of New Mexico.[14] The Nogales station in the Tucson sector was the busiest station in the USBP from 1997–1998, when Tucson became the preferred location for smuggling across the U.S.-Mexico border. Nogales is a challenging environment due to the drainage system that travels underground into Mexico. Nogales is an urban environment with steep terrain and numerous hills that limit the view of people and technology. Areas of Cochise and Santa Cruz counties in Tucson's eastern corridor are known for their many arroyos, washes, and overall shifts in terrain, which makes maintaining a consistent view of border crossers more challenging in many of the Douglas, Naco, and Nogales' border zones. Significant investments were made in personnel, technology, and infrastructure in this area, as well as across the entire Tucson sector, which led to a reduction in apprehensions from more than 600,000 in the

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[11] "Yuma Sector Arizona."

[12] Richard Stana, *Testimony before the Subcommittee on Border and Maritime Security, Committee on Homeland Security, House of Representatives, Border Security Preliminary Observations on Border Control Measures for the Southwest Border, Statement of Richard M. Stana, Director, Homeland Security and Justice Issues*, GAO-11-374T (Washington, DC: Government Accountability Office, 2011), http://www.gao.gov/new.items/d11374t.pdf.

[13] Dennis Wagner, "Arizona Border: Security Differs in Yuma and Tucson Regions," *Arizona Republic*, May 18, 2011, http://archive.azcentral.com/arizonarepublic/news/articles/20110518arizona-border-security-yuma-tucson-sector.html.

[14] "Tucson Sector," U.S. Customs and Border Protection, accessed April 16, 2017, www.cbp.gov.

Tucson sector during FY 2000 to about 65,000 apprehensions in FY 2015. During the same time period, 52 miles of fencing in the Tucson sector in FY 2006 increased to approximately 200 miles by 2016.[15]

D. LITERATURE REVIEW

This literature review encompasses various types of government documents, congressional testimony, and think-tank analysis divided into two categories. The first section reviews the arguments of supporters of border walls and fences, who believe such infrastructure can be effective. The second section covers a different perspective that can be summarized by the fence or wall not being a good investment, and even in some cases, harmful to the United States. Each chapter of this thesis compares operational experience of the USBP in two Arizona sectors with the evidence provided in the literature.

1. Supporters of Border Walls and Fences

Government officials have sometimes argued that border walls and fences can be very effective. The Congressional Research Service (CRS) has written that beginning in the Clinton Administration, "prevention through deterrence" was the strategic theme of the USBP. Back when the organization was a component of the Department of Justice, saturation of border resources at the immediate border was the tactic used to deny routes of travel for potential illegal border crossers attempting U.S. entry.[16] According to the CRS, fencing or a wall has been determined to be a critical enforcement piece for detection and identification of illegal entry, especially in urban areas.[17]

The Homeland Security and Governmental Affairs Committee (HSGAC) conducted hearings on April 4–5, 2017, which included experts and retired government officials with border experience about enforcement and security at the border. Senator Johnson, chairman of the committee, spoke about the need for more barriers, more

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[15] Bixler, *USBP Tactical Infrastructure Report*.

[16] Carla Argueta, *Border Security: Enforcement between Ports of Entry*, CRS Report No. R42138 (Washington, DC: Congressional Research Service, 2016).

[17] Blas Nuñez-Neto and Michael J. Garcia, *Border Security: The San Diego Fence*, CRS Report No. RS22026 (Washington, DC: Congressional Research Service, 2007).

fencing, and other investments because the border is not secure.[18] Retired Chief Ronald S. Colburn of the USBP l's Yuma sector testified that fencing played a significant role in reducing arrests in the Yuma, Arizona area of responsibility from 138,000 in 2005 to about 8,300 in 2008.[19] Yuma sector arrests also continued to decrease to 5,900 in 2014.[20] Chief Colburn stated, "Yuma Sector became the 'proof of concept' that America can protect and control its border, when the proper mix of resources is placed almost instantaneously."[21] Retired Deputy Commissioner of U.S. Customs and Border Protection (CBP), David V. Aguilar, also provided written testimony to HSGAC for its fence hearing:

> Since the Border Patrol first began building infrastructure (fences, walls, vehicle barriers) along our nation's border, there has been endless debate on its value. Border Patrol agents and the Border Patrol as an organization agree that properly constructed, placed, and supported physical infrastructure is essential to border security.[22]

As DHS Secretary John Kelly, who now is the Chief of Staff at the White House, supported the construction of a border wall, but he also testified that physical barriers "must be bolstered by persistent patrol, and the vigilance of the dedicated men and women of DHS."[23] During his testimony, Secretary Kelly discussed the concept of a wall across the entire southwest border and stated, "We're not going to build a wall where it doesn't make sense, but we'll do something across the southwest border."[24] Scott Luck,

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[18] Ron Johnson, "We Have to be Committed to Securing the Southern Border," Homeland Security & Governmental Affairs Committee, April 6, 2017, https://www.hsgac.senate.gov/media/majority-media/chairman-johnson-on-cnn-we-have-to-be-committed-to-securing-the-border-.

[19] Ron Colburn, *Written Testimony on Fencing along the Southwest Border* (Washington, DC: U.S. Senate Committee on Homeland Security & Governmental Affairs, 2017).

[20] U.S. Customs and Border Protection, *United States Border Patrol, Total Illegal Alien Apprehensions by Month—FY 2000* (Washington, DC: United States Border Patrol, 2016), https://www.cbp.gov/sites/default/files/assets/documents/2016-Oct/BP%20Total%20Monthly%20Apps%20by%20Sector%20and%20Area%2C%20FY2000-FY2016.pdf.

[21] Colburn, *Written Testimony on Fencing along the Southwest Border*.

[22] David V. Aguilar, *Written Testimony on Fencing along the Southwest Border* (Washington, DC: U.S. Senate Committee on Homeland Security & Governmental Affairs, 2017).

[23] John Kelly, *Improving Border Security and Public Safety* (Washington, DC: U.S. Senate Committee on Homeland Security & Governmental Affairs, 2017).

[24] "Border Wall: DHS' Kelly Says it Won't Stretch "from Sea to Shining Sea,"" CBS News, April 5, 2017, http://www.cbsnews.com/news/border-wall-dhs-kelly-says-it-wont-stretch-from-sea-to-shining-sea/.

Acting Deputy Chief of the USBP, testified before a congressional committee on July 25, 2017 that a wall provides impedance and denial and is a part of a package with surveillance and road access.[25] When asked during the hearing, he said it was too early to give a number of how much wall should be built beyond the FY 2018 budget request. He said, "the adversary gets a vote."[26] The author believes this statement alludes to the mobile capabilities of transnational criminal organizations and gangs involved in illegal smuggling businesses and their ability to remain agile and shift tactics. The annual appropriations cycle provides blocks of funding and an opportunity to plan against updated information. The annual budget allows for changes in investment priorities to include deployment locations. The challenge is for the government to apply timely resourcing to address problems and not be years behind schedule.

Supporters note that fencing is built to deflect illegal traffic to areas where agents have a higher probability of identifying crossers and responding within a short period. Ultimately, that impedance factor would lead to the denial of access to the Unites States through apprehension. While physical barriers present the greatest impedance to illegal cross-border traffic, advancements in technology also allow for the possibility of "smart" fencing in the United States that provides a high-quality detection and identification capability at the immediate border. Congressman Will Hurd inquired about fiber optics as an option for smart fencing during his House Committee hearing on July 25, 2017, when questioning Acting Deputy Chief Scott Luck of USBP headquarters.[27] A wall also can influence the decision making and ability of smugglers to improvise when law enforcement responds to illegal activity.[28] As the USBP has experienced in some locations, when physical barriers to areas or zones deflect illicit cross-border traffic where more law enforcement surveillance capabilities have been placed, interdiction efficiency and effectiveness tends to increase. The interdiction effectiveness rate (IER) is calculated by adding the number of arrests and turnbacks (those observed to have

[25] "Border Wall: DHS' Kelly Says it Won't Stretch "from Sea to Shining Sea.""

[26] Ibid.

[27] Ibid.

[28] Gabriella Sanchez, *Crossing Borders, Migrant Smuggling Organizations on the U.S.-Mexico Border* (El Paso, TX: Center for Law and Human Behavior, University of Texas at El Paso, 2016).

returned to Mexico before being apprehended) and dividing that sum by total entries detected.[29] The accuracy depends, in part, upon USBP agents documenting when they believe that an illegal border crosser has not been arrested or turned back to Mexico (these are known as got-aways). Acting DHS Secretary Elaine Duke wrote an opinion piece on the border security effort in Yuma that was published in USA Today on August 22, 2017. Her closing argument and main theme was:

> It is undeniable that simply enforcing the law, combined with sufficient investment in personnel, infrastructure and technology, can allow us to be successful in our efforts to protect the homeland. Lawmakers on both sides of the aisle should come together like they did 10 years ago and give the men and women of DHS the resources we need to defend our homeland. This starts with fully funding the construction of a wall along our Southern border.[30]

2. Critics of Border Walls and Fences

Just as staunch advocates for construction of physical barriers along the U.S. border with Mexico are prevalent, a community of critics of any plan to do so also exists, and the debates they wage can be polarizing. During the last 10 years, considerable research has been conducted to study the effectiveness of a border wall or fence. Scholars, such as Joseph Browning have concluded that such border infrastructure has only a limited effect.[31] Browning's work was conducted shortly after the initial government response to the passage of the Secure Fence Act. Specifically, he studied the San Diego fence project's impacts and examined staffing and displacement of illegal entries before additional investment was made in other parts of the southwest border. John Sherwood conducted a similar study, and found that a fence or wall can be a key

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[29] Carla N. Argueta, *Border Security Metrics between Ports of Entry*, CRS Report No. R44386 (Washington, DC: Congressional Research Service, 2016), https://fas.org/sgp/crs/homesec/R44386.pdf.

[30] Elaine Duke, "Homeland Security Secretary: Border Walls Work. Yuma Sector Proves it," *USA Today*, August 23, 2017, https://www.usatoday.com/story/opinion/2017/08/22/homeland-security-secretary-border-walls-work-yuma-sector-proves-it-elaine-duke-column/586853001/.

[31] Joseph Browning, "The Secure Fence Act: The Expected Impact on Illegal Immigration and Counterterrorism" (master's thesis, Naval Postgraduate School, 2008).

piece to border enforcement, but asserts that they alone do not stop terrorism or illegal immigration.[32]

Terence M. Garrett, PhD, professor at the University of Texas-Rio Grande Valley, authored a paper in March 2017 that describes the wall as a waste of money that can reach a price exceeding $20 billion.[33] Garrett concludes that the construction of the border wall will not reach the desired policy objectives.[34] Ron Nixon wrote in the *New York Times* that geography like riverbanks and trails, which are challenging for access by vehicle, makes constructing a wall nearly impossible and extremely expensive.[35] Reece Jones examined wall projects in the United States, India, and Israel regarding their common issues with cost and politics that prevented completion.[36] Jones also discussed how terminology matters in how barriers are described.[37] Elisabeth Vallet examines border walls as a political tool, wall discourse, and border investment symbolism.[38]

Other commentators have also argued that border fences have limited utility. In 2009, Jacques De La Croix and Sergey Nikikorov of the *Independent Review* described the "so-called fence" as something insufficient to stop illegal entry from Mexico because of the lure of the U.S. economy.[39] Nadav Morag writes that countries can only prevent a small number of people from entering a country illegally.[40] Bettina J. Cory argues in her Naval Postgraduate School thesis from the Center for Homeland Defense and Security

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[32] John T. Sherwood, "Building the Wall: The Efficacy of a U.S.-Mexico Border Fence" (master's thesis, U.S. Army, Ft. Leavenworth, Kansas, 2008).

[33] Terence Garrett, "Where There's a Wall There's a Way: The End (?) of Democratic Discourse regarding Immigration and Border Security Policy," American Society for Public Administration 2017 Conference, Atlanta, Georgia, March 17–21, 2017.

[34] Ibid.

[35] Ron Nixon, "Patrolling the Border on Four Legs," *New York Times*, April 18, 2017, https://www.nytimes.com/2017/04/18/us/border-patrol-horses-immigration-trump.html?_r=0.

[36] Reece Jones, *Border Walls* (London, United Kingdom: Zed Books, 2012), ch. 1.

[37] Ibid.

[38] Elisabeth Vallet, *Borders, Fences and Walls State of Insecurity?* (Farnham, Surrey, UK, Burlington, Vermont: Ashgate, 2014).

[39] Jacques De La Croix and Sergey Nikikorov, "If Mexicans and Americans Could Cross the Border Freely," *The Independent Review* 14 (Summer 2009): 101–133.

[40] Nadav Morag, "Border Management: International Experiences," 11, March 2015, https://www.chds.us/moodle/mod/resource/view.php?id=25144.

that U.S. border-security policy has "rendered the fence obsolete."[41] In early 2017, a politician from Mexico made a similar point by having his picture taken atop the border fence in the San Diego sector.[42]

As noted previously, some observers, such as Lowry, believe that a combination of aggressive rhetoric from the White House regarding potential consequences and increased border and interior enforcement may be sufficient to reduce illegal immigration significantly, even without additional walls and fences.[43] As the USBP makes progress in securing sections of the border, some may argue that any amount of additional tactical infrastructure may not be needed, and that the costs will outweigh any benefit. This discussion may increase if the drop in illegal immigration that began January 20, 2017, continues. The argument may be made that the policy statements from the White House are more important than the construction of a wall, because a real deterrent of illegal immigration is the immigrants' perceptions of harsh consequences or probable failure in the attempt to cross the border illegally. USBP apprehensions are averaging a 70 percent decrease in arrests each day since the inauguration.[44] Over this 180-day period, overall crossings have been reduced by a range of 40–70 percent depending on the month.

The reduction in border crossings appears to be accompanied by an overall reduction in the number of illegal aliens in the United States. Jens Manuel Krogstad and his colleagues from the Pew Research Center reported that the illegal alien population was at a high of 12.2 million people in 2007, and has been reduced ever since.[45] A shift in demographics has also occurred, as Mexico's percentage of the overall illegal alien

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[41] Bettina J. Cory, "Recasting the US-Mexico Border Security Net" (master's thesis, Naval Postgraduate School, 2014), https://www.hsdl.org/?view&did=753843.

[42] Chris Sommerfeldt, "SEE IT: Mexican Congressman Scales Border Fence near Tijuana to Ridicule, resident Trump's 'Absurd' Wall,'" *NY Daily News*, March 3, 2017, http://www.nydailynews.com/news/politics/mexican-congressman-scales-border-fence-ridicule-trump-wall-article-1.2987705.

[43] Lowry, "A Trump Victory on the Border."

[44] Michael Young, *USBP Daily Report* (Washington, DC: USBP Statistics and Data Integrity Branch, 2017).

[45] Jens Manuel Krogstad, Jeffrey S. Passel, and D'Vera Cohn, "5 Facts about Illegal Immigration in the U.S.," Pew Research Center, April 27, 2017, http://www.pewresearch.org/fact-tank/2017/04/27/5-facts-about-illegal-immigration-in-the-u-s/.

population is decreasing.[46] However, individuals from Central America can still be solicited by alien and drug smugglers in large numbers to enter the United States illegally for financial gain.

While a lot of literature involved in both sides of the debate regarding the need for physical barriers along the border can be accurately characterized as anecdotal, more empirical efforts are used to evaluate the effectiveness and efficiency of capabilities that lend themselves to gaining operational control of the southern border. The Government Accountability Office (GAO) is the primary government organization evaluating the usefulness of border walls and fences, which questioned the ability of a fence to increase apprehensions or create a deterrent.[47] One reason this usefulness can be seen as a complex standard is that border zones can see an increase in apprehensions but still not create a deterrent. An USBP IER is reported to the Office of Management and Budget.[48] However, some who based their doubts on the belief that the USBP does not detect or encounter every person crossing the border illegally (referred to as "unknown flow") questioned the accuracy of this measure. Another question is what percentage of entries needs to be successful between POEs to maintain a successful smuggling operation from Mexico into the United States.

According to the GAO, the CBP spent $2.3 billion on tactical infrastructure from 2007 to 2015, and that figure does not include all costs.[49] This amount of money is concerning to many U.S. taxpayers because illegal entries into the United States remain a substantial number to some people who would like arrest numbers much closer to zero. With Executive Order 13767, "Border Security and Immigration Enforcement Improvements," which President Donald Trump signed January 25, 2017, the White House stated its objective for the security of the U.S. southern border by mandating that

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[46] Krogstad, Passel, and Cohn, "5 Facts about Illegal Immigration in the U.S."

[47] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, GAO-17-331 (Washington, DC: U.S. Government Accountability Office, 2017).

[48] Argueta, *Border Security Metrics between Ports of Entry*.

[49] Ibid.

the country achieve complete operational control.[50] Operational control is a term adopted from the Secure Fence Act of 2006, and is defined within that Executive Order identically from the legislation. It expects 100 percent success at the border so illegal crossings do not occur, including contraband.[51] An estimated 11.2 million illegal aliens are living in the United States, according to 2012 statistics, more than in any other nation.[52] Given those statistics, some with a voice in the border security discussion, including those within U.S. government agencies, maintain that the strict Secure Fence Act of 2006 language is actually an aspirational end state unlikely to be achieved unless an impenetrable barrier is designed and constructed along the United States' international boundaries.

In 2009, the GAO recommended that a cost-benefit analysis for border fencing be conducted.[53] The CBP has yet to submit a cost-benefit analysis for border fencing. Additional GAO reports have examined the fence construction during 2006–2009 as part of the Secure Border Initiative (SBI). These reports have addressed many questions involving acquisition processes, requirements validation, and governance. The 2009 report explored the CBP tactical infrastructure investments made in the last two years of the Bush Administration. The report also inquired if the money had been used for fences instead of SBI technology in Arizona.[54] This question was a natural one since the SBInet project only constructed a few towers in the west desert of the Tucson sector. Smugglers were still able to operate in those areas with very little disruption, as the surveillance coverage was limited.

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[50] "Executive Order 13767, Border Security and Immigration Enforcement Improvements," White House, January 25, 2017, www.whitehouse.gov/the-press-office/2017/01/25/executive-order-border-security-and-immigration-enforcement-improvements.

[51] Secure Fence Act.

[52] Marc Rosenblum, *Securing the Border: Defining the Current Population Living in the Shadows and Addressing Future Flows* (Washington, DC: U.S. Senate Committee on Homeland Security & Governmental Affairs, 2015), https://www.hsgac.senate.gov/.

[53] Government Accountability Office, *Secure Border Initiative: Technology Deployment Delays Persist & The Impact of Border Fencing Has Not Been Assessed*, GAO-09-896 (Washington, DC: U.S. Government Accountability Office, 2009).

[54] Government Accountability Office, *Secure Border Initiative Fence Construction Costs*, GAO-09-244R (Washington, DC: U.S. Government Accountability Office, 2009).

Conflicting views about the effectiveness of border walls and fences in terms of the larger immigration picture have arisen. Scott Savitz from the RAND discusses challenges with fencing in terms of tunnels and people overstaying their visas.[55] Michael Wermuth and Jack Riley from RAND testified to the House Homeland Security Committee in 2007 on border security that, "We have very little understanding of how individual policies and suites of policies combine to affect risk reduction."[56] In addition, former DHS Assistant Secretary Seth Stodder testified before the House Oversight and Government Reform Committee on April 27, 2017 that the Trump wall proposal is a mistake and would be wasteful financially, as well as undermine security efforts.[57] Arizona Congressman Raul Grijalva agreed with Seth Stodder and signed a letter opposing any funding for a border wall addressed to the Appropriations Committee leadership, including Chairman John Carter dated July 21, 2017. Rep. Grijalva believes that border wall funding is a "poison pill," which he includes not using funds to replace a legacy fence or vehicle barriers just like new wall construction.[58] This viewpoint may signify a shift in Congressional thinking since over 300 million dollars was funded in the 2017 DHS budget for a replacement fence and other infrastructure needs. Rep. Grijalva said that the wall symbolizes hatred, divides communities, and is harmful to wildlife.[59]

3. Summary

Although many government officials and USBP professionals argue that border walls and fences are effective in limiting illegal immigration, this literature review has shown that many researchers and policy analysts believe they provide little value. This lack of agreement suggests that further research is needed to help in understanding the

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[55] Scott Savitz, "Would a Border Wall be Effective?," *The Rand Blog* (blog), September 26, 2016, http://www.rand.org/blog/2016/09/why-a-border-wall-would-do-little-besides-waste-money.html.

[56] Michael A. Wermuth and K. Jack Riley, *Testimony: The Strategic Challenges of Border Security* (Santa Monica: RAND, 2007), 6.

[57] Seth Stodder, *Testimony: The Border Wall: Strengthening our National Security* (Washington, DC: House Oversight and Government Reform Committee, 2017).

[58] "Grijalva and Vela Lead Letter Opposing Funding and Construction of Border Wall," Raul Grijalva, July 21, 2017, https://grijalva.house.gov/press-releases/grijalva-and-vela-lead-letter-opposing-funding-and-construction-of-border-wall/.

[59] Ibid.

value of border walls and fences in gaining operational control of the border. In fact, the USBP's strategic outlook embraces a refined construct of operational control between the POEs and interprets it as a subset of the DHS's overall border-security mission. Operationally, the USBP clarifies its role as gaining and maintaining operational control between the POEs by adopting a definition much more aligned with the capabilities and resources it has been provided. The USBP defines its operational control as its ability to impede illegal entries and deny them access to the country, maintain situational awareness of the operating environment, and apply law enforcement resolutions to those it apprehends for U.S. immigration law or illegal contraband violations.[60]

E. RESEARCH DESIGN

This thesis is intended to inform decision makers about the risks and potential benefits from the construction of border walls and similar infrastructure. It examines two areas along the southwest border where walls or fences have been constructed in an attempt to determine which factors tend to make such infrastructure effective or ineffective. It first examines the Yuma sector, which has been described as a successful use of a border wall. Second, it studies the Tucson sector, which has a variety of complex border challenges that include tunnels, a drainage system accessible from Mexico, an urban population at the immediate border, and terrain that has a significant slope, all of which lead to the questionable effectiveness of the border wall. This thesis examines various categories of information that can provide insight on future decision making on setting priorities for wall construction at the border.

This thesis uses arrest and geographical data from the DHS as a measure of the effectiveness of border infrastructure in each area. The majority of high-level USBP arrest data is available on the CBP website. This thesis examines the type of border infrastructure in use, the cost of the complete wall system, and the results that have been realized in terms of reducing illegal crossings.

[60] Ron Vitiello, *Testimony on Border Security Gadgets, Gizmos, and Information: Using Technology to Increase Situational Awareness and Operational Control* (Washington, DC: Committee on Homeland Security, 2016).

F. OVERVIEW

This thesis discusses the USBP's strategic evolution since the DHS was created and identifies the benefits, costs, and enforcement impacts of current border infrastructure in the state of Arizona. Specifically, it examines whether a primary wall or fence improves security and safety at the border at locations where an individual can hide or disappear quickly that are a short distance from Mexico. Although this thesis is limited to two sectors, it may yield lessons of general applicability across the entire southwest border. Chapter II examines the previous and current USBP strategic plans and how a fence or wall is included in those plans. Chapter III reviews the impact fence construction has had on the border in the Arizona sectors. Chapter IV analyzes the wall data from Arizona and how it can make sense operationally. It also reviews options, requirements and costs for the wall, technology and other investment. Chapter V provides a conclusion of findings and recommendations for where wall investment can be considered, and why and it also examines reasons why some border locations may be a lower priority for wall construction.

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II. HISTORY OF BORDER FENCING AND THE WALL

A. USBP STRATEGY EVOLUTION FROM 2004–2016

The CBP is charged with managing and overseeing activities at immediate U.S. borders, as well as at interior POEs, which are usually international airports.[61] The USBP protects the border from illicit incursions by interdicting those involved in the illicit activity, apprehending illegal entrants, and seizing contraband while providing a publicly facing law enforcement presence in many remote locations where state and local police resources are limited.

In 2004, the USBP introduced a national strategy that was a resource-driven approach to increase border security.[62] USBP Chief David V. Aguilar testified that the organization used agents, surveillance, sensors, and tactical infrastructure as needed to increase security, especially in or near larger population centers.[63] He also described USBP initiatives in west Texas, Chula Vista, CA, and south Texas areas, respectively, with more effective security at the border and how the changes significantly affected illegal migration by deploying the increased resources in a focused way near high-cross border traffic areas between official POEs.[64] The increase in allocating resources to those sectors, which included densely populated areas of southern California, west Texas, and south Texas, led to a substantial increase in illegal entries at the Arizona and Mexico border.[65] The influx of illegal entries began a significant investment in Arizona from the creation of the DHS through 2017 in terms of additional personnel, more advanced technology, and increased infrastructure. For the purpose of this thesis, the infrastructure included the construction of most of the fence or wall across the state of Arizona.

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[61] U.S. Customs and Border Protection, *Vision and Strategy 2020*, CBP Publication Number 0215-0315 (Washington, DC: U.S. Customs and Border Protection, 2015).

[62] David V. Aguilar, *2004 Border Patrol Strategy* (Washington, DC: U.S. Customs and Border Protection, 2004).

[63] David V. Aguilar, *The Southern Border in Crisis: Resources and Strategies to Improve National Security* (Washington, DC: U.S. Customs and Border Protection, 2005).

[64] Ibid.

[65] Wayne Lutton, "Border Crisis in Arizona—Senate Testimony," *The Social Contract* 11, no. 1 (Fall 2000), http://www.thesocialcontract.com/artman2/publish/tsc1101/article_71_printer.shtml.

Operation Jump Start in 2006–2007 and the SBI from 2007–2010 were funded to improve border security across Arizona. Operation Jump Start was a joint DHS and National Guard task force implemented to improve border security. President Bush deployed 6,000 National Guard members to build additional capacity for border enforcement with regard to surveillance, fences, and vehicle barriers, while the DHS hired 6,000 new agents to patrol the border.[66] The DHS also approved the SBI, a multi-billion dollar effort for U.S. border enforcement through the deployment of technology and tactical infrastructure.[67] The Yuma sector received money to build pedestrian and vehicle fencing across its entire area of responsibility. The Tucson sector increased its fence deployment while concentrating on vehicle barrier construction. By 2009, more than half of Tucson's area of responsibility had vehicle barriers in addition to having pedestrian fencing at all its urban locations.[68]

In 2012, the USBP shifted its strategy to a risk-based approach in response to pending budget cuts from sequestration.[69] This approach translated into zero dollars being available for new fence construction. In testimony before members of Congress in early 2013, USBP Chief Michael J. Fisher explained his vision for a secure border.[70] He used the term "linear miles of operational control," which he described as a tactical deployment term because border operations are complex and statistics do not depict the

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[66] "Operation Jump Start—CBP Border Patrol and the National Guard," U.S. Customs and Border Protection, updated November 13, 2015, https://help.cbp.gov/app/answers/detail/a_id/1021/~/operation-jump-start---cbp-border-patrol-and-the-national-guard.

[67] Government Accountability Office, *Statement for the Record to the Committee on Homeland Security and Governmental Affairs, U.S. Senate, Secure Border Initiative: DHS Has Faced Challenges Deploying Technology and Fencing Along the Southwest Border*, GAO-10-651T (Washington, DC: Government Accountability Office, 2010).

[68] Eileen Sullivan, "US-Mexico Border Fence nears Completion," *Arizona Daily Star*, January 28, 2009, http://tucson.com/news/local/border/us-mexico-border-fence-nears-completion/article_76cf6ded-2b34-5f94-977b-257cab3f7a14.html.

[69] Michael Fisher, *2012–2016 Border Patrol Strategic Plan* (Washington, DC: U.S. Customs and Border Protection, 2012).

[70] Michael Fisher, "Written testimony of U.S. Customs and Border Protection U.S. Border Patrol Chief Michael Fisher and Office of Field Operations Acting Assistant Commissioner Kevin McAleenan for a House Committee on Homeland Security, Subcommittee on Border and Maritime Security Hearing Titled "What Does a Secure Border Look Like?," Department of Homeland Security, February 26, 2013, https://www.dhs.gov/news/2013/02/26/written-testimony-us-customs-and-border-protection-house-committee-homeland-security.

situation in its entirety.[71] Resources alone are not the answer, because even the heaviest concentration cannot seal the border completely.[72] This definition officially changed the strategy from 2004 and focused on a high quality of life for residents and visitors that include commerce and moving freely without being afraid that illegal activity will occur. This change in strategy occurred out of necessity, as CBP priorities appeared to shift toward facilitating legitimate travel and trade at POEs versus detecting and interdiction entries between POEs, where all cross-border activity is illegal. It also meant that no additional wall or new fence was being built during this time.

If a question remains pertaining to the source of this shift in strategic thinking or whether an option was available to continue pursuing the 2004 resource-based strategy, sequestration made it mandatory.[73] The Budget Control Act of 2011 changed the strategic thinking across Washington, DC. The decision to have spending caps and dealing with spending cuts became a realistic part of how decisions were made across all of the CBP.[74] The majority of CBP components had to evaluate priorities, and adjust to the reality that a flat budget would seem like an increase since most agencies would be dealing with reduced budgets. As funding for the construction of additional physical barriers withered, fiscal considerations also greatly influenced the fence repair efforts, which began in 2011. The Office of Management and Budget are evaluating the sequestration matter annually during the preparation of the President's annual budget, as well as by the Congressional Budget Office through 2021.[75]

Due to the organizational budget reality, the USBP started determining its needs and applied various capabilities via the Capability Gap Analysis Process (CGAP) to

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[71] Fisher, "Written Testimony of U.S. Customs and Border Protection U.S. Border Patrol Chief Michael Fisher and Office of Field Operations Acting Assistant Commissioner Kevin McAleenan for a House Committee on Homeland Security, Subcommittee on Border and Maritime Security hearing titled "What Does a Secure Border Look Like?"

[72] Ibid.

[73] Budget Control Act of 2011, Public Law 112–25, S. 365, U.S. Statutes at Large 240 (2011): 125.

[74] "Sequestration," Congressional Budget Office, accessed August 28, 2017, https://www.cbo.gov/topics/budget/sequestration.

[75] Congressional Budget Office, *Final Sequestration Report for Fiscal Year 2017* (Washington, DC: Congressional Budget Office, 2017), https://www.cbo.gov/publication/52704.

produce mission outcomes that increase the border's levels of control.[76] Resources that comprise those capabilities include personnel, technology, infrastructure, information (including intelligence), and equipment.[77] USBP leadership and subject-matter experts identify and deploy the best available mix of those resources to increase border security. Even under difficult budget circumstances that include consecutive, unpredictable continuing budget resolutions, as well as significant funding reductions, the USBP is required to maintain its border enforcement operations, including funding repairs of existing physical barriers.

A primary challenge with a resource-based strategy is that improvements may not be seen as realistic unless funding increases. This viewpoint helped shift the focus that gaining and maintaining operational control between POEs requires risk-based decisions that enable the CBP to detect, identify, track, and respond to arrest illegal crossings across all border regions and sectors.[78] The CBP's approach through 2016 was designed to be nimble, threat-based, and intelligence driven to allow the border agency to identify high-risk areas and flows, plan targeted responses, optimally deploy resources, and establish partnerships and information-sharing agreements to achieve border security objectives as early as possible.[79] The transition from a resource-based strategy to a risk-based approach has allowed the USBP the opportunity to gain experience-setting priorities. This transition was done through an annual mission analysis from the field up to the national headquarters through the CGAP.

As the USBP concluded FY 2016, it became clearer that a U.S. effort to secure the border should be more inclusive across the government. Providing the USBP only with more agents, procuring and deploying more technology by itself, or building additional tactical infrastructure, the three primary facets in the CBP investment portfolio, has appeared to offer a diminishing return over time. Departments across many

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[76] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 19.

[77] Ibid.

[78] Keith McManus and Chris Pietrzak, *U.S. Border Patrol Requirements Management Process* (Washington, DC: Operational Requirements Management Division, U.S. Border Patrol HQ, 2016).

[79] Ibid.

governmental entities affect the state of the border. Immigration actions or policies, whether real or perceived, influence border security. In 2014, the perception that women and children would be allowed to stay or remain in the United States after arrest shifted tactics and procedures used by smuggling organizations at the border and how people were transported into the U.S. interior.[80] However, with the change in immigration enforcement policy by Attorney General Jeff Sessions in 2017, the USBP's operational effectiveness at the border regains a more prominent role in the nation's border security posture.[81]

A wall or fence has been a piece or component of the USBP's strategy during these 12 years. The wall decreased in focus from 2012–2016, the period in which the strategic plan pivoted to an emphasis on the pillars of integration, information, and rapid response, as opposed to 2004–2012, when the fence was one leg of the "three-legged stool."[82] That leg of tactical infrastructure was joined by personnel and technology as key pieces of gaining and expanding operational control of the border in the early years of the DHS.[83]

B. THE 2017 EXECUTIVE ORDER AND A STRATEGIC PIVOT

One fundamental purpose of Executive Order 13767 is to provide clear instructions to stop illegal entry into the United States.[84] The use of tactical infrastructure, including walls, fences, and other investments have had some success in deflecting illicit traffic to areas where higher concentrations of resources increase the probability of detection and interdiction, and in supporting a factor of deterrence and prevention of successful illegal entries.

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[80] Jeh Johnson, "Policies for the Apprehension, Detention and Removal of Undocumented Immigrants" (DHS memorandum, Washington, DC: Department of Homeland Security, 2014), https://www.dhs.gov/sites/default/files/publications/14_1120_memo_prosecutorial_discretion.pdf.

[81] Ted Hesson, "Sessions Signals Immigration Crackdown," Politico, April 11, 2017, http://www.politico.com/story/2017/04/jeff-sessions-immigration-crackdown-237109.

[82] Doris Meissner et al., *Immigration Enforcement in the United States, The Rise of a Formidable Machine* (Washington, DC: Migration Policy Institute, 2013), 3.

[83] Aguilar, *2004 Border Patrol Strategy*.

[84] Exec. Order No. 13767 (2017), www.whitehouse.gov/the-press-office/2017/01/25/executive-order-border-security-and-immigration-enforcement-improvements.

The Yuma and Tucson sectors can attest to the benefits of past investments in border security, including border infrastructure and additional law enforcement personnel and technology. As these additional resources have been deployed as a "network of systems," DHS Joint Task Force-West Director Paul Beeson has testified that border security has improved and local communities have seen dramatic improvements in security, safety, and economic growth.[85] With all the resources and infrastructure deployed to the border, significant border security gaps remain. As Beeson's testimony confirms, some areas would greatly benefit from the construction of a wall or the replacement of the legacy fence with a wall, as well as from the deployment of technology and additional agents. The term gap is not geographically specific, and can refer to urban, rural, and remote environments.

The USBP's current strategic vision in 2017 is "a safe homeland with protected borders," and the organizational objective associated within the DHS's overall border security mission is operational control of the border between the POEs. This control is composed of three elements: impedance and denial, situational awareness, and execution of a law enforcement resolution.[86] The ability to achieve operational control of the border is influenced significantly by many things, which include but are not limited to terrain features, infrastructure, technology, the availability of resources, or the sophistication of criminal elements operating in any given area of the border. For these reasons, operational control cannot be resourced with a "one size fits all" approach.[87] Operational control is achieved in varied operational environments leveraging a variety of operational tactics, resources, and capabilities tailored to those environments. No single effort or resource achieves operational control, nor is it the product of any single effort or resource. It is achieved as the outcome of persistent and unified efforts, supported by

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[85] Paul Beeson, "Written Testimony of CBP Paul Beeson, Director of DHS Joint Task Force—West for a House Committee on Homeland Security, Subcommittee on Border and Maritime Security Hearing Titled "A Dangerous and Sophisticated Adversary: The Threat to the Homeland Posed by Cartel Operations,"" February 16, 2017, https://www.dhs.gov/news/2017/02/16/written-testimony-cbp-house-homeland-security-subcommittee-border-and-maritime.

[86] Gerald Martino, Ron Koch, and Martina Melliand, *Border Patrol Headquarters Internal Briefing for Border Security Improvement* (Washington, DC: U.S. Customs and Border Protection, 2017).

[87] Scott Luck, *Testimony on Border Technology* (Washington, DC: U.S. House of Representatives Committee on Homeland Security, 2017).

appropriately applied capabilities as identified and executed by field commanders who know and understand the environment in which they operate. The next section discusses the three elements of operational control in detail.

1. Impedance and Denial

Impedance and denial are intended primarily to stop and contain illicit cross-border activity.[88] In all cases, the fence or wall should convey to the adversary a persistent certainty of apprehension and consequence of arrest.[89] Impedance and denial over the years have meant pedestrian fencing in urban areas and vehicle barriers in very remote areas to prevent vehicles from driving across the international boundary. A wall can be thought of as a barrier. Barriers impede or deny the ability of an adversary to enter the United States unlawfully along the land border, or alerts U.S. enforcement officials that a breach has occurred.[90] Barriers can be separated into two broad categories, physical and non-physical.

A physical barrier is a permanent structure or natural terrain that impedes or denies unlawful entry into the United States. Physical barriers include pedestrian and vehicle walls and fencing, as well as natural terrain features like mountains and the desert. These physical structures have evolved over the years due to improved engineering design and technology.[91] A non-physical barrier is a (generally) relocatable, electronically based capability that alerts and informs USBP agents that a breach has occurred. Non-physical barriers are generally not intended to prevent entry into the United States; however, they provide the data necessary to enable timely USBP agent response and adversary apprehension. The timeliness required of that response to detection depends on what is known as the vanishing time. Simply put, the vanishing

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[88] McManus and Pietrzak, *U.S. Border Patrol Requirements Management Process.*

[89] Ibid.

[90] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 50.

[91] Ron Nixon, "Engineers Begin Preparatory Work for Border Wall Construction," *New York Times*, July 18, 2017, https://www.nytimes.com/2017/07/18/us/politics/border-wall-construction.html?mcubz=1; Ron Nixon, "Trump Administration Selects Contractors for Border Wall Prototypes," NPR, August 31, 2017, http://www.npr.org/sections/thetwo-way/2017/08/31/547684547/trump-administration-selects-contractors-for-border-wall-prototypes.

time is the period in which, after an illegal entry has occurred, that the subject becomes nearly indistinguishable from other elements in the surroundings. The USBP also speaks in terms of the vanishing point, which is the space that the subjects have to traverse before reaching the area in which they are nearly indistinguishable from their surroundings. The southwest United States ranges from densely populated areas to remote areas in which the terrain is harsh. In an effort to help understand the different border environments and why walls or barriers may be more sensible in some areas more than others, these different environments are defined as follows.

(1) Urban

Areas where cities or populations are close enough to the international border that it facilitates illegal border crossers to enter into the smuggling cycle by reaching the vanishing point—transportation options or a house in which to hide—within minutes or less. These areas require heavy investment in impedance and denial infrastructure (wall/fencing, roads, and permanent camera towers), as well as heavy concentrations of agents to address illegal entries very quickly.[92]

(2) Rural

Sparsely populated areas (e.g., ranches, farms, small villages) where entry into areas accessible to transportation or housing would take hours or less. Impedance and denial investments may require investment in physical barriers, border-access roads, and permanent camera towers. Longer-ranging detection capabilities and agent mobility are essential in these areas, while physical barriers are placed strategically to impede and deny entry, as well as provide a deflection factor that funnels traffic of those entering illegally to areas where other capabilities are in place to increase the likelihood of interdiction.[93]

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[92] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 15.

[93] Ibid.

(3) Remote

Areas with little or no civilian population (national parks, wilderness areas, or vast deserts) where entry into the second tier of the smuggling cycle takes hours to days. The vanishing points in these areas are often dozens of miles in length in very harsh conditions that makes it very difficult to become indistinguishable from the surroundings. Impedance and denial investments would likely be limited except for vehicle barriers, and instead rely heavily on situational awareness technologies and a well-trained agent force that maintains a posture of agility and mobility.[94]

2. Situational Awareness

The second element to maintaining operational control of the border is situational awareness. Situational awareness is the knowledge and understanding of the border environment to include organizations facilitating illegal activity.[95] However, the meaning of this term in 2017 is still under debate and influenced by different agencies and Congress. The wall plays a role in potentially impacting unlawful crossings under this current USBP definition.

A new USBP version of situational awareness will most likely be considered due to the legislative interest and new administration. The operational piece of situational awareness is a main component in rural and remote operations in the border region. Situational awareness allows the USBP the benefit of more time to make an arrest if detection occurs at a time when distance and capabilities can be leveraged. That awareness also assists with determining how many resources are needed in a remote area. The potential definition more aligned with trends and surveillance capability is, "Knowledge and understanding of information that promotes timely, relevant, and accurate assessment of friendly, enemy, and other activities within the operational environment to facilitate decision-making."[96]

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[94] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 15.

[95] Ibid.

[96] Martino, Koch, and Melliand, *Border Patrol Headquarters Internal Briefing for Border Security Improvement*.

The issue of situational awareness and levels of control is aligned with the question: What is the unknown flow across the southern border? Some cable news networks reported in late FY 2016 that the DHS had a report that was being hidden because it was unfavorable.[97] The DHS report was based on the work of John Whitley from the Institute for Defense Analysis (IDA). This report uses a repeated trials model with surveys that assumes that if someone who was returned to Mexico is not caught again within a period of time, it means a successful illegal entry occurred.[98] The IDA used both migration at Mexico's northern border and CBP data to construct an econometric model of 90-day deterrence for all USBP arrests for a 16-year period.[99]

The USBP and CBP have not endorsed this specific report from the IDA. One reason is because the IDA report was not able to be replicated by DHS statisticians and because border enforcement analysis is based on actual data and not surveys.[100] The level of reliability of these surveys is not known. A wall or fence makes it more difficult to hide footprints in the sand and can therefore assist in understanding the number of people crossing the border in some locations.

3. Law Enforcement Resolution

A successful law enforcement resolution is the final and possibly the most important piece of the three factors required for maintaining operational control of an area. It is possible to impede entry and have awareness that activity is occurring. If the arrest does not occur with a corresponding consequence for the illegal entry of action, the incentive to continue and increase business remains. However, the resolution requires partnership across the government. Legal support enhances border security if it provides

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[97] Malia Zimmerman and William Lajeunesse, "DHS Accused of Sitting on Damning Border Report," Fox News, September 15, 2016, http://www.foxnews.com/politics/2016/09/15/dhs-accused-sittingon-damning-border-report-as-immigration-issue-drives-presidential-race.html.

[98] Sarah K. Burns and John E. Whitley, "Border Enforcement Study" (presentation, Western Economic Association International [WEAI] 91st Annual Conference, June 29–July 3, 2016, Portland Oregon), https://www.ida.org/en/HS/HSResearch/SecureandManageBorders.aspx.

[99] Marc Rosenblum, *Efforts by DHS to Estimate Southwest Border Security between Ports of Entry* (Washington, DC: Office of Immigration Statistics Department of Homeland Security, 2017).

[100] William V. Beltran, *Interdiction Effectiveness Rate Quarterly Report* (Washington, DC: Analysis Division, U.S. Border Patrol HQ, 2017).

law enforcement with the necessary authority to provide appropriate consequences after detecting and arresting those who enter the United States illegally. Border security professionals are enhanced by processes that remove illegal aliens who enter the United States illegally, that maximize bed space, and maximize other limited Department of Justice resources. When businesses or smugglers who engage in illegal cross border activity locate a weakness in border security, they take advantage of the border security gap in several ways:

- Building a hidden compartment in a vehicle crossing through the POE.
- Utilizing undetected tunnels that cross from Mexico into the United States.
- Lack of bed space or lack of personnel to execute the criminal or administrative processes needed to apply consequences for cross-border crime. If illegal aliens and smugglers do not face appropriate consequences, such as deportation, removal, or prosecution, then that category of people have plenty of incentive to enter the United States illegally again. These considerations and duties impact border security in addition to the many federal agencies that facilitate legitimate trade and travel in and out of the United States.

The Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) of 1996 has provided the primary authority for tactical infrastructure construction at the border for 21 years.[101] This Act includes the idea of layers of fences.[102] The Secure Fence Act of 2006 amended IIRIRA to align the increase in available technology resources with the forward deployment strategy of agents close to the border.[103] The DHS Appropriations Act, 2008 provided resources and flexibility for the DHS Secretary to build up to 700 miles of fence and acquire the necessary technology and lighting.[104] In

[101] Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) of 1996, Public Law 104-208, div. C, tit. I, subtit. A, § 102(a), 110 Stat. 3009 (1996): 3009–554 (classified to 8 U.S.C. § 1103 note).

[102] Ibid.

[103] Secure Fence Act.

[104] Department of Homeland Security Appropriations Act of 2008, S. 1644, 110th Cong., 1st. sess. (2007).

some areas along the border, technology can complement or improve enforcement activity in terms of detection and surveillance of illegal activity by increasing situational awareness with impedance and allow for the possibility of positive law enforcement resolutions. The next chapter studies the two USBP sectors in terms of wall investment, efficiency, and how other factors like terrain and distance influence illegal cross-border traffic.

III. CASE STUDY, ARIZONA BORDER

This chapter analyzes the two sectors in Arizona—Yuma and Tucson. Specifically, it examines the illegal traffic flows in terms of activity and effectiveness where pedestrian and vehicle fence projects exist, as well as where fencing does not exist in Arizona. The number of crossings that occur and the level of USBP effectiveness can potentially provide evidence as to whether the impedance and denial capability is working. Crossing data can also help determine if different infrastructure is needed in other areas due to too many entries on foot taking place in certain zones or locations. This perspective is contradictory to some literature on border fencing that state that any additional value would not be added to border security in building walls or a fence. However, the evidence may also confirm that some border locations can be considered lower priority in terms of additional wall or infrastructure investment because the level of security is already high or sufficient.

A. YUMA

This section examines the first of two USBP sectors in Arizona. The Yuma Border Patrol sector has been described as a success most often when compared to other Border Patrol locations, especially in terms a border wall's use.[105] President Bush made two trips to Yuma during his administration to highlight improvements in border security and visiting the fence construction tied to the implementation of the secure fence act.[106] President Trump also chose to visit Yuma for his first official presidential visit to the border.[107]

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[105] Jordan Fabian, "Trump to Visit Border Patrol Facility in Arizona," *The Hill*, August 22, 2017, http://thehill.com/homenews/administration/347458-trump-to-visit-border-patrol-facility-in-arizona.

[106] "President Bush Visits Yuma Sector Border Patrol in Arizona," The White House, April 9, 2007, https://georgewbush-whitehouse.archives.gov/news/releases/2007/04/20070409-11.html.

[107] Fabian, "Trump to Visit Border Patrol Facility in Arizona."

1. Background

The Yuma sector successfully reduced border arrest activity by 94 percent from 2005 to 2008, with arrests decreasing from 138,000 to approximately 8,300.[108] The reduction has been attributed to the construction of vehicle fencing and the addition of more border patrol agents. Illegal vehicle crossing were reduced dramatically; 2,700 conveyances were counted crossing the border between POEs in 2005,[109] but this number was reduced to six a few years later.[110] That type of vehicle smuggling (drive-through) is very dangerous as the drivers usually have to navigate unimproved roads with vehicles that are overloaded in terms of weight, while committing a crime and trying to avoid law enforcement. The Yuma sector's ability to reduce that activity significantly was a key component to improving the security levels in the area.

a. Geography

The Yuma sector is in the southwest corner of Arizona and is primarily desert terrain divided between California and Arizona. USBP agents patrol 126 miles of the U.S. border from the Imperial Sand Dunes in California to the Yuma-Pima County line in Arizona.[111] This area includes the "floating fence," which rises and falls with the sand level in the dune zones and the Colorado River border area, which causes the international boundary not to run horizontally and makes it complex to patrol.[112] The Yuma station was the busiest in the USBP in 2006.[113] The Yuma station has two Native American tribal nations, the Quechan and the Cocopah, within the area of patrol responsibility at the border, which is worth mentioning because these areas have their own police jurisdictions, protected lands, and town councils. Developed areas with housing and businesses are also close to the border. The Colorado River is another unique

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[108] Bill Broyles and Mark Haynes, "On the Line with the U.S. Border Patrol," Texas Monthly, November 2010, https://www.texasmonthly.com/articles/desert-duty-on-the-line-with-the-u-s-border-patrol/.

[109] Ibid.

[110] Colburn, *Written Testimony on Fencing along the Southwest Border*, 3.

[111] "Yuma Sector Arizona."

[112] Broyles and Haynes, "On the Line with the U.S. Border Patrol."

[113] Ibid.

feature in the Yuma area that serves as a natural barrier at the immediate border with Mexico that stretches north and south rather than east to west like the vast majority of the southwest border. The Yuma station has the cities of San Luis, Somerton, and Yuma within its area of responsibility, and these cities and their proximity to the border can provide the mobility, access, opportunity for business coordination, and a place to evade law enforcement if a successful illegal entry is made. Vanishing times—the time it can take for an illegal crosser to disappear into the U.S. landscape—in this area are very brief. However, many of the miles are flat. Flat terrain makes it easier to see movement in the desert, especially when using binoculars or night-vision technology. Yuma County is larger than the state of Connecticut with over 5,000 square miles to cover with limited staffing. This limitation creates a challenge because illegal border crossers have a large area in which to hide, they can use carpet or booties on the bottom of their shoes to hide footprints, and can hide in protected lands.

b. Existing Infrastructure and Staffing

In FY 2016, 829 Border Patrol agents were assigned to the Yuma sector.[114] The Yuma sector area of responsibility (AOR) has a fence or wall constructed on about half of its immediate border area.[115] From the time of the DHS's creation on March 1, 2003, the Yuma sector doubled its staffing through 2010.[116] Agent staffing approached 1,000 agents in 2009 but has decreased about 20 percent since then. This reduction allowed new personnel to be assigned to other sectors due to the levels of control gained and sustained in the Yuma sector.[117] Two USBP stations, Wellton and Yuma, are responsible for the 126 miles of international border in their area. The third station in the Yuma sector is Blythe Station, which is actually in California and focused primarily in interior zones

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[114] U.S. Customs and Border Protection, *United States Border Patrol Sector Profile—Fiscal Year 2016 (Oct. 1st through Sept. 30th)* (Washington, DC: U.S. Customs and Border Protection, 2017), https://www.cbp.gov/sites/default/files/assets/documents/2017-Jan/USBP%20Stats%20FY2016%20sector%20profile.pdf.

[115] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 50.

[116] U.S. Customs and Border Protection, *United States Border Patrol Sector Profile—Fiscal Year 2016 (Oct. 1st through Sept. 30th).*

[117] Wagner, "Arizona Border: Security Differs between Yuma and Tucson Regions."

away from the immediate border in support of Yuma and Wellton. This approach allows for layered enforcement and prevents a single point of failure at the border. The Yuma sector has some type of fencing in each border zone and maintains a higher apprehension rate in locations with a primary fence, as well as in areas without a primary fence, when compared to Tucson and other USBP sectors.[118] In its latest report, the GAO determined that the USBP apprehension rate was much better in areas with modern fencing at 81 percent versus the legacy landing mat fence that cannot be seen through at 53 percent.[119] Modern fencing is a combination of concrete filled posts with small gaps in between and sometimes metal mesh to provide agents with the ability to see through the other side. A landing mat fence is dark or rusted steel that does not provide any view of the other side from the ground level. See Figure 1.

[118] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 50.

[119] Ibid.

Figure 1. Examples of Border Fences 1996–2016[120]

c. Historic Illegal Activity

The primary goal of border security along the southwest border is to increase the certainty of arrest to a high level so human and drug smugglers will not use the area due to the inability to make a profit. In 2005, the Yuma station was the single busiest USBP station in the country with more than 126,000 apprehensions.[121] Although a large number of arrests may seem like good news, it actually indicates a high level of illegal activity,

[120] Source: Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 11.

[121] Colburn, *Written Testimony on Fencing along the Southwest Border*.

and suggests that the smuggling business was doing very well. After 2005 and a significant investment in fencing and personnel by 2008, the Yuma arrest activity decreased by 90 percent as seen in Figure 2, the chart of Yuma sector apprehensions that dates back to 1992.

In 2016, more than 14,000 arrests were made in the Yuma sector.[122] This figure is double the number of arrests within the sector from the lows seen from 2010–2013 when arrests ranged between 7,000–8,000 per year and operational control of the border was determined for the entire sector.[123] Operational control is a term used in the Secure Fence Act in 2006, which designated that resource levels and security levels are where Congress expected in a certain location. After the initial border investments were made, credit for the successful transformation at the border in the Yuma sector is generally given to the prosecution program known as Operation Streamline, an area that has favorable topography, and a high apprehension rate.[124] Operation Streamline was a zero tolerance based prosecution program focused on adults who entered certain border zones. If someone illegally entered a zone in Yuma designated as a Streamline zone, they were prosecuted.

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[122] U.S. Customs and Border Protection, *United States Border Patrol Sector Profile—Fiscal Year 2016 (Oct. 1st through Sept. 30th)*.

[123] Stana, *Testimony Before the Subcommittee on Border and Maritime Security, Committee on Homeland Security, House of Representatives, Border Security Preliminary Observations on Border Control Measures for the Southwest Border, Statement of Richard M. Stana, Director, Homeland Security and Justice Issues*, 1.

[124] Wagner, "Arizona Border: Security Differs between Yuma and Tucson Regions."

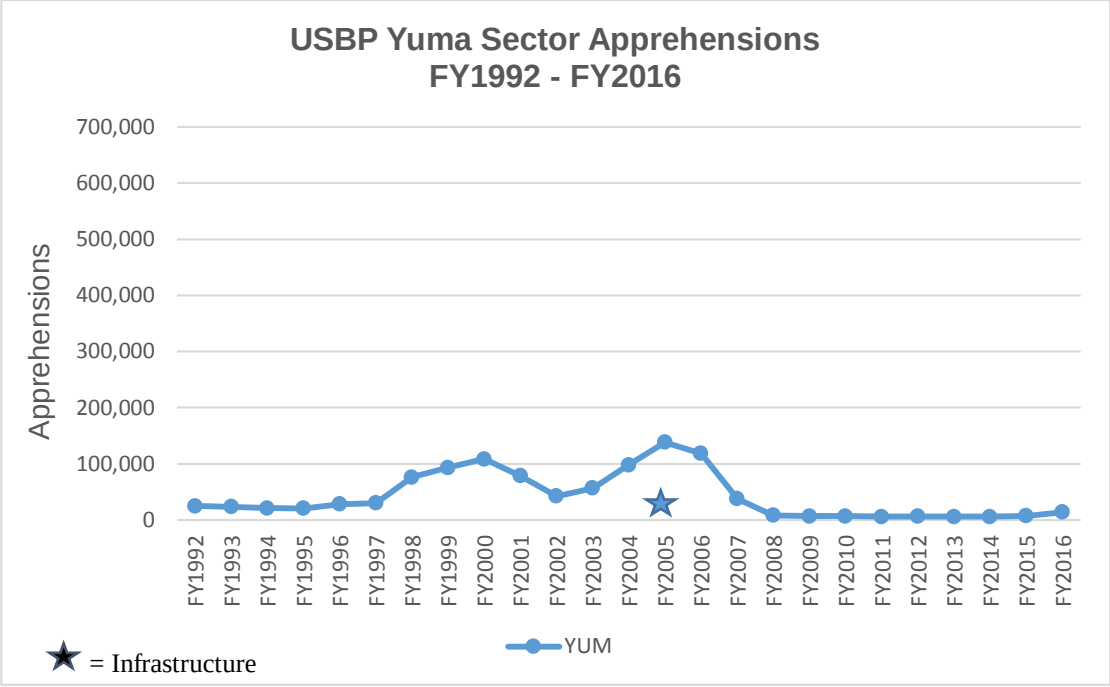

Figure 2. Yuma Sector Statistics[125]

2. Benefits

A benefit seen from building fences in Yuma was to increase the quality of life for those communities close to the border.[126] Specifically, the fence slowed down illegal border crossers so agents would have more time to make apprehensions, which allowed the sector to inflict consequences on those who broke the law.[127] Border arrests decreased to below 6,000 in FY 2014.[128] By reducing illegal activity in the Yuma border region, local residents felt safer in their homes and community.

After reviewing the chart of entry data throughout the Yuma area by fence type in Figure 3, it seems clear that Yuma does have a clear situation in terms of how illegal

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[125] Source: Young, *USBP Daily Report*.

[126] William La Jeunesse, "It Works: Yuma's Fence, Manpower Make the Border Nearly Impenetrable," October 22, 2015, http://www.foxnews.com/us/2015/10/21/it-works-yuma-fence-man power-make-border-nearly-impenetrable.html.

[127] Jeff Flake, "Yuma Border Security Is Working: Keep it That Way," AZCentral, October 30, 2014, http://www.azcentral.com/story/opinion/op-ed/2014/10/31/operation-streamline-yuma-border-security/18206293/.

[128] Ibid.

crossers prefer to enter the United States illegally. Yuma does receive most of its traffic in proximity to the fencing, which supports the need for the construction. It also applies the quality of impedance and denial that the USBP desires. Of the 32,000 entries calculated from FY 2015 through June 6, 2017, more than 25,000 entered where the fence is located. In Yuma border zones with only vehicle barriers or no fencing at all, fewer than 5,000 people crossed the border illegally during the 32-month period or approximately 150 per month or 5 a day.

In USBP's experience, the level of crossers has remained low in terms of the southwest border and historical standards because the certainty of arrest in the Yuma sector AOR causes smugglers to seek an easier path. Since Yuma has locations or zones with an apprehension rate or an IER higher than 80 percent as seen in Table 1, it seems clear that a low probability of success makes it less worth the risk to travel illegally for multiple days in the Yuma County desert in 80–120 degree heat. This percentage also provides evidence that expanding the wall or fence across the Yuma sector may not be a high priority investment at many million dollars per mile when low activity and high effectiveness are already seen.

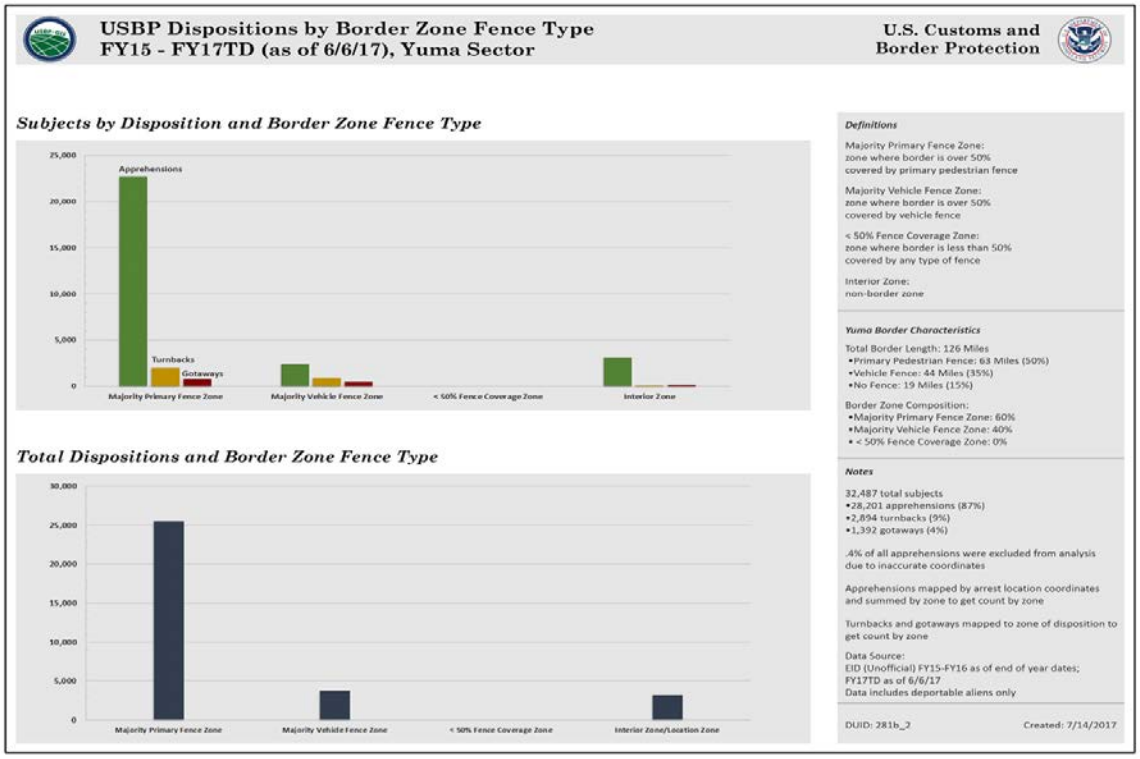

Figure 3. USBP Enforcement Systems Division, Yuma Sector Fence[129]

[129] Source: Scott Crozier, *USBP Dispositions by Initial Fence* (Washington, DC: Enforcement Systems Division, U.S. Border Patrol HQ, 2017).

Table 1. FY 2017 USBP Interdiction Effectiveness, Nationwide and Yuma Sector[130]

Entire Southwest Border	APPs in AOR	Gotaways	Turnbacks	Interdiction Effectiveness Rate*[131]
1st Quarter	134,122	32,807	25,389	82.94%
2nd Quarter	61,147	26,300	21,777	75.92%
3rd Quarter	40,088	19,456	19,583	75.41%
[redacted]				
3rd Quarter Cumulative	235,556	78,558	66,749	79.37%

Yuma Sector	APPs in AOR	Gotaways	Turnbacks	Interdiction Effectiveness Rate*
1st Quarter	5,761	125	188	97.94%
2nd Quarter	1,747	246	400	89.72%
3rd Quarter	1,139	130	388	92.15%
[redacted]				
3rd Quarter Cumulative	8,647	501	976	95.05%

*Please Note: The cumulative results may not precisely match the aggregation of the previous quarters due to data settling and data reconciliation efforts that occur between quarters; however, these official results are provided by the following data sources: Government Performance and Results Act (GPRA), and Enforcement Integrated Database.

Definitions[132]: Turnbacks—Someone who returns to Mexico or Canada after crossing before apprehension[133], Gotaways—"Those entrants that evade apprehension"[134], Apprehension—Interchangeable with arrest.

B. TUCSON

Tucson is the second sector in Arizona examined in this thesis The Tucson sector has also experienced significant reductions in arrests and crossings since September 11,

[130] Source: Young, *USBP Daily Report*.

[131] Ibid., Beltran, *Interdiction Effectiveness Rate Quarterly Report*.

[132] Department of Homeland Security, *U.S. Department of Homeland Security Annual Performance Report Fiscal Years 2015–2017* (Washington, DC: Department of Homeland Security, 2015), http://cdn.cnsnews.com/attachments/dhs_annual_performance_report-fy-2015-2017.pdf.

[133] Argueta, *Border Metrics between the Ports of Entry*, 8.

[134] Ibid.

2001.[135] Replacing legacy fencing from the 1990s with a fence that can be seen through has helped agents make arrests more efficiently.[136] However, Tucson has had less national positive attention in terms of border improvements when compared to Yuma because it is a very large sector and has consistently remained either first or second in national sector apprehension numbers since well before the DHS was created.[137]

1. Background

The Tucson sector became a national focus of the Border Patrol in 1996 when President Clinton started increasing agent resources enough to patrol the vast desert with 24-hour coverage.[138] During the 1990s, the Border Patrol in Tucson began constructing small sections of legacy fencing in urban areas in response to large increases in illegal entries between Arizona POEs.[139] The high point in activity for Tucson was in 2000 with over 616,000 arrests.[140] However, arrests steadily declined after resourcing of agents and wall construction from 2006 to 2010.[141] After 2010, arrests numbers and overall activity stabilized from the 616,000 in 2000 to around 100,000 or fewer through 2016.

a. Geography

The USBP's Tucson sector can be divided into three corridors of Santa Cruz, Cochise, and Pima counties. In all, the three counties cover approximately 262 miles of border. Nogales, Douglas, and the west desert near Lukeville, Arizona, serve as primary urban locations near the U.S.-Mexico border with a large USBP presence.

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[135] Julia Preston, "Arizona Border Quiets after Gains in Security," *New York Times*, March 15, 2013, http://www.nytimes.com/2013/03/16/us/arizona-border-security.html.

[136] Ibid.

[137] U.S. Customs and Border Protection, *United States Border Patrol, Total Illegal Alien Apprehensions by Month—FY 2000*.

[138] "Bill Clinton on the Issues, Immigration," 4President, http://www.4president.us/issues/Clinton 1996/Clinton1996immigration.htm.

[139] U.S. Customs and Border Protection, *United States Border Patrol, Total Illegal Alien Apprehensions by Month—FY 2000*.

[140] Ibid.

[141] Ibid.

Nogales is the center corridor of Tucson sector, and Interstate 19 is a well-traveled highway that facilitates all types of business, travel, and commerce. Nogales station was the busiest station in the USBP in 1997–1998. Operationally, it is a challenging environment due to the drainage system that travels underground into Mexico. An additional challenge agents face is the climate in Arizona's high desert, where temperatures can swing from hot days to cold nights. Nature also presents challenges in the form of seasonal monsoon rains, often dropping from one to three inches in a short time and filling the usually dry riverbeds and washes. Nogales is an urban environment with steep terrain and numerous hills that limit the lines of sight for people and technology. Illegal aliens can cross the border and disappear from view rather quickly due to the rolling hills, arroyos, and canyons. The western portion of the Nogales area has protected lands and limited access roads. The USBP piloted the first integrated fixed tower (IFT) project across the southwest border here in an attempt to invest in technology instead of fence or wall to improve border security.[142]

The Douglas station is located in Douglas, Arizona, which is home to about 18,000 residents and shares a border with Mexico.[143] Douglas has seen large levels of illegal immigration over the years and was the nation's fastest growing community in 2000 when the Tucson sector agents made more than 600,000 arrests. Douglas was a desirable crossing point in part because of the multiple highways, such as State Route 80, State Route 90, and State Route 191 that provide escape routes from the immediate border, cooler average summer temperatures than most of Arizona near the Mexico border, and numerous canyons, arroyos, and wildlife preserves that can provide concealment.[144] Douglas has desert areas with deep washes, desert grasslands, and extremely rugged mountains, as well as heavy brush, and steep, rocky canyons. The average elevation is about 4,000 feet in the valley areas. The Douglas corridor extends east to the New Mexico state line through some of the most remote and rugged mountainous terrain, and west to an area patrolled by the agents at the USBP's Brian A.

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[142] McManus and Pietrzak, *U.S. Border Patrol Requirements Management Process*.

[143] "Douglas, Arizona," City of Douglas, accessed June 30, 2017, http://www.douglasaz.org/.

[144] Ibid.

Terry of the Naco station. Included in the Douglas AOR is the San Bernardino Wildlife refuge, an area with many protected species of animals and plants. The Naco area has the Coronado National Forest and the San Pedro River, which both present unique patrol challenges. Illegal crossers and evidence of a trail can be more difficult to detect due to the river and the mountains in this area. Within the city limits of both towns, in some locations, the international boundary is less than one block from residential areas and commercial warehouses.[145]

The west desert corridor's primary makeup is the majority of Pima County near the border. The area includes Lukeville, which is a part of the Organ Pipe National Monument, as well as the Cabeza Prieta Wildlife Refuge and the Tohono O'odham Nation (TON). USBP agents from the Tucson, Ajo, and Casa Grande stations work this corridor. These stations have many protected lands in this area that makes established roads harder to find, build, and use. Most of the corridor is remote with limited access roads and is often inaccessible during inclement weather. All the station's border responsibility and the primary area patrolled by Casa Grande agents are contained within the TON. Due to the harsh desert terrain and lack of improved infrastructure throughout much of the Casa Grande station's AOR, Casa Grande agents face numerous logistical challenges in addition to long duty hours. Agents patrolling the border drive about 90 miles from Tucson and Casa Grande to reach their assigned areas. The area comprises some the harshest terrain and climate in the country. Temperatures range from sub-freezing in the winter to 125 degrees in the summer. The weather can range from drought conditions, to monsoon rains with spectacular lightning storms, and then to snow in the winter months. The climate, mountains, and distances people must pass through while attempting to enter the United States illegally makes it a hazardous area to enter. It is also much more difficult to pinpoint a location in this corridor without a global positioning system (GPS). This area is very remote and the extreme heat is more of a threat to both agents and crossers.

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[145] Douglas Jehl, "$1-Million Drug Tunnel Found at Mexico Border: Narcotics: The Passageway Ends at a Warehouse in Arizona. It Was Used to Bring Cocaine into the U.S.," *Los Angeles Times*, May 19, 1990, http://articles.latimes.com/1990-05-19/news/mn-65_1_mexico-border.

b. Existing Infrastructure and Staffing

In FY 2016, 3,834 Border Patrol agents were assigned to the Tucson sector to patrol 262 miles of the border.[146] Tucson has the largest number of personnel resources in the USBP. Tucson has more than 14 agents assigned for every mile of its Arizona border responsibility, due to the complex area of responsibility discussed earlier in this chapter. This sector possesses a much greater density of human resources than the Yuma sector, which has 802 agents for 126 miles of border, or about six agents per mile. The Tucson sector has some type of physical barrier that impedes access along 80 percent of its AOR, but only 27 percent of it is a primary pedestrian fencing or wall. To date, the CBP has deployed 654 miles of fencing along the southwest border, and specifically, 211 miles in Tucson, as shown in Figure 4.

Sector	Land Border*	River Border*	Pedestrian Fence*	Vehicle Fence*	% Total Sector Border Covered	% Sector Border Covered by Pedestrian Fence	% Sector Border Covered by Vehicle Fence
SDC	60	N/A	45.9	0.4	77.2%	76.4%	0.6%
ELC	70	N/A	44.0	14.9	84.1%	62.8%	21.3%
YUM	126	N/A	62.9	43.8	84.7%	49.9%	34.7%
TCA	262	N/A	71.8	139.4	80.6%	27.4%	53.2%
EPT	180	88	64.7	101.3	61.9%	24.1%	37.8%
BBT	0	510	4.6	0.2	0.9%	0.9%	0.0%
DRT	0	210	4.0	0.0	1.9%	1.9%	0.0%
LRT	0	171	1.2	0.0	0.7%	0.7%	0.0%
RGV	0	316	54.9	0.0	17.4%	17.4%	0.0%
TOTAL			353.9	299.9			
	*in miles						

Figure 4. U.S. Border Patrol Fence Report[147]

c. Historic Illegal Activity

The Tucson sector has seen a steady decrease in apprehensions from its record year in 2000, as shown in Figure 5. In FY 2000, the Tucson sector made more than

[146] U.S. Customs and Border Protection, *United States Border Patrol Sector Profile—Fiscal Year 2016 (Oct. 1st through Sept. 30th).*

[147] Source: Bixler, *USBP Tactical Infrastructure Report*.

616,000 arrests.[148] In FY 2016, the arrests numbered about 64,000.[149] This number of apprehensions is approximately 90 percent less than at the high point in 2000. However, the Tucson sector has been within the top two locations for the highest number of illegal entries across the southwest border during the last 20 years. In recent years, it ranked second behind the Rio Grande Valley sector, according to GAO and USBP statistics in 2017.[150] Due to the many years of high activity, congressional overseers have been critical of how the USBP deploys its resources, especially in the Tucson sector.[151] The Tucson sector's three unique corridors in Cochise County, Nogales, and the West Desert of Sasabe and Lukeville, make this AOR very challenging. Arizona Republican Senator John McCain authored a plan in 2010 that would have divided the Tucson sector in smaller pieces with the intent of providing more direct oversight over a smaller number of personnel.[152] His plan also called for more technology and infrastructure.[153] The plan made sense to many people, especially considering the three sectors west of Tucson, Yuma, El Centro, and San Diego have about the same number of land border miles with Mexico combined as the Tucson sector does by itself.

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[148] U.S. Customs and Border Protection, *United States Border Patrol, Total Illegal Alien Apprehensions by Month—FY 2000*.

[149] Ibid.

[150] Ibid.

[151] Martha McSally, *Statement of Subcommittee Chairwoman Martha McSally (R-AZ) Border and Maritime Security Subcommittee Moving the Line of Scrimmage: Re-examining the Defense-in-Depth Strategy September 13, 2016* (Washington, DC: Homeland Security Committee, 2016), https://homeland.house.gov/wp-content/uploads/2016/08/09-13-16-McSally-Open.pdf.

[152] Jon Kyl and John McCain, "10-Point Plan Would Spur US Government into Action on Border Security," John McCain, U.S. Senator, June 29, 2010, https://www.mccain.senate.gov/public/index.cfm/opinion-editorials?ID=8fea2c1f-94cf-fe6f-af59-043326d8d4e3.

[153] Ibid.

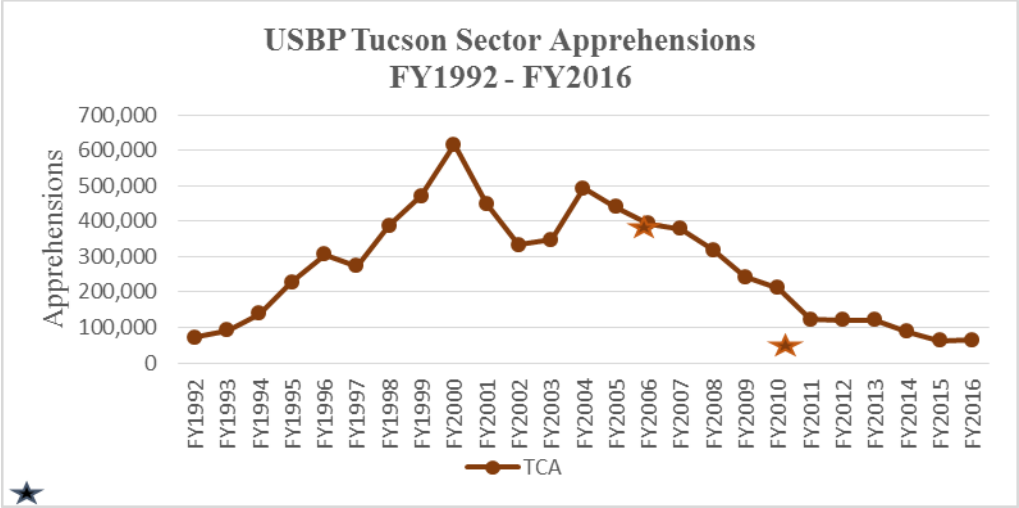

Figure 5. Tucson Sector Arrests 1992–2016[154]

A potential challenge of increasing the amount of fencing in Tucson is that it may trigger an additional requirement for more agents staffing to defend the infrastructure. Arizona Congresswoman Martha McSally said in a Fall 2016 hearing that almost half of the Tucson sector's arrests occur more than five miles from the international boundary with Mexico.[155] GAO Report GAO-17-331 provided a documented synopsis of the wall and its related outcomes by sector including Tucson.[156] The report cited the following from the Tucson sector, "bollard pedestrian fencing in urban areas has helped divert much of the illicit cross-border activities that occurred there into more rural and remote environments where agents are better able to interdict these activities."[157]

the new style of fencing that the Nogales station received has helped move the illegal crossings from the City of Nogales and into more rural and remote areas because the agents became more effective at arresting those who crossed illegally.[158] This fence

[154] Source: Michael Young, *USBP Southwest Border Apprehensions by Sector* (Washington, DC: USBP Statistics and Data Integrity Branch, 2017).

[155] McSally, *Statement of Subcommittee Chairwoman Martha McSally (R-AZ) Border and Maritime Security Subcommittee Moving the Line of Scrimmage: Re-examining the Defense-in-Depth Strategy September 13, 2016*.

[156] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 22.

[157] Ibid., 21.

[158] Ibid.

construction allowed a better view of the south side of the fence and provides agents more time in Tucson and the usage of other force multipliers like sensors and surveillance technology to help with detecting and locating illegal border crossers. However, with the staffing shortfall the USBP faces, having the agents needed to support current and future fencing is not necessarily guaranteed or even likely.[159]

2. Benefits

The Tucson sector includes the cities of Douglas, Naco, Nogales, Sasabe, and Ajo all located at the border with official land POE leading to Mexico. The nature of port infrastructure in these locations allows for the facilitation of legitimate vehicle and foot travel, as well as trade.[160] Since these areas are favorable to foot traffic between the United States and Mexico, many locations include homes, businesses, and bus stations, as well as numerous accessible conveyances. These five cities have had both legacy and modern fences constructed in an effort to slow down people who choose not to cross through an official POE. The number of miles and type of fence in these locations and across the rest of Tucson sector has varied and is evaluated regularly by Border Patrol planning and gap analysis to determine how to obtain greater levels of border security. This gap analysis, as well as an analysis of the effectiveness of border operations, is discussed further in this chapter and Chapter IV.

The ability to impede and deny the adversary has been a strategy, tactic, and capability employed by the USBP for many years. As a strategy, it is intended to contain or deny entry, ensure apprehension, and the delivery of consequences. As a capability, it currently exists in the form of manmade structures that includes walls, fencing, and vehicle barriers.

The purpose of the fence or wall is to improve the ability to impede border incursions and deny the adversary's use of terrain (land and water) for an advantage in

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[159] Melanie Zanona, "GOP Senator Pushes to Improve Hiring Process for Border Patrol Agents," The Hill, May 8, 2017, http://thehill.com/policy/transportation/332384-gop-senator-pushes-to-improve-hiring-process-for-border-patrol-agents.

[160] U.S. Customs and Border Protection, *Vision and Strategy 2020*, CBP Publication Number 0215-0315 (Washington, DC: U.S. Customs and Border Protection, 2015).

conducting illegal activity in conjunction with access and mobility from newly constructed or improved roads, and mission readiness capabilities from staffing and logistics.[161] In concert with other capabilities provided through personnel, infrastructure, technology, and partnerships, impedance and denial are an integral part of the border security equation.[162] Impedance and denial enhance the USBP's estimated time to complete the mission essential tasks to detect identify, classify, and respond to adversary actions and is most effective when it can be persistently applied toward the prevention and containment of illicit cross border activity.[163]

The USBP has had some success with fence deployments in urban areas of Arizona like Douglas, Naco, and San Luis (Yuma). This success in reducing illegal activity has been greater when other master capabilities like surveillance, personnel, and access roads were incorporated into the effort together.[164] The remote video surveillance system program combined with the fencing and increases in personnel in Naco and Douglas has provided the combination of capabilities of daytime and nighttime visibility to improve security levels significantly. Unfortunately, funding and the availability of resources often restricted the most comprehensive and long-term solution, which tempered the degree of success, as well as the enduring nature of that success across the entire Tucson sector, which includes rural areas where the vehicle fence is located. The vehicle fence reduced illegal driving through vehicle crossings but might not be providing enough impedance or deterrent in terms of foot crossings. Ron Colburn testified before Congress about the success in Yuma in terms of new infrastructure and vehicle barriers across Arizona having greatly reduced incursions by truck or car. In some locations, crossings on foot remain significant and may be a reason that some researchers like Professor Garrett in Texas or former DHS Assistant Secretary Seth Stodder spoke publicly that the wall would be a waste. The issue is not that simple.

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[161] Chris Pietrzak, *Operational Requirements Management Division Capability Gap Analysis Process* (Washington, DC: Operational Requirements Management Division, U.S. Border Patrol HQ, 2017).

[162] Ibid.

[163] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 15.

[164] Colburn, *Written Testimony on Fencing along the Southwest Border*.

Another benefit of construction of a new or replacement wall is the understanding of how critical it is to see what is going on in Mexico. President Trump spoke of this need in an interview on July 13, 2017, when he discussed transparency for the wall and heavy objects potentially being thrown from the Mexico side of the structure.[165] The GAO reported similar findings regarding agent safety in 2017 during interviews in Tucson, Arizona.[166] The ability to see through the bollards in the fence allows agents more time to prepare for illegal entries, especially when involving large numbers of people.[167] On July 28, 2008, a USBP agent was flown to the hospital for treatment and evaluation after being struck by a rock thrown from Mexico.[168] In 2014, a man was killed after throwing a rock and striking a USBP agent when the agent responded with gunfire.[169] These incidents provide some evidence that replacing an existing fence that cannot be seen through may be more important in some sectors than building new miles of wall in more remote locations.

As discussed in the previous section, officer safety and slowing down illegal crossers are primary reasons for wall construction along the southern border in Arizona. Currently, the Tucson sector has more primary fence or wall than any other sector in the USBP.[170] This presence is partially due to the many urban areas in their area of responsibility. The fence, along with stronger border enforcement efforts providing impedance to illegal entry, can cause a shift in illegal activity to remote or rural areas. Approximately half of the Tucson sector's illegal entry traffic crossed in areas without

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[165] David Jackson, "Takeaways from Trump Chat on Russia, Immigration, and his Dream of a Transparent Solar-paneled Border Wall," USA Today. July 13, 2017, https://www.usatoday.com/story/news/politics/onpolitics/2017/07/13/donald-trump-russia-china-transparent-solar-powered-border-wall.

[166] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 21.

[167] Ibid.

[168] Brady McCombs, "Border Agent Hit by Rock Sent to Tucson Hospital," Arizona Daily Star, July 28, 2008, http://tucson.com/news/border-agent-hit-by-rock-sent-to-tucson-hospital/article_af1205af-3480-5ccb-95ff-38234d2fc1d2.html.

[169] Elliot Spagat, "Sheriff: Man Killed by Border Patrol Agent after Throwing a Basketball Size Rock," *U.S. News and World Report*, February 19, 2014.

[170] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 51.

pedestrian fencing.[171] According to a GAO analysis, the USBP only arrested four out of nine illegal entries within that population of crossers who chose to enter the United States around the Tucson primary fencing.[172] This level of performance appears to create a greater risk for future activity due to the level of success of the illegal crossers. A 44 percent apprehension rate is also a potential liability in terms of the GPRA reporting that the DHS is required to do in its annual performance report.[173] As mentioned in a CRS report from Carla Argueta, the USBP IER target for FY 2017 is 81 percent.[174] Since the Tucson sector is routinely in the top two sectors in terms of arrests each year, it is reasonable to believe that the apprehension of less than half of crossers in zones without primary fence creates an increased risk of failing to meet the annual performance goal. It can also be a business incentive for more people to cross where others have been successful.

Over the last 2.5 years, the Tucson sector had significantly more illegal entries in zones that were more than 50 percent covered by vehicle barrier than where a wall was constructed. Approximately 140,000 crossings occurred during FY 2015 through June 6, 2017 in the area with more vehicle barrier and less than 60,000 crossings during the same time frame where the area is covered mostly with a fence or wall.[175] The Tucson sector has reduced its apprehension and activity levels significantly as seen in Figure 5. However, the graph is starting to flatten out since 2014. More progress in terms of arresting a higher percentage of entries in the remote areas is probably necessary to improve effectiveness levels and reduce entries over a longer period of time.

Adding a fence or wall is intended to prevent illicit cross-border activity by creating and conveying a greater certainty of apprehension; the consequence that dissuades the adversary. Historically, impedance and denial have been achieved by deploying barriers designed to a specific threat in targeted areas of the border. Some

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[171] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 51.

[172] Ibid.

[173] Argueta, *Border Security Metrics between Ports of Entry*, 8.

[174] Ibid.

[175] Crozier, *USBP Dispositions by Initial Fence*.

locations within the Tucson sector covered with vehicle barrier appear to be within this spectrum. Barriers designed and deployed against specific threats have been very successful against the threats for which they were designed. However, funding and resource limitations have historically limited the scope and design of many barriers to include some within the Tucson sector, which is especially true with barriers designed and deployed in the 1990s. These limitations have been exacerbated by time, deterioration, and a lack of funds to replace or adapt certain legacy designs. In the past, many fence deployments were not appropriately supported and or accompanied by other master capabilities, which diminishes the wall's effectiveness. Access roads in wilderness or protected lands are one example in the Tucson sector.

The southwest border topography as discussed in Chapter II, which includes Arizona, can be generally characterized as follows: urban, rural, and remote.[176] Depending upon the totality of circumstances, to include operational objectives, some circumstances warrant the use of a wall or fence in all topography. Generally, rural areas do not provide the housing, vehicles, or business to hide, which is typically associated with urban areas, but do provide some opportunity to disappear. New construction of a wall or fence if equipped with smart technology may provide additional detection capability that justifies the expense through increased capability and knowledge at the border. The Tucson sector may be a good example. A need for fence capability or a wall in these areas does exist to mitigate vulnerabilities and improve the USBP's ability to detect and respond. The leadership's goal may be to shrink the enforcement footprint in a rural environmentally sensitive area by diminishing the impact of patrols and illegal entrants and enclosing illicit activities with a containment posture close to the border. It is recognized that some exceptions may result concerning each of these rules by understanding these generalized descriptions of border topography. Specific drivers impacting deployment locations must be considered by each USBP sector that include the benefits of either technology or more fencing when personnel deployments may be limited due to ongoing hiring shortfalls. See Table 2 and Figure 6.

[176] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 21.

Field commanders in Arizona may utilize their experience and knowledge in identifying locations from which to deploy the wall solution. For numerous reasons, these decisions may not correlate with a "general" deployment strategy. The USBP has, and continues, to utilize impedance and denial to improve its operational control of any given area of the southwest border across Arizona. Similarly, improved operational control has been achieved through a combination of resource saturation in targeted areas. In these instances, high concentrations of extra personnel (supported by technology) were deployed to a targeted area to achieve the desired outcome. While this tactic is effective, it is not sustainable or an efficient use of resources for long-term operations. Improvements in fencing with technology deployed with it at the immediate border may be a potential solution.[177]

[177] Associated Press, "Arizona-Mexico Border Fence to Get Replaced in Naco," AZ Central, January 19, 2017, http://www.azcentral.com/story/news/politics/border-issues/2017/01/19/arizona-mexico-border-fence-replaced-naco-border-patrol/96771064/.

Table 2. FY 2017 USBP Immigration Enforcement Statistics, Tucson Sector[178]

Entire Southwest Border	APPs in AOR	Gotaways	Turnbacks	Interdiction Effectiveness Rate*[179]
1st Quarter	134,122	32,807	25,389	82.94%
2nd Quarter	61,147	26,300	21,777	75.92%
3rd Quarter	40,088	19,456	19,583	75.41%
[redacted]				
3rd Quarter Cumulative	235,556	78,558	66,749	79.37%

Tucson Sector	APPs in AOR	Gotaways	Turnbacks	Interdiction Effectiveness Rate*[180]
1st Quarter	15,635	7,529	6,589	74.70%
2nd Quarter	8,056	6,227	4,998	67.70%
3rd Quarter	6,227	4,657	3,492	67.61%
[redacted]				
3rd Quarter Cumulative	29,915	18,413	15,079	70.96%

178 Source: Young, *USBP Daily Report*.

179 Beltran, *Interdiction Effectiveness Rate Quarterly Report*.

180 Ibid.

Figure 6. USBP Dispositions by Fence Type, Tucson Sector[181]

President Donald Trump issued an Executive Order on January 25, 2017 that stated it is the policy of the United States to, "secure the southern border of the United States through the immediate construction of a physical wall on the southern border, monitored and supported by adequate personnel so as to prevent illegal immigration, drug and human trafficking, and acts of terrorism."[182]

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[181] Source: Crozier, *USBP Dispositions by Initial Fence*.

[182] "Executive Order 13767, Border Security and Immigration Enforcement Improvements."

The USBP in Arizona has focused on impedance and denial of terrain and how it complements and is supported by other resources and capabilities to deploy an effective border security operation. This order also potentially changes the expectation about what flow and apprehension level is determined to be within the scope of operational control. It may also change the number of crossers deemed a level of high illegal entry.

Border crimes are similar to other illegal activity in the sense that most criminals prefer to commit the acts without being seen or where evidence is difficult to obtain. At the border, many smugglers employ individuals called scouts who keep a lookout for law enforcement. Many scouts in the United States have legal status to be or remain in the United States and can use technology to share information of what or who is around in a certain border zone or area. Scouts can observe agents patrolling or responding to traffic, the camera polls, and the mobile technology sites. Scouts try to signal when a good crossing time presents itself, with the goal of maximizing the probability of a successful illegal entry.

The same landscape also assists agents tasked to operate mobile technology from hills or mountains to locate groups traveling northbound from the international boundary fence (IBF) before reaching Arizona highways. Agents need to consider accessibility, travel time, and cover and concealment. In these areas, travel time from the boundary to the highways on foot, known as the vanishing time, can vary from less than an hour to a few hours, depending on entry location and weather conditions. Cover and concealment in the remote parts of the Tucson sector can consist of sporadic areas of tall grass, heavy mesquite trees, and washes. The USBP needs to invest strategically to slow down or stop the adversary from execute mission-essential tasks effectively.[183] The study in this chapter of Yuma sector and urban areas in Tucson sector have provided evidence that border enforcement has improved. Sometimes a wall alone may not provide enough time, as the response time and vanishing times are almost equal. The USBP needs to improve situational awareness in areas of lower effectiveness. A more robust surveillance or

[183] Office of Inspector General, *Progress in Addressing Secure Border Initiative Operational Requirements and Constructing the Southwest Border Fence* (Washington, DC: Department of Homeland Security, 2009).

sensor capability may reduce the time needed to complete the phases of detect and identify, and thereby, significantly improve response times with early detection. A newly constructed wall that includes sensors or fiber optics may assist in clearly seeing the international boundary to decrease accidental incursions, which is a common issue in parts of southern Arizona. In the next chapter, the study of Arizona is integrated with the analysis and USBP requirements process to determine the level of effectiveness and recommendations for potential future investment.

IV. ANALYSIS

A. STRUCTURE AND REQUIREMENTS

This chapter reviews the data concerning the Yuma and Tucson sectors examined in Chapter III to see what recommendations can be made in terms of fence effectiveness. Specifically, it examines the questions of whether areas exist where the fence can be constructed to improve USBP effectiveness. Does Arizona have any places that do not benefit from additional fencing? This thesis focuses on these sectors based on their geographic diversity, historical trends of illegal activity, and the USBP's experience to date with barriers and tactical infrastructure. This chapter uses cost information and a methodology that reviews operational challenges that can be applied across the entire border in terms of additional wall investment impacts on border security.

The review of the Yuma sector shows that in locations where a pedestrian fence is in place, the fence provides the impedance and denial that USBP desires. In locations with only a vehicle fence or no fence at all, the agents are effective because the necessary response time and the entry numbers are manageable. More fencing in Yuma does not appear to be necessary. However, a replacement primary wall with new technology may offer an improvement in interdiction effectiveness and agent safety. Public debate on the wall fails to distinguish between the many options of infrastructure that exists and how upgrading legacy fencing does provide additional capabilities for border security.

The Tucson sector has 139 miles of vehicle barriers with no detection capability and more than 50 miles of border without any fencing. As shown in Figure 6, activity in the Tucson sector over the measured period of FY 2015 through June 6, 2017, was significantly higher in zones with mostly vehicle barrier, or less than 50 percent vehicle fence. With 200,000 entries during this time period, and an apprehension rate of 56 percent, some of these border zones can potentially be improved. This improvement may require an additional investment in personnel, technology, or impedance and denial from a wall, or better road access. How would the USBP make this determination?

In 2014, the USBP began developing the requirements management process (RMP). The first step of this process, the CGAP, began to document critical vulnerabilities across the nation, including those in Arizona.[184] By 2015, a nationwide CGAP effort once again re-validated that critical vulnerabilities are specific to land-based surveillance.[185] This combination of vulnerabilities, including a shortage of personnel, spurred the USBP to advocate aggressively for research, development, and acquisition of surveillance technologies and other capabilities to improve agent safety and effectiveness. This process allows for a bottom-up review from the field in which border-security experts can provide feedback as to whether wall, technology, more staffing, or other law enforcement authorities are the most needed elements to improve security or operational control in their area. Figure 7 displays what was determined as the key components for operational control.

Figure 7. Elements for Operational Control[186]

As of August 2017, USBP agent staffing remained below its authorized level by almost 10 percent nationwide, a shortage that is more acute in the Tucson and Yuma sectors. This lower level intensifies the need to improve detection and impedance capabilities since staffing increases may not be a realistic option for many years.[187]

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[184] McManus and Pietrzak, *U.S. Border Patrol Requirements Management Process*.

[185] Ibid.

[186] Source: Office of Inspector General, *Progress in Addressing Secure Border Initiative Operational Requirements and Constructing the Southwest Border Fence*.

[187] "U.S. Customs and Border Protection," U.S. Customs and Border Protection, accessed August 27, 2017, https://www.cbp.gov/.

However, maintenance costs and potential construction costs are recurring and should be considered dollars spent that will not be available for different investments like personnel or mobile technology.

B. BORDER MANAGEMENT

Walls, personnel, and technology are all investments. At different places and for different reasons, more of one type of investment and less of another is needed. The USBP's Requirements Working Group's (RWG's) purpose is to provide decision support, assessments, and recommendations to the USBP Headquarters' chain of command and the Executive Governance Board (EGB) by examining competing priorities among existing and future USBP programs. This practice was established to assist with compliance of a previous Office of Inspector General (OIG) review.[188]

The USBP identifies problems or areas where improvement is needed using the CGAP. The process identifies capability gaps to help determine what the USBP needs to fill those gaps, and drive technology and tactical infrastructure investments. The CGAP considers the total mission and can reveal rapidly executable solutions to identified problems. The CGAP is a process developed by the USBP Headquarters' Strategic Planning and Analysis Directorate in partnership with Johns Hopkins University's Applied Physics Laboratory. The USBP is charged with ensuring the appropriate capabilities are in the appropriate place at that border. Not every capability is suitable for or needed in every area.[189] Unique problems require tailored solutions. However, the ability to execute these solutions is critical. Due to hiring challenges, wall construction or technology deployments may be more necessary to improve levels of border control in the short or intermediate term. The denying of terrain with additional fencing or wall can increase the utility of existing agents by funneling illicit flows towards areas of the border that allow for more response time and locations with better views from border cameras.

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[188] Office of Inspector General, *Risk Management Advisory for the SBInet Program Initiation*, OIG-07-07 (Washington, DC: Department of Homeland Security, 2006).

[189] Office of Inspector General, *Progress in Addressing Secure Border Initiative Operational Requirements and Constructing the Southwest Border Fence*.

The sheer size of the USBP necessitates a repeatable process to justify and explain why it needs certain resources and technology in the field. Too much turnover in personnel and temporary assignments occurs within sectors or stations for them to be able to answer why decisions are made without a regimented process. The CGAP process is designed to be bottom up in alignment with high-level guidance. Simply put, the USBP Headquarters recognizes that receiving input from agents in the field is essential to determining the operational requirements within a given sector, and in turn, making good investment decisions.[190] The capability gaps identified through the CGAP are translated into requirements and then plans.[191] The findings of the process will determine what the USBP buys and deploys to the field for years to come.

The CGAP uses collaborative analysis exercises (workshops) and station and area-specific scenarios to determine the problems or gaps.[192] These exercises bring agents of various ranks and experience levels together and use threat scenarios to assess: (1) how adversary and friendly forces operate, (2) the capabilities friendly and adversary forces possess, and (3) whether adversary capabilities exceed friendly force capabilities. In addition to scenarios and exercises, the CGAP uses specified quantitative and qualitative measures. A gap is identified when it is assessed that an adversary action or capability can defeat a friendly action or capability.[193]

After the workshops are complete, it is common for sectors to have identified capability gaps that are resolved locally (or are in the process of being resolved) using station or sector solutions. Many of the solutions (such as reconfiguring equipment that helps look for footprints, information sharing, assignment of tactical units, changing tactics, etc.) are zero cost.

Through the RMP, requirements become the basis by which investment decisions are made. The ultimate objective is to deploy solutions that mitigate specific gaps in specific areas to create an environment in which friendly force capabilities exceed

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[190] McManus and Pietrzak, *U.S. Border Patrol Requirements Management Process*.

[191] Ibid.

[192] Ibid.

[193] Ibid.

adversary capabilities. For example, a wall could be identified to improve the ability to predict, detect, and add time to respond to illegal activity successfully. The goal of these processes, as well as this thesis, is to allow decision makers access to better information for decision making and planning for future budget cycles.

C. FUNCTIONAL BENEFIT

Numerous scenarios are contemplated at the USBP sector or station levels in Arizona during the annual use of the CGAP. These scenarios provide insight into how capability solutions like wall or fencing will assist in a USBP station's operational environment. Time parameters are used throughout the scenarios to assist the reader's understanding of adversaries' actions and the reasons for a need to counter these actions with an impedance and denial capability. Six specific time parameters can be used to assess the contributions of impedance and denial functions.[194]

- Time the illegal entry occurred
- Vanishing time (unimpeded + impeded vanishing time)
- Sum of the approximate time it takes to detect, ID, classify the activity
- Estimated response time
- Average distance of the arrest from the international boundary
- Average distance it takes to detect, identify, and classify from the border

One mathematical formula that describes how fence or barriers enhance operational control can be defined as if time of crossing + vanishing time is > sum of the estimated time to detect, identify, and classify + estimated response time. Therefore, if detection and response is greater than crossing and vanishing time, the capability is successful and is an indicator of improved operational control.

[194] Roger Kemp, Terry Kellison, and Ariel Plisko, *Compliance Briefing Update for Acquisition Process, Directive 102* (Washington, DC: USBP Operational Requirements Management Division, 2017), https://www.dhs.gov/sites/default/files/publications/01.%20Directive%20102-01%20Acquisition%20Management%20Directive.pdf.

Figure 8 depicts a typical operation involving an adversary crossing and USBP response. The figure has two sides, a task indication on the left, and a notional laydown on the right. The orange circles and boxes indicate sensor technology deployments and the dashed lines indicate infrastructure, roads and trails. A fence is also indicated. Green areas represent USBP patrol areas or roads. The red ring represents the "vanishing point," where the adversaries are picked up and leave the area.[195]

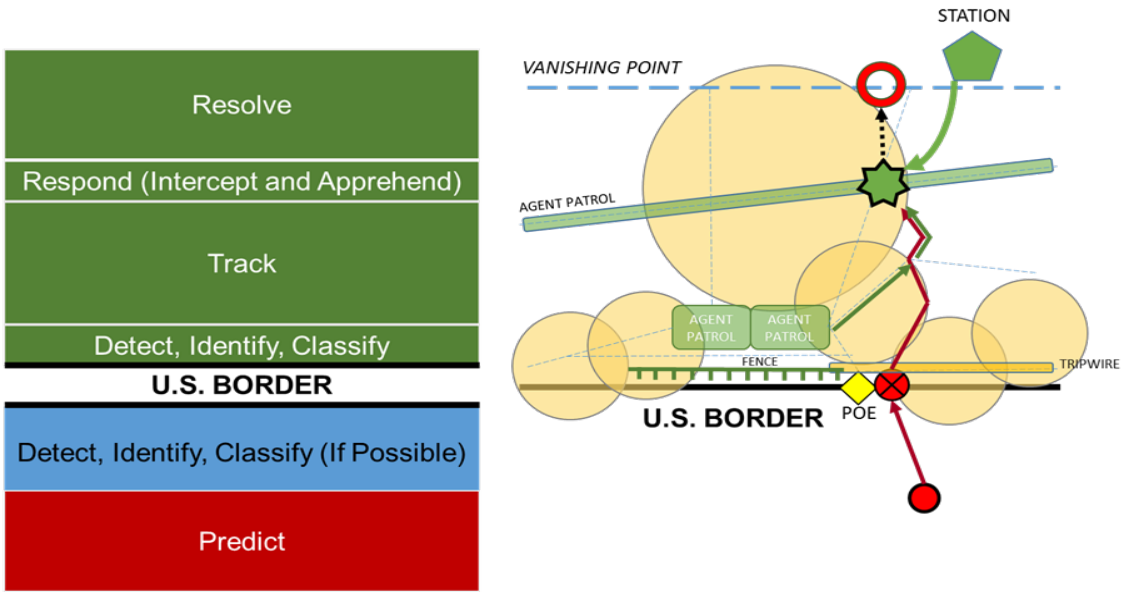

Figure 8. Typical Border Patrol Operation[196]

In a field scenario, the smuggler or illegal crosser plans their route to avoid the fence and USBP patrol areas. It is also highly probable that most illegal crossers have knowledge of deployed sensor technology and plan their foot travel to avoid, or at least minimize, their exposure to detection. Illegal entrants generally avoid traveling on roads and known trails. Their goal is to reach the vanishing point, a place where they are not able to be seen by agents with or without technology. After an individual reaches the

[195] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 19.

[196] Source: McManus and Pietrzak, *U.S. Border Patrol Requirements Management Process*.

vanishing point, the probability of arrest is significantly reduced unless the individual or group is at a location where footprints are left behind and can be followed.

USBP operations rely initially on infrastructure and technology. The intent of the fence or wall is to force adversary movement into areas beneficial to detection capabilities, where overt and covert sensors can detect the initial crossing and identify and classify the adversary group. Tracking adversary groups (especially multiple groups simultaneously) is a challenge with static technology, so USBP agents rely on mobile and agent-portable technology. Mobile technology offers an additional benefit of not requiring land acquisition, but its mobility carries a risk of damage while in motion from one place to another. Communications is essential to link technology, agents in the field, and agents at the station to plan and execute an effective response. Information needs to travel fast and accurately between agents in the field, technology, and the station. It must be integrated into an operational picture for agents to have robust situational awareness of their surroundings.

As detections are reported, a track of the adversary's movements is initiated and disseminated to agents and sensors. If possible, an agent in the field can intercept the group to begin "eyes-on" tracking to provide information back to the station. Resources are deployed to intercept and apprehend the group at a time and place of the agent's choosing. Of course, if any of these tasks, which are supported by the four pillars of people, technology, information, and infrastructure, is not conducted adequately, the operation is at least disrupted, if not defeated. Tactical infrastructure, specifically physical and non-physical barriers, is an important component in a total-system solution. In whatever form it is deployed, tactical infrastructure cannot provide full security in and of itself, but it can represent an effective first line of defense, which contributes to the overall federal border-security mission.

The USBP itself does not control all the forces that drive border security. Many factors create a pull factor for people to enter the United States and tend to push them from their homelands and vice versa. For example, national policies on immigration, the local economy, trade partnerships and treaties, the political climate, fear of transnational criminal organizations (TCOs), the perception of internal enforcement motivation, and

the availability of social services can each increase or decrease the stimulus of migration, legal or illegal. An increased number of people seeking to enter the country (whether at or between POEs), for example, requires increased numbers of USBP personnel and resources to achieve a constant level of operational control. Border areas with effectiveness levels close to 50 percent will continue to be preferred locations for illegal activity due to success and profits so the construction of modern fencing or a future wall design with detection capability can result in long-term improvements to border security.

D. EXTENDING THE WALL OR REPLACING VEHICLE BARRIERS WITH A WALL ACROSS ARIZONA

As discussed throughout this thesis, a wall is an investment for border security. When an organization analyzes the choices for investments and operational requirements, there are various factors to consider when making a decision of what would be the best option to invest in a potential improvement in border security. In 2017, the Border Patrol has not been able to hire agents at a pace to maintain the appropriated national staffing authorization of 21,370 agents.[197] For Arizona, this hiring shortfall adds to the calculation of whether other options might be better investments than uniformed personnel. This section discusses the cost to build a wall, the construction of tactical infrastructure that directly and indirectly supports a wall or other barrier, and the options of acquiring technology at the border as an investment to increase operational control of the border.

1. Costs

The initial cost to build a wall or barrier begins with a government planning stage. Historically, it includes the Army Corps of Engineers.[198] In the Tucson sector, 139 miles of vehicle barrier currently built could be replaced with a wall. If the USBP decided to make this change, it probably would require environmental work for the government, as

[197] U.S. Customs and Border Protection, *United States Border Patrol Sector Profile—Fiscal Year 2016 (Oct. 1st through Sept. 30th)*.

[198] Chad C. Haddal, Yule Kim, and Michael John Garcia, *Border Security: Barriers along the U.S. International Border*, CRS Report RL33659 (Washington, DC: Congressional Research Service, 2009), 16, https://fas.org/sgp/crs/homesec/RL33659.pdf.

well as materials, and DHS acquisition procedures potentially to include land. This change could include seeking an environmental waiver from the Secretary of the DHS, as well as environmental surveys to determine what wildlife would be impacted by the construction of a border wall. In terms of environmental work, the restriction of movement of wildlife is very concerning to many people, including Congressman Raul Grijalva.[199] Congressman Grijalva's district covers much of the border from Yuma to Nogales, Arizona. Congressman Grijalva signed a letter with other border members of Congress addressed to the Appropriations committee to communicate their position on the wall.[200] Specifically, Mr. Grijalva opposes both new construction and replacing existing fences with new or improved designs.[201]

These environmental impacts would include the possible restriction of movement or migration and can lead to financial responsibility for the DHS to land management agencies for mitigation of those impacts. A mile of newly constructed fence or wall is approximately $8 million or less per mile due to having access to government land and not having to buy private land according to some government estimates. In terms of the national cost to build a wall or fence, Bernstein Research and Marc Rosenblum from the Migration Policy Institute found in their study that the cost would be closer to $15–25 million per mile based on a 1,000-mile wall project, especially when land acquisition is needed.[202]

Projects in the Yuma and Tucson sector over the last seven years were built for approximately to $4–6 million per mile but in more rural and remote areas, additional logistics costs are likely. Other factors are dealing with and making repairs in flood plains and monsoon rains that can cause severe damage to existing roads and infrastructure during the summer months in the Tucson sector. This damage includes road erosion that

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[199] "Environment," Raul Grijalva, accessed August 16, 2017, https://grijalva.house.gov/environment/.

[200] Raul Grijalva, "Grijalva and Vela Lead Letter Opposing Funding and Construction of Border Wall," July 21, 2017, https://grijalva.house.gov/press-releases/grijalva-and-vela-lead-letter-opposing-funding-and-construction-of-border-wall/.

[201] Ibid.

[202] "Here's What We Know about Trump's Mexico Wall," Bloomberg Politics, last updated August 23, 2017, https://www.bloomberg.com/graphics/2017-trump-mexico-wall/how-much-would-the-wall-cost/.

becomes a blockade until repaired and fencing that can become dislodged or even collapse.

The cost to build a fence or wall has increased significantly since the USBP began these types of construction projects. According to the CRS in 2009, the average cost for a mile of fence ranged from $400,000 for landing mat fence installation to$3 million a mile according to the Congressional Budget Office.[203] Any area in the Tucson sector where double layer fencing is determined to be necessary may add an additional cost of $14–17 million per mile. This cost includes real estate and environmental planning, construction and construction oversight, as well as money for a road between the layers of a fence. A conservative estimate to retrofit or build walls in the locations of the 139 miles of current vehicle barrier should be approximately $1.12 billion or more and does not include unfenced areas of the Tucson sector.

The GAO report in 2017 outlined that the price per mile of fence was $6.5 million per mile for primary fence and $1.8 million per mile for a vehicle fence in 2009.[204] In Yuma, almost all buildable areas have some sort of fencing. Therefore, the cost decision in the Yuma area is to determine if a vehicle fence should be converted to a wall at $6.5 million to $8 million per mile. Converting 44 miles of vehicle fence to a wall is estimated to have a base cost of $352 million, which does not include any consultation fees with the Quechan and Cocopah Indian nations or any areas that would be deemed a flood plain. It also not only improves the denying of terrain from foot crossings since the vehicle barriers are already in place in Yuma. As former CBP Deputy Commissioner David Aguilar testified in the past, the USBP has continued to seek the right mix of investment to achieve operational control.[205] Tactical infrastructure is one of the key pieces. Sometimes, a vehicle barrier is better than a wall or fence because of cheaper construction and maintenance costs.

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[203] Haddal, Kim, and Garcia, *Border Security: Barriers along the U.S. International Border*, 9, 27.

[204] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 16.

[205] Aguilar, *Written Testimony on Fencing along the Southwest Border*.

As the GAO reported in February 2017, additional taxpayer costs continue through breaches found in the current legacy border fencing, and illegal smuggling activity where limited or no border barrier exists. Over 9,200 breaches or cuts in the fence occurred from 2010–2015, an average of four breaches per day.[206] Douglas, Naco, Nogales, and Yuma are all urban locations along the Arizona border susceptible to breaches of their primary fences because of the popularity of some smuggling routes that lead to housing that can provide safe harbor or concealment from law enforcement.[207] This behavior displays how desirable and successful those entry points are or have been over the years. In the USBP's experience, it is critical to identify those breaches immediately and maintain a high effectiveness rate with entries from those breaches in the fence to discourage that tactic. However, it is an additional cost in terms of supplies, manpower hours, or contracts to fix the recurring damage. It is also a uniformed manpower cost to the USBP when it needs to dedicate agents patrolling the border to identify vulnerabilities for illegal entry where the wall is cut.

An additional challenge for current estimates outside the state of Arizona include the cost of real estate acquisition when it is a known administration priority and additional potential risks and costs associated with building a wall. Other factors that create significant site adaptations are flood plains and potential International Boundary and Water Commission (IBWC) requirements. The IBWC is a federal agency that collaborates between the United States and Mexico and applies the relevant treaties between both countries.[208] These cost and logistics estimates do not account for changes that may potentially increase the cost to build a wall or fencing.

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[206] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 23.

[207] Ibid.

[208] "About Us," International Boundary & Water Commission, accessed October 7, 2017, https://ibwc.gov/About_Us/About_Us.html.

2. Construction and Use of Other Infrastructure

The CBP manages an inventory of over 5,000 miles of roads identified by the USBP for maintenance.[209] Roads are utilized for operational requirements including patrol and drag roads. Drag roads are primarily used to look for footprints. These roads provide access to tactical infrastructure including fence and boat ramps. The average cost to construct new roads is currently estimated at $3.3 million and includes environmental planning, buying the land, environmental mitigation, staffing requirements, design, and construction.[210] This estimate does not include the $3.5 billion cost that the GAO reported as an estimate for maintenance of current fencing over the next 20 years.[211] Any construction of a new wall is an additional cost in terms of maintenance. The recurring average cost to maintain existing roads is $240,000 per mile, per year.[212] Estimates for recurring costs reflect average maintenance costs per mile of road plus environmental compliance and staffing and human capital requirements.

Another aspect of Section 102 of IIRIRA is the so-called "consultation provision," which is found in Section 102(b)(1)(C) and requires that the Secretary consult with various stakeholders concerning the potential impacts of fencing on "culture, commerce, and quality of life."[213] The consultation provision was a source of delay in previous efforts to construct fencing, and can have the same impact again. In Arizona, it is less of an issue since the government owns the land at the immediate border. However, efforts to build multiple layers of fence with roads and electronic surveillance may require land acquisition in Arizona like other border states.[214] The language concerning the DHS Secretary's waiver authority does not explicitly mention maintenance. Although the CBP has taken the position that infrastructure built under a waiver may be maintained

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[209] Bixler, *USBP Tactical Infrastructure Report*.

[210] Ibid.

[211] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 1.

[212] Ibid.

[213] Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA).

[214] Nixon, "Engineers Begin Preparatory Work for Border Wall Construction"; Nixon, "Trump Administration Selects Contractors for Border Wall Prototypes."

under the waiver, the lack of statutory language to support this position may generate legal challenges from some states like California and non-governmental organizations.[215] An increased cost can be litigation if a decision is made to replace a current vehicle barrier with a wall.

A few primary legal considerations must be taken into account in terms of investing in building a wall along the southwest border. Environmental law is one area of consideration when the federal government determines where and when to build a fence or a wall. The environmental laws that can be relevant include refuge areas, pollution control, clean water, and historic preservation to name a few.[216] Consultation, public comment periods, and a review of government projects ensure no significant impacts occur to the land or areas take time and cost money. According to Chad Haddal of the CRS, challenges to the DHS Secretary's waiver authority under the Real ID Act have been rejected in court so far.[217] Another major consideration is determining the best course of action in obtaining private land for wall construction. The federal government has the ability to condemn the land to facilitate the construction. Typically, the representatives of the government involved in that process are not employed by the USBP. The USBP representatives have to maintain a long-term relationship with the impacted land owner for years to generations after the decision and process are initiated that can potentially impact decision making when weighing short-term project completion versus generational relationship impacts. Sometimes, these situations cause the federal government to choose investments other than wall construction. Avoiding costly and time-consuming litigation allows program managers the opportunity to provide resources like technology, personnel, or greater mobility much more quickly. For decision makers, these and other unanticipated obstacles should be factored in when making choices in terms of border security because of financial costs, as well as time invested with lower or slower than expected results.

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[215] Brooke Singman, "California Suing Trump over Border Wall, Escalating Battle with White House," Fox News, September 20, 2017, http://www.foxnews.com/politics/2017/09/20/california-suing-trump-over-border-wall-escalating-battle-with-white-house.html.

[216] Haddal, Kim, and Garcia, *Border Security: Barriers along the U.S. International Border*, 44–45.

[217] Ibid., 33.

3. Technology

Technology in USBP terms refers to a surveillance and detection capability that is as important to improving border security as is having a wall or personnel. Acting Chief Carla Provost of the USBP testified that the wall is a system, which includes technology.[218] If technology is to be a part of a new push for border infrastructure at the immediate border, the application of Section 102 of IIRIRA to the deployment of technology, such as cameras, radars, sensors, etc., is not clear. The inability to use the DHS Secretary's waiver authority can seriously hinder future efforts to deploy fixed technology at the border quickly if a successful legal challenge is mounted. Technology in this area can be broken down into several options.

The remote video surveillance system (RVSS) has been a fixture for the USBP in terms of stationary surveillance in Arizona for over 20 years. This system provides day and night cameras that feed back to a USBP station where an operator can move the cameras from a dispatch center.[219] The current program is focused on replacing old cameras that do not function with the same level of precision as newer cameras. Replacement parts become a challenge to find and to keep functional as some RVSS locations reached close to 20 years of age. The new program provides greater detection, identification, and classification capability at greater distances than the previous version, which makes better use of limited agent resources.[220]

CBP Assistant Commissioner Mark Borkowski of the Office of Acquisition testified in May 2016:

> The remote video surveillance system is the other large, significant program in Arizona. That program also has clicked along with a -- it was

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[218] Carla Provost, "Written Testimony of CBP U.S. Border Patrol Acting Chief Carla Provost and CBP Office of Field Operations Deputy Executive Assistant Commissioner John Wagner for a House Committee on Appropriations, Subcommittee on Homeland Security Hearing Titled "Immigration and Customs Enforcement & Customs and Border Protection FY18 Budget Request," June 13, 2017, https://www.dhs.gov/news/2017/06/13/written-testimony-cbp-house-appropriations-subcommittee-homeland-security-hearing.

[219] Office of the Chief Information Officer, *IT Program Assessment, CBP-RVSS Program* (Washington, DC: Department of Homeland Security, 2012), https://www.dhs.gov/xlibrary/assets/mgmt/itpa-cbp-rvss2012.pdf.

[220] Ibid.

> awarded at a reduced cost compared to our estimate. I essentially have four degrees of freedom that I play with. Cost, schedule, performance, and risk. And for the most part, I think we've not done well on schedule. I would have to acknowledge that. We've failed on schedule. We're trying to attack that. But on the cost, schedule, and performance on these systems, I actually think we've done well once we got them going. So Arizona is well under way compared to the baseline.[221]

It is reasonable that with such recent testimony, all high dollar programs involving wall construction will receive close Congressional and departmental oversight.

The IFT was initially deployed in the Nogales, Arizona, AoR on a full-time basis in 2015. The IFT is designed to bring surveillance capability to improve agent safety and increase awareness at the border in a challenging area of the Tucson sector. The IFT has new sensors with access to the USBP dispatch center for improved operational capacity.[222] Due to the recent developments with IFT, some insight is available in terms of the length of time it takes to execute the construction and implementation of this program. The environmental work for the Douglas, Arizona USBP station was complete with no impact in April 2014.[223] The IFT did not become operational in Douglas until three years later in 2017. This example serves as a reminder of what realistic timelines are for the deployments of newly constructed items or newly deployed agents to the border.

Technology may evolve in the United States to include a detection system at the immediate border. Martha McSally, Chair of the Border and Maritime Subcommittee, Committee on Homeland Security, has stated concerns of agents working too far from the border.[224] As pictured in a proposed fence design from Dark Pulse Technology in

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[221] Mark Borkowski, *Border Security Gadgets, Gizmos, and Information: Using Technology to Increase Situational Awareness and Operational Control* (Washington, DC: Committee on Homeland Security, 2016).

[222] "Elbit Systems of America's Integrated Fixed Tower Program Named Most Notable Border Security Program," Elbit Systems, accessed July 15, 2017, http://ir.elbitsystems.com/phoenix.zhtml?c=61849&p=irol-newsArticle&ID=2193594.

[223] Integrated Fixed Towers," U.S. Customs and Border Protection, April 1, 2014, https://www.cbp.gov/border-security/along-us-borders/technology-innovation-acquisition/integrated-fixed-towers.

[224] McSally, *Statement of Subcommittee Chairwoman Martha McSally (R-AZ) Border and Maritime Security Subcommittee Moving the Line of Scrimmage: Re-examining the Defense-in-Depth Strategy September 13, 2016*.

Arizona in Figure 9, a fiber optic cable at the border can potentially improve detection capability at the border and potentially impact tunnel construction, as well as reduce fence breaches.[225]

Figure 9. Dark Pulse Technology[226]

If agents and dispatch centers can receive an alert that someone is at the border upon approaching or initiating an entry, an improved detection capability and an earlier potential response time is possible. This option can potentially make a new constructed modern wall more effective than that reported by the GAO in 2017, as well as potentially improving existing communication infrastructure if a power source exists to operate the fiber as a stand-alone enhancement. It may be included in fence projects beginning in 2018 and beyond depending on the outcome of the DHS wall prototype project.[227]

Technology can complement or improve enforcement activity in terms of detection and surveillance of illegal activity along some areas of the border by increasing situational awareness with impedance and allow for better odds of positive law enforcement resolutions.

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[225] Bob Price, "Border Wall Contractors Fear Attacks during Construction," Breitbart News, April 5, 2017, http://www.breitbart.com/texas/2017/04/05/border-wall-contractors-fear-attacks-construction/.

[226] Source: "Scottsdale Company Wants to Build High-tech Wall," ABC News, accessed July 15, 2017, https://www.bing.com/images/search?view=detailV2&ccid=mHAECBb%2b&id=4626A86BA8884517B3DBA54E7CA806AD18303FE6&thid=OIP.mHAECBb-xO5SY-iy_51GTgFAC0&q=dark+pulse+technology+wall+proposal&simid=608045673003156473&selectedIndex=0&ajaxhist=0.

[227] Nixon, "Engineers Begin Preparatory Work for Border Wall Construction"; Nixon, "Trump Administration Selects Contractors for Border Wall Prototypes."

As the analysis in this chapter shows, many factors and costs should be considered when contemplating investments at the border that range from the millions to potentially billions of dollars to include delays in deployment schedules and the projected cost estimates that are usually lower than the actual cost. The Tucson sector does need to improve its interdiction effectiveness rate in some locations from the 50s to the 80s. Since agent hiring is not meeting attrition or increasing, Mr. Borkowski testified that since acquisition schedules have slipped, wall or fence construction with technology imbedded in it seems to be a reasonable investment in targeted areas with significant traffic levels.[228] The case study of the Yuma sector also confirmed that some remote areas of that border are already under operational control, and as such, more walls or fences in those locations should be a low priority. In Chapter V, some conclusions are drawn regarding how evidence can determine higher and lower level priorities for potential wall investment.

[228] Borkowski, *Border Security Gadgets, Gizmos, and Information: Using Technology to Increase Situational Awareness and Operational Control*.

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V. ASSESSMENT AND CONCLUSION

The USBP's performance is measured annually by the DHS and the administration in accordance with the GPRA. The last two chapters provided information on effectiveness and examined how Yuma and Tucson scored relative to the nationwide interdiction effectiveness performance rate of approximately 80 percent. Yuma scored over 90 percent, while Tucson scored only close to 70 percent. This chapter provides insight into potential recommendations on where a wall or fence should be constructed or replaced as a high organizational priority.

A. CRITICAL ASSESSMENT

The GAO released questions from its February 2017 report regarding the effectiveness of border infrastructure construction.[229] This chapter attempts to add to that report in terms of the contribution a fence or wall makes towards border security and the process used to preserve the investment.[230] This final chapter also provides thoughts on other factors when building a border wall, such as construction, legalities, and maintenance.

1. Contribution

The map in Figure 10 illustrates how time, distance, terrain, and access to roads or mobility can affect the "vanishing time"—the amount of time it takes for border crossers to disappear before they can be apprehended. Using the identified criteria, the map shows where this thesis recommends either new fencing or replacement fencing be constructed to improve border security. Much of the green and yellow line locations in Arizona are in or near the cities of Douglas, Naco, Nogales, Sasabe, Ajo and Yuma, which have legacy landing mat fence or older models that is 10 to 20 years old and could be improved.[231] The paths indicated on the map were categorized from quickest vanishing time (higher

[229] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 50–51.

[230] Ibid.

[231] Haddal, Kim, and Garcia, *Border Security: Barriers along the U.S. International Border*.

impact) to longest vanishing time (lower impact).[232] The areas south of the interior red line away from the border show locations where vanishing time is much greater. In those locations, agents with road access and surveillance capability can achieve a high effectiveness rate without a wall. The Yuma sector has been an example.

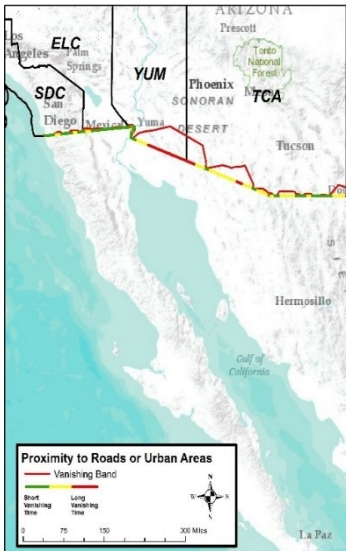

Figure 10. Proximity to Roads and Urban Areas[233]

Replacing fences with a new wall combined with technology can increase awareness, the safety of agents, and provide increases in time to respond or to have situational awareness of illegal activity taking place. Areas on the map in Figure 10 between Yuma and Tucson show a red line that moves well north of the border with Mexico. That line shows how far crossers need to travel by foot or vehicle to reach established roads and escape routes. Generally, between Mexico and this line, large sections of terrain appear where agents can use technology and tracking skills to locate people smuggling drugs or crossing illegally into the United States. These areas have large travel distances and longer vanishing time where fence replacement or construction would be lower priority in comparison to other locations in Arizona. However, as the

[232] Chris Pietrzak, Peyton Patterson, and Dane Hammack, *Capability Gap Update* (Washington, DC: USBP Operational Requirements Management Division, 2017).

[233] Source: Ibid.

Arizona case study has shown, the issue and decision-making process is more complex than that. IERs, the execution of environmental waivers for construction, costs to build in certain locations, mobility, and access to the border and consultation of tribal nations are all additional factors when determining the construction or replacement of the border wall.

2. Process in Place

Senator John Cornyn of Texas and several other members of Congress have introduced the Building America's Trust Act in August 2017.[234] In terms of wall and infrastructure, the bill would require that:

> Not later than January 20, 2021, the Secretary of Homeland Security shall deploy tactical infrastructure along the Southern border, using the most effective tactical infrastructure available for achieving situational awareness and operational control of the southwest border.[235]

In Subtitle A of the bill, Section 102, the DHS Secretary is instructed to take actions that include the "removal of obstacles to build wall and place technology at the U.S. border in locations with high traffic."[236] The bill also provides tactical flexibility for the DHS Secretary to make changes if those changes improve operational control or situational awareness.[237] Section 113 refers to federal lands and how federal border enforcement is slowed or restricted.[238]

As a patrol agent in charge of the USBP's Wellton station in western Arizona, the author experienced this issue of patrolling federally protected lands directly with his agents working the Cabeza Prieta Wildlife Refuge along the Tucson and Yuma border seam where both sectors meet. I believe the goal of this exemption is not to ignore laws of the land that preserve and protect nature in the United States. The aim is to gain access

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[234] John Cornyn, *Building America's Trust Act* (Washington, DC: U.S. Senate, n.d.), accessed August 19, 2017, https://www.cornyn.senate.gov/sites/default/files/BuildingAmericasTrustAct.pdf.

[235] Ibid., 8–9.

[236] Ibid., 8.

[237] Ibid., 30.

[238] Ibid., 46.

and provide the impedance or denial capability necessary so that the majority of those areas are better preserved from illegal entries into the United States.

As the potential legislation works its way through the congressional process, an organization like the Border Patrol can still move forward by previous recommended practices. The DHS OIG conducted an audit involving the construction wall and acquiring technology in 2009.[239] One main finding was that the CBP "has made progress in identifying the Border Patrol's operational requirements for technology and tactical infrastructure. However, Border Patrol assessments could better document and define operational requirements for tactical infrastructure to ensure that border fence goals."[240] For the wall, if detection and response is greater than crossing and vanishing time, the investment in wall and agents is successful and is an indicator of improved operational control. This improvement helps validate the investment of both the fence construction and the personnel deployed to patrol the area.

The USBP baseline processes that began in 2009 were budget-based requirements. As discussed earlier in Chapter IV of this thesis, the USBP uses the RMP and CGAP process now, but it is still fairly new to the average USBP agent who works in the field and an educational process for many. The USBP will most likely prioritize time and distance, along with budget limitations and the ability to execute the project in accordance with their mission analysis in the CGAP when deploying the wall or fencing. The formula discussed in Chapter IV also provides an ability to measure effectiveness for the wall so Congress has a justification for providing maintenance to the wall and necessary patrol roads, as well as construction funds.

3. Legal

Even with pending bills in Congress, the current laws require a balance between wall construction, security, and understanding the rules for operating near protected lands. As a part of the Secure Fence Act of 2006, the CBP was tasked with constructing

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[239] Office of Inspector General, *Progress in Addressing Secure Border Initiative Operational Requirements and Constructing the Southwest Border Fence*.

[240] Ibid.

hundreds miles of "two-layer" fencing segments of the wall, mostly in Arizona and California. In December 2007, Congress repealed the fencing requirements in the Secure Fence Act). Congress replaced the Secure Fence Act fence requirements, with more flexible statutory authority.[241] Section 102 calls for "not less than 700 miles" of fence on the southwest border, including certain "priority miles" of fencing to be built. At the same time, that section provides the DHS Secretary with substantial discretion. As of fiscal year 2017, the CBP had constructed 654 miles of fence on the border.[242] The CBP continues to assess operational needs, and where the USBP identifies an operational need for a fence, the CBP has the statutory authority, assuming sufficient funding from Congress, to construct a new fence.

In 2011, Arizona sought an order from a federal judge mandating that the CBP construct 700 miles of fence.[243] However, the United States District Court dismissed the state's request, stating:

> While the construction of the fencing and infrastructure improvements may be phrased in mandatory language, the IIRIRA and the Appropriations Acts leave the Secretary and the DHS with a great deal of discretion in deciding how, when and where to complete the construction.[244]

In some areas along the border, technology can complement or improve enforcement activity in terms of detection and surveillance of illegal activity by increasing situational awareness with impedance and allow for better odds of positive law enforcement resolutions. Under the language of Section 102, the DHS Secretary's authority to construct border infrastructure or utilize the waiver is limited to "areas of high illegal entry."[245] Although the DHS Secretary should have discretion to determine what constitutes an area of high illegal entry, it can be challenging if the CBP builds in areas of

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[241] Office of Inspector General, *Progress in Addressing Secure Border Initiative Operational Requirements and Constructing the Southwest Border Fence*, 3.

[242] Source: Bixler, *USBP Tactical Infrastructure Report*.

[243] Michael John Garcia, *Barriers along the U.S. Borders: Key Authorities and Requirements*, CRS Report No. R43975 (Washington, DC: Congressional Research Service, 2015), https://www.everycrsreport.com/files/20150408_R43975_36eab205981e98cf1ba0c02f82b3debba152f8e0.html.

[244] Ibid.

[245] Ibid.

the southern border that have seen substantial reductions in illegal traffic because a consensus has not been reached on what defines a high traffic area at this time.

A waiver of applicable environmental laws by the DHS Secretary is necessary to execute tactical infrastructure improvements along the border. Additionally, a waiver can provide for rapid access to federal lands for construction. Without a waiver, the timeline to construct the necessary tactical infrastructure to secure the southwest border is likely to be extended due to litigation and associated injunctions prohibiting construction.

4. Construction

The foundation for CBP cost-per-mile for primary fence construction costs appears to be based on average costs and past experience associated with the construction of fencing from 2006–2010.[246] These estimates are said to include the cost of real estate acquisition and additional potential risks and costs associated with building a wall. These risks are much lower in Arizona due to the Roosevelt Easement, which allows the wall to be built on government property. The Roosevelt Easement is government land designated by proclamation along the border in Arizona, California, and New Mexico since 1907 due to concerns about smuggling and security.[247] In places like Texas, millions of dollars are needed to acquire land from private ownership.[248] However, the identification and validation of adequate construction access and laydown is important for Arizona wall construction since some of the rural and remote desert areas have limited road access. While some priority requirements are located in the Roosevelt Reservation, real estate purchases by the government can require additional land beyond the easement based on final fence placement. Construction access is also needed to build the wall and maintain the materials in a secure compound while the work is taking place.

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[246] Government Accountability Office, *Secure Border Initiative Fence Construction Costs*.

[247] Haddal, Kim, and Garcia, *Border Security: Barriers along the U.S. International Border*, 17, 18.

[248] Jon Harper, "Wide-Ranging Estimates for Cost of Border Wall," National Defense, March 31, 2017.

5. Maintenance

When cost discussions occur regarding a potential border wall or even a specific project for a new or replacement wall or fence, they typically focus on construction costs. However, maintenance costs can be significant amounts of money and the ability to repair the damage quickly can sometimes have an impact on having operational control.

> From fiscal year 2007 to 2015, CBP spent approximately $2.4 billion on TI on the southwestern border—about 95 percent, or $2.3 billion was spent on constructing pedestrian and vehicle fencing.[249]
>
> In addition, CBP officials reported that TI operations and maintenance requirements totaled approximately $450 million during this same period.[250]

The GAO explained that a tactic in the Tucson sector for smuggling in urban areas involves cutting or damaging the wall or barrier.[251] Once the infrastructure is cut, smugglers facilitate the illegal entry of people or carrying of drugs into the United States.[252] The ability to see individuals approaching the fence can alert enforcement in advance of the fence being damaged to allow for the coordination at the immediate border and Mexican officials can assist with stopping or disrupting the activity. Identification of these routes and immediate maintenance of breaches can create a deterrent if it includes arresting the groups using that route to cross illegally. Simply put, effective enforcement countering that behavior can create a feeling that using that tactic of cutting the fence and crossing in an area is a waste of time. The ability to reduce breaches with modern fences can also reduce maintenance costs.

Arizona border locations potentially chosen for fence replacement can be improved in terms of officer safety and potential immediate detection capability at the international boundary. Enhancing the ability to see the crossers before they reach the fence or wall and have the entrants set off a sensor alert at the border will increase

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[249] Harper, "Wide-Ranging Estimates for Cost of Border Wall."

[250] Government Accountability Office, *Southwest Border Security: Additional Actions Needed to Better Access Fencing Effectiveness for Operations & Providing Guidance for Capability Gaps*, 16.

[251] Ibid.

[252] Ibid.

response time from the current state of affairs. This improvement in impedance and denial has the potential to add positive factors to the law enforcement mission by providing greater opportunity for predicting, detecting, identifying, and arresting potential illegal entrants or foot guides, and drug smugglers. Supporting an environment that puts these law enforcement capabilities in place increases the certainty of arrest and possibly leads to the deterrence of others making an attempt at an illegal entry. The smuggling business is affected in this manner by seizing more contraband or interdicting more people. The cost of doing business increases, possibly to the point at which it is too high to sustain a business.

Figures 11 and 12 show areas where a fence or wall are probably less effective because time and distance are greater than in urban areas and are already an advantage for enforcement. The challenge inherent to making decisions regarding the construction of more fencing is that it requires more manpower to monitor and check the fence for breaches, even where activity is often very low. The ability to add USBP manpower to the border has been an ongoing challenge in recent years. The deficit is approaching 10 percent or more in Arizona locations and is a significant shortfall for the border if the organization is trying to add more walls or fences. Any improvements to add a fence or wall in remote locations can also create a more advantageous access and mobility environment for smuggling organizations if proper enforcement is not monitoring border roads.

Figure 11. San Miguel Gate, Tucson Sector[253]

[253] Source: "Mexican Gangs Have Easy USA Access Day & Night–San Miguel Gate on Tohono Indian Reservation Has Been Easy Access for Hundreds of Years," Tea Party HD, June 23, 2010, https://teapartyhd.wordpress.com/2010/06/23/san-miguel-gate-mexican-gang-lookout-permanent-bases-usa-tohono-indian-reservation-has-been-easy-access-for-hundreds-of-years-mexican-gangs-members-included/.

Figure 12. Yuma Sector Vehicle Barrier Near the Colorado River and Morelos Dam[254]

So how does the government provide proof that this investment is worthwhile and that improvement is being made? According to Steven Camarota of the Center for Immigration Studies, the prevention of approximately 200,000 successful illegal entries during the next decade would save approximately $15 billion.[255] This number is based on work from the National Academy of Sciences (NAS), Engineering and Medicine that determined the future burden of the current demographics of illegal immigrants is more

[254] Source: John Fleck, "Morelos Dam, Minute 319 and Replumbing the Colorado River Delta," March 15, 2014, http://www.inkstain.net/fleck/2014/03/morelos-dam-minute-319-and-replumbing-the-colorado-river-delta/.

[255] Steven A. Camarota, *Cost of a Border Wall versus the Cost of Illegal Immigration* (Washington, DC: Center for Immigration Studies, 2017), https://www.hsdl.org/?view&did=798945.

than $74,000 dollars each over a lifetime.[256] Additional investments in wall construction that improve interdiction effectiveness can potentially pay for itself by reducing the costs of arresting, detaining, and removing illegal aliens. As seen in Yuma, high levels of control can also allow for the reduction of manpower, which is also a cost savings.

B. CONCLUSION

The ability to achieve operational control of the border is influenced significantly by a number of factors, including, but not limited to, terrain features, infrastructure, technology, the availability of resources, and the sophistication of criminal elements operating in any given area of the border. For these reasons, operational control cannot be pursued with a one-size fits-all or checklist-type approach. It will be manifested in varied operational environments using a variety of operational tactics and resources, including a wall, in many of these locations; however, they must be tailored to those environments. Operational control is not achieved as the result of any single effort or resource. It is accomplished as the outcome of persistent and unified efforts, supported by appropriately applied capabilities as identified and executed by field commanders who know and understand the environment in which they operate. The impedance and denial capability offered by walls, fences, or barriers is intended to primarily stop, and then contain, illicit cross-border activity by increasing the probability of apprehensions close to the border.

The USBP's requirements process should remain agile to address a constantly evolving threat. As funding becomes available, the USBP should ensure any tactical infrastructure investments, including a wall, be deployed to areas of highest threat and operational priority using its current methodology and potentially impede greater amounts of future entries. However, the low level of activity in non-wall zones within the Yuma sector makes it clear that a wall across the entire state of Arizona would not likely have an appropriate impact in the Yuma area of operations. As seen in all cases in Arizona, for a wall or fence to be effective, the impedance and denial capability must also convey to the adversary a persistent certainty of apprehension and consequence of arrest. The Yuma sector has already shown positive evidence about how impedance and denial

[256] Camarota, *Cost of a Border Wall versus the Cost of Illegal Immigration*.

provide the benefit of extra time to assist agents with response time and sometimes advance warning with a modern see-through fence that an entry may occur. Therefore, with the advancements made in deploying capabilities in support of impedance and denial of illegal entries, including technology at the immediate border, additional fence can help improve security in the United States in locations where law enforcement response time is limited. The Tucson sector is a candidate for additional miles of wall based on the need to increase certainty of arrest in certain border zones.

As seen in the Yuma sector, an entire AOR does not need to have a wall or fence for control to be gained and sustained. As discussed, it costs more than $1.5 billion or more to retrofit a vehicle barrier to a wall across Arizona. This cost does not include building a wall in Arizona in locations where no barrier exists or replacing legacy fencing. Some locations within the current deployment in Tucson sector are good candidates for additional wall investment to improve interdiction effectiveness.

A wall can be employed in varying degrees, according to the operational objective and need in any given environment (e.g., a single fence located on the actual border, a double layer of fencing, lighter or heavier construction). Typically, a wall is intended to facilitate the impedance or denial of illicit cross-border activity. It does so by physically obstructing the act of entry to the point that many or most choose not to attempt entry or are entirely denied the ability to do so. Some of the effects of a wall in its various forms are that it physically denies terrain, increases vanishing times (the amount of time the adversaries generally has before they have access to shelter or transport), contains incursions to the immediate border, and protects community, businesses, and other sensitive environments.

The fullest effects of a wall are manifested when complemented by other supportive capabilities, such as new detection technologies, personnel increases, and improved road access. In fact, when these capabilities are strategically combined, a wall serves as the backbone of which operational control can be achieved. In concert with other capabilities provided through personnel, technology, and partnerships, impedance and denial through fencing is critical to the USBP mission.

This thesis provides evidence that a wall or fence presents a viable option to improve the security of some sections of the southern border.[257] The Tucson sector represents an area across the southwest border that is higher priority for some segments of new wall construction, especially in areas where their interdiction effectiveness rate is below the national average. Yuma is lower priority. The analysis used in this thesis can most likely be applied in a similar way across other geographical areas or sectors along the U.S. border with Mexico. More research is potentially needed regarding the denying of terrain and what interdiction effectiveness percentage truly impacts the business model of smugglers profiting from illegal entry into the United States.

[257] "Executive Order 13767, Border Security and Immigration Enforcement Improvements."

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