

## **A Review of Conservation Finance Mechanisms in the American West**

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**Prepared for:**

Michael Scott, Program Officer  
Environment Program  
The William and Flora Hewlett Foundation  
Menlo Park, California

**Prepared by:**

Emily Peterson  
Master of Public Policy Candidate, 2013  
Sanford School of Public Policy  
Duke University

**Faculty Advisor:**

Dr. Alexander Pfaff  
Associate Professor of Public Policy  
Sanford School of Public Policy  
Duke University

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# EXECUTIVE SUMMARY<sup>1</sup>

## Background

As part of a multi-pronged strategy to improve ecological integrity on 300 million high-priority acres in the West by 2035, the Hewlett Foundation seeks to target and increase public funding for private land conservation. The Hewlett Foundation has funded the Trust for Public Land and The Nature Conservancy for several years to raise public funding for conservation through ballot and legislative initiatives. This study examines the extent to which private lands protected through public funding have improved ecological integrity in the West. It also considers which combinations of funding mechanisms and government levels have yielded the highest returns for ecological integrity, in terms of acres protected. The purpose of this evaluation is to provide a set of lessons learned about past conservation finance activities to inform the Hewlett Foundation's new five-year strategic plan for its Western Conservation Program in 2014-2018.

## Methodology and Principal Findings

Private lands protected using public funding were examined using GIS and the Conservation Almanac dataset to determine the degree to which protected lands overlap with the Hewlett Foundation's internal priority areas. The results of ballot measures were also analyzed using the LandVote Database for the 12 Western states to examine how public conservation funding has changed by year and across states during 1988-2012. This study found that 2,521,311 acres of land were protected for ecological integrity in the West during 1998-2011. Of all funding mechanisms and jurisdiction combinations, federal appropriations protected the highest number of aggregate acres for ecological integrity. Among lands located in overlapping priority areas, appropriations and donations contributed the highest acreage for protecting ecologically important lands, whereas lottery funding tended to be used for protecting land of lower ecological value. Bonds at the state level have generated roughly 40 percent of all new conservation funding in the West since 1988.

## Recommendations

1. Prioritize the re-authorization of funding with a near-term expiration date to maximize the generation of public funding for private land conservation.
2. Continue to use feasibility studies to ascertain the optimal funding mechanism type for ballot initiatives, with knowledge that bonds have been the most successful mechanism to date.
3. Collaborate with The Nature Conservancy's Conservation Lands Program to jointly identify mutual targets for ecosystem-level conservation in the West.
4. Continue to fund data collection and standardization initiatives, such as the LandVote and Conservation Almanac databases maintained by the Trust for Public Land.
5. Use a model on a finer scale than the current Focal Areas layer to assess ecological and political threats to lands in the West.
6. Expand the messaging platform of conservation finance to target forest restoration as a means of preventing catastrophic wildfire and protecting public drinking water supplies.

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<sup>1</sup> This student paper was prepared in completion of the Masters Project requirement for the Master of Public Policy Program at Duke University's Sanford School of Public Policy. The research, analysis, and policy alternatives and recommendations contained in this paper are the work of the student who authored the document, and do not represent the official or unofficial views of the Sanford School of Public Policy, Duke University, The William and Flora Hewlett Foundation, or the Foundation's grantees. Without the specific permission of its author, this paper may not be used or cited for any purpose other than to inform the client organization about the subject matter.

## **POLICY QUESTION**

Based on conservation outcomes to date, should the William and Flora Hewlett Foundation revise its approach to conservation finance as part of its 2014-2018 Western Conservation Program Strategy?

## **RESEARCH QUESTIONS**

To address the policy question described above, this study seeks to answer the following research questions:

1. How has conservation funding generated through ballot measures changed by year and across each of the twelve Western states? Which conditions may support increased public funding in the future?
2. Of total public conservation dollars expended in the U.S. West, what fraction has protected land that falls within any of the Hewlett Foundation's three priority areas and thus, is viewed as improving ecological integrity of the West?<sup>2</sup> Which combinations of funding mechanism (e.g., bonds, sales taxes, and appropriations) and government level have protected the highest number of acres for ecological integrity?
3. Considering that the Hewlett Foundation views protected lands that fall in multiple priority areas as more robust in improving ecological integrity, do differences exist concerning funding mechanisms and county socioeconomic characteristics for parcels located in overlapping priority areas?

## **STUDY PARAMETERS**

The Hewlett Foundation is the only foundation which currently supports the conservation finance work of The Nature Conservancy (TNC) and The Trust for Public Land (TPL) in the American West. Given that TNC and TPL have been involved in the majority of ballot and legislative initiatives for land conservation in the Western states, one can infer that the Hewlett Foundation's grant investments have helped catalyze public conservation funding in this region.

However, it is beyond the scope of this study to draw a causal link between the Foundation's respective grants and individual land parcels that were protected in the West during the period 1998-2011. Additionally, this study does not consider the counterfactual of which conservation finance activities might have occurred in the absence of the Foundation's grantmaking in this field. Instead, the purpose of this study is to highlight strategies across funding mechanisms and government levels that have yielded the highest returns for ecological integrity, in terms of acres protected.

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<sup>2</sup> Please see the "Data and Methods" section for a description of the Hewlett Foundation's three priority levels.

## 1. BACKGROUND

### *1A. About The William and Flora Hewlett Foundation*

The William and Flora Hewlett Foundation is a private foundation based in Menlo Park, California that is committed to solving social and environmental problems. The overarching goal of the Hewlett Foundation's Western Conservation Program is to ensure the ecological integrity of the North American West to benefit wildlife and people. Several modern threats—including rapid population growth, resource extraction, and climate change—jeopardize the natural aesthetic, biodiversity, and economic livelihoods of the West.

By 2035, the Hewlett Foundation seeks to increase land protection to improve ecological integrity on 300 million high priority acres in the West. Given the expensive undertaking of directly purchasing ecologically valuable land, the Foundation works to achieve this long-term objective partly through a strategy of targeting and increasing public funding for private land conservation. Currently, its two primary grantees for conducting this work are The Nature Conservancy and the Trust for Public Land. The Hewlett Foundation provides approximately \$1 million per year, cumulatively, to support both organizations in identifying and creating funds from federal, state, and local sources for conservation—either via the legislature or ballot measures voted on by citizens.

TNC and TPL collaborate closely, in both formal and informal capacities, to complement each other's work on conservation finance in the West. The two organizations largely seek to generate public funding to protect ecologically important land, an aim directly connected to the Hewlett Foundation's program strategy. However, governments across all levels also use a segment of public conservation funding to create open spaces such as parks and playgrounds in urban areas, which does not reinforce the Foundation's objective of improving ecological integrity.

To optimize the use of its grant dollars, the Hewlett Foundation is interested in delineating how total public conservation dollars at the federal, state, and local levels support the protection of ecologically important land. The Foundation is also interested in learning whether any finance mechanisms have proven particularly effective, and whether specific socioeconomic traits characterize the communities that have protected land for ecological integrity.

Given that it spends approximately \$25 million each year across its entire Western Conservation Program, the Foundation is keen to monitor whether its investments are properly aligned for achieving conservation outcomes in the most cost-effective manner. The Foundation is currently undertaking a review of its Western Conservation Program Strategy, and in March 2013, it will draft a new five-year strategic plan for the period 2014-2018. Lessons learned about the success of past conservation finance work will help influence the Foundation's strategy and program activities going forward, in addition to providing feedback to grantees on potential opportunities for framing future conservation activities.

### *1B. Scope of the Hewlett Foundation's Western Conservation Program*

The Hewlett Foundation defines the West as an area covering about 1.5 billion acres across roughly one-third of the North American continent. This area encompasses all or part of the 11 westernmost states of the contiguous U.S., in addition to Alaska, three Canadian provinces, and the

Colorado River Delta in Mexico. From an ecological perspective, the area includes 53 terrestrial ecosystems, 53 riparian ecosystems, 37 freshwater ecosystems, 202 threatened species, and 17 focal species.<sup>3</sup> (See Appendix 1 for maps of the ecological and political scope of the Foundation's Western Conservation Program.)

### ***1C. Definition of Ecological Integrity***

The long-term goal of the Foundation's Western Conservation Program is to ensure the ecological integrity of the North American West for wildlife and people. For the Foundation's purposes, ecological integrity means broadly that "natural systems function similarly to their cycles in the absence of human activity."<sup>4</sup> The Foundation describes ecological integrity as having the following six components: threatened ecosystems are conserved through increased protection; key species have sufficient habitat to ensure their persistence; core areas of outstanding conservation value are preserved; core areas are connected to other habitats with intact corridors; conservation outcomes maximize greenhouse gas mitigation and ecosystem adaptation to climate change; and sustainable human uses are supported.<sup>5</sup>

In its 2011 report, "A Strategy Planning Tool for Western Conservation," the Foundation outlined quantitative targets for the first four of the six aforementioned components based on scholarly literature and expert input. The latter two components are assessed based on the discretion of the Foundation's program officers.

For the purpose of this report, protected parcels are considered to improve ecological integrity if they fall within one or more of the Foundation's three priority areas and lie at least 5 miles outside of an urban area, as classified by the U.S. Census Bureau. The Foundation's priority areas include ten focal areas, 53 ecoregions, and a mosaic of core areas and corridors throughout the West. The Foundation's rationale is that if protected, land within these high priority areas would further its mission to ensure the ecological integrity of the West. (A more detailed description of the Foundation's respective priority areas is provided in the "Data and Methodology" section.)

### ***1D. About The Nature Conservancy and The Trust for Public Land***

The Hewlett Foundation is the only foundation to date that supports the conservation finance work of The Nature Conservancy and The Trust for Public Land exclusively within the North American West. The Doris Duke Charitable Foundation provides similar program funding to TNC and TPL, though its grant is intended more broadly for conservation finance work across the United States. TNC and TPL share a collective goal of securing dedicated, reliable public funding sources for conservation purposes, though each organization pursues a slightly different theory of change and programmatic approach.

TNC as an organization works in all 50 U.S. states, as well as 30 countries, with a staff of approximately 3,669 employees and an annual budget of \$505 million (for fiscal year 2012).<sup>6</sup> Its 6-member national Conservation Finance team generates conservation funding, primarily at the state-

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<sup>3</sup> The William and Flora Hewlett Foundation, 2009.

<sup>4</sup> The William and Flora Hewlett Foundation and Redstone Strategy Group, 2011.

<sup>5</sup> *Ibid.*

<sup>6</sup> The Nature Conservancy, May 2012.

level, by leveraging the Conservancy's chapter-based organizational structure and the scientific expertise of its state-based staff. The primary objectives of TNC's Conservation Finance Program are to equip Western officials with research and guidance to create new sources of conservation funding, and to educate both the public and government officials about the various benefits of protecting open space, as a means to prevent rollbacks on conservation funding.

TNC's Conservation Finance Program largely focuses on measures at the state level. According to TNC's staff, honing in on statewide programs permits the organization to secure a broad pool of funding and to strengthen the likelihood of protecting habitats with high conservation values across the entire state, rather than within a limited number of counties.<sup>7</sup> TNC maintains that certain counties, particularly those that are sparsely populated, may lack a sufficient economic base to generate public funding for conservation purposes. Therefore, the organization seeks to build a geographically broad base of support, even in urban areas, to build political will for statewide conservation initiatives.

The Trust for Public Land has offices in 28 states, roughly 285 staff members, and an annual budget of \$80.8 million (for fiscal year 2012).<sup>8</sup> Its Conservation Finance team is composed of 14 staff nationwide, two of whom are dedicated to field work in the West. TPL works to foster new sources of conservation funding at the local and state levels by working with city councils, open space advisory committees, land trust boards, county commissions, legislative committees, and governors' offices.

TPL's niche is to provide technical assistance and research services to support communities in evaluating the viability of ballot and legislative measures. Specifically, TPL staff conducts polling and feasibility studies to determine whether land conservation initiatives are likely to succeed. Based on results from public opinion surveys, TPL staff provides detailed recommendations to officials on framing ballot language, selecting the most appropriate finance tool and funding request level, and gauging timing for introducing measures to voters.

TPL's Conservation Finance team does not universally recommend that jurisdictions introduce ballot initiatives. In fact, about one-third of the organization's feasibility and public opinion studies indicate that public support is not yet sufficient to assure likely success at the ballot box.<sup>9</sup> In these situations, TPL works with stakeholders in an ongoing capacity to monitor public opinion and to evaluate when the political timing is ripe for introducing a ballot initiative.

Both TNC and TPL seek to maximize each organization's respective skillsets and assets to increase dedicated public funding for land conservation. Although the two organizations adhere to moderately different internal strategies, they collaborate in a concerted fashion to plan conservation finance work across the West. In addition to holding monthly conference calls to discuss the status of conservation finance activities, TNC and TPL staff meets for an annual strategy session to prioritize a list of states where the two organizations will focus their work during the coming year.

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<sup>7</sup> Interview with Wong and Morris, The Nature Conservancy, October 3, 2012.

<sup>8</sup> The Trust for Public Land, April 2012.

<sup>9</sup> Interview with Frankfourth, The Trust for Public Land, September 25, 2012.

## 2. PROBLEM STATEMENT

### *2A. Changing Demographics of the West and Increased Human Pressures*

The North American West has experienced rapid population growth in recent decades, which has markedly impacted the ecological, economic, and demographic characteristics of the region.<sup>10</sup> During the 1990s, the mountain West was the fastest growing region in the country, with most areas expanding at double or triple the national growth rate.<sup>11</sup> The U.S. Census Bureau projects that the population of the Western states will grow 45.8 percent by 2030 as compared to 2000 levels, the fastest growth rate of any region in the country.<sup>12</sup>

The restructuring of the global economy as well as advancements in transportation access and telecommunications appear to be primary factors in facilitating the West's rapid growth.<sup>13</sup> Modern "knowledge-based" industries, such as software development, biomedical research, and management consulting, are no longer constrained to base their operations in urban centers, a shift that has granted greater geographic freedom to workers in these industries. Researchers refer to such professionals as being "footloose" in the sense that they can live nearly anywhere.<sup>14</sup> A portion of these professionals and companies have chosen to relocate to the West for access to its natural amenities, including outdoor recreation opportunities, dramatic scenery, wilderness, and wildlife.<sup>15</sup>

However, researchers suggest that where newcomers are electing to live and recreate can adversely affect the precise landscape attributes that initially attracted these individuals.<sup>16</sup> Many recent transplants reference the "one-hour rule," meaning that they intend to work within an hour's drive of desirable hiking, fishing, skiing, or hunting opportunities.<sup>17</sup> Human development is infringing on natural buffers that previously protected national parks, wilderness areas, and nature reserves.<sup>18</sup> Sprawling subdivisions, shopping malls, and road networks are also replacing previously intact natural habitats and agricultural land.

In addition to population growth, centuries of resource extraction and a recent surge in oil and gas development have compounded environmental impacts on natural landscapes throughout the West.<sup>19</sup> Partly as a result of increased political pressure for the United States to reduce its dependence on foreign energy sources, oil and gas production in the American West has risen sharply in recent years.<sup>20</sup> In the period between 1990 and 2007, oil and gas development doubled in the Intermountain West.<sup>21</sup> Emerging technologies for extracting oil shale and tar sands also have the potential to spur significant expansion in the industry and lead to potentially harmful ecological consequences.<sup>22</sup>

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<sup>10</sup> Hansen et al., 2002.

<sup>11</sup> Travis, William R., et al., 2002.

<sup>12</sup> U.S. Department of Commerce, 2010.

<sup>13</sup> Shanahan, 2010.

<sup>14</sup> Gude, P.H. et al., 2012.

<sup>15</sup> Hansen et al., 2002.

<sup>16</sup> Travis, William R., et al., 2002.

<sup>17</sup> Hansen et al., 2002.

<sup>18</sup> *Ibid.*

<sup>19</sup> The William and Flora Hewlett Foundation, 2009.

<sup>20</sup> Copeland et al., 2009.

<sup>21</sup> *Ibid.*

<sup>22</sup> The William and Flora Hewlett Foundation, 2009.

As the region's once-vast open spaces continue shrinking and/or degrading in quality, the economic role of public land has become a focal issue. Many economists suggest that the West's expansive wilderness areas and public land are the region's most valuable economic asset for long-term economic growth and productivity.<sup>23</sup> Both the public and elected officials must determine the level of protection that they are willing to assign to public land, in addition to evaluating funding mechanisms to support the potential purchase or permanent conservation of private land for public benefit.

## ***2B. Public Funding Sources for Land Protection***

Throughout the United States, citizens are increasingly using ballot initiatives as a direct democracy approach for raising taxes or issuing bonds to purchase private land for the purpose of public open space.<sup>24</sup> State and local ballot measures have been the backbone of recent public funding for land conservation, both nationwide and across the West.

In the November 2012 elections, voters approved 46 out of the 57 conservation funding measures on local and state ballots nationwide, which generated \$767 million in new funding for open space protection.<sup>25</sup> In the 2010 midterm elections, the 36 conservation funding measures on the ballot nationwide had an 84 percent success rate—the second highest approval rate in the past two decades, even despite the country's economic stagnation.<sup>26</sup>

The public can vote on ballot measures, either at the state or local level, to directly approve the use of a new funding source—such as a bond, income tax, real estate tax, sales tax, license plate proceeds, oil and gas revenues, or lottery proceeds—as dedicated funding for land conservation.<sup>27</sup> In addition to ballot measures, the decision to allocate public funding for conservation can also be made by the state legislature.<sup>28</sup> State legislatures can fund land conservation either through a budget line item or a general fund appropriation that must be approved every year.<sup>29</sup>

In both cases, garnering wide public and political backing is vital to obtaining sufficient stakeholder support. The Trust for Public Land and The Nature Conservancy are among the two organizations most active in using open space ballots and legislative initiatives to confront the question of if and how private land should be protected in the face of pressures on natural landscapes throughout the West.<sup>30</sup>

Despite the relatively high support rate among the voting public, initiatives for open space protection are not immune to financial challenges. During the recent recession, staff from TNC and TPL observed a reduction in the number of open space measures that went to the ballot.<sup>31</sup> Although a high percentage of the measures passed by a wide margin in the 2010 election, TPL and

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<sup>23</sup> Power, T.M. and Barrett, R.N, 2001; Hansen et al., 2002.

<sup>24</sup> Banzhaf et al., 2010.

<sup>25</sup> Trust for Public Land, 2012.

<sup>26</sup> Trust for Public Land, 2011.

<sup>27</sup> *Ibid.*

<sup>28</sup> LandScope America, 2012

<sup>29</sup> *Ibid.*

<sup>30</sup> Banzhaf, H., et al., 2010.

<sup>31</sup> Interview with Dee Frankfourth, The Trust for Public Land, September 25, 2012.

TNC staff suggests that elected officials' political appetite for supporting open space initiatives can diminish during an economic slowdown in light of associated budget cutbacks.<sup>32</sup>

Preserving conservation funding that lacks statutory protection can also present a challenge for the conservation community. As a line item in a state's budget, this funding can be especially vulnerable to budget reductions or elimination during tight economic times, and thus, organizations like TNC and TPL must continually work to preserve funding even after its initial approval.

### 3. LITERATURE REVIEW

The nascent scholarly research on open space ballot initiatives in the American West attempts to identify and measure a range of social and economic factors influencing the likelihood that voters will propose and subsequently support land conservation initiatives.<sup>33</sup> At present, there is noticeably scant literature delineating the conservation value of land that receive protection through the ballot initiative process.

This literature review provides perspective on how individual and community characteristics may influence environmentally-oriented decisions like open space protection. To embrace a wider breadth of findings from academic research, the review first considers personal motivations for harboring broad environmental concern. The second section examines scholarly research specifically related to open space ballot initiatives.

#### ***3A. Literature about Environmental Concern***

For several decades, scholars have sought to understand how public attitudes influence general support for environmental protection, yet substantial disagreement remains in the literature about how individual and community characteristics relate to environmental concern.<sup>34</sup> Researchers have attempted to link personal motivations for environmental concern with background characteristics such as urban-rural differences, income, and education. However, much of the research presents conflicting findings and thus provides no clear representation of how social bases influence environmental concern.

While several scholars have suggested that urban-rural differences may account for differing levels of environmental concern, scholarly research has not reached a consensus. Tremblay and Dunlap (1978) propose a "differential-exposure theory" to suggest that individuals are exposed to different levels of degradation—such as water pollution, air pollution, and traffic congestion—based on whether they reside in rural or urban areas.<sup>35</sup> They report that the degree of exposure to place-based environmental degradation has a positive correlation with individuals' level of environmental awareness and concern.

Multiple studies have indicated a positive relationship between urban residence and support for environmental protection.<sup>36</sup> These studies suggest that urban residents may experience higher

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<sup>32</sup> Eleanor Morris, The Nature Conservancy. 3 October 2012.

<sup>33</sup> Banzhaf et al., 2010; Kline, 2006; Pompe and Lipford, 2005; Salka, 2000.

<sup>34</sup> Tremblay and Dunlap, 1978; Buttell, 1975; Buttell, 1978; Lowe and Pinhey, 1982; and Shanahan, 2010.

<sup>35</sup> Tremblay and Dunlap, 1978.

<sup>36</sup> Lowe and Pinhey 1982, Buttell and Flinn 1978, Tremblay and Dunlap 1978.

exposure to environmental degradation, leading them to demonstrate a higher level of environmental concern as compared to their rural counterparts. Other studies offer alternative theories to suggest that rural areas where development has not encroached may demonstrate lower support for open space protection because residents perceive a lower marginal value for local open space.<sup>37</sup> If these areas maintain access to vast open spaces, the value of an additional acre is considered less significant than in areas where open space has grown scarce.

However, more recent studies report no significant difference between the levels of environmental concern of urban versus rural counties.<sup>38</sup> For instance, Salka (2003) found that variables for urban-rural differences lose significance in a multivariate regression model.<sup>39</sup> This finding suggests that other characteristics varying across counties, rather than whether a county is urban or rural, provide more explanatory power for county voting behavior on environmental issues.

Alternative explanations propose that income and education are linked to environmental concern.<sup>40</sup> Studies have found that as real income rises, individuals are increasingly willing and able to support public spending on environmental protection.<sup>41</sup> However, in relation to land conservation ballot measures, Kline (2010) suggests that income has a threshold because wealthy voters may substitute access to private land for public open space.<sup>42</sup>

Kline (2010) found that income had a positive but diminishing effect on public demand for preserving open space in U.S. counties. Examining per capita annual incomes in metropolitan counties in the range between \$9,900 to \$45,000, Kline concluded that the likelihood for supporting open space referenda was upward sloping until per capita income reached \$32,400. At higher incomes, the demand for open space protection followed a downward sloping trend. This finding suggests that open space may become an inferior good for individuals with higher incomes.

A limited number of studies have demonstrated that education level has a positive relationship with support for environmental protection.<sup>43</sup> These studies suggest that voters with higher levels of education may perceive implicit value in prioritizing long-term environmental amenities over short-term economic gains. Salka (2003) examined socioeconomic determinants of voting behavior on land conservation ballot initiatives at the county-level throughout five U.S. states and found a significant association between education and voting for 28 out of 36 ballot measures.<sup>44</sup>

### ***3B. Literature about Open Space Ballot Initiatives***

Literature on the relationship between political ideology and support for open space ballot measures is limited. Banzhaf et al. (2010) investigate the success of land conservation ballot initiatives at the local level during the period 1998 to 2006 and find that party affiliation—measured by voting patterns in the 2000 presidential election—has no association with level of support for open space measures.<sup>45</sup>

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<sup>37</sup> Kline, 2010.

<sup>38</sup> Alm and Witt, 1997; Salka, 2003.

<sup>39</sup> Salka, 2003.

<sup>40</sup> Buttell, 1975; Elliot et al. 1995.

<sup>41</sup> Elliot et al., 1995.

<sup>42</sup> Kline, 2006.

<sup>43</sup> Salka, 2003; Kline, 2006.

<sup>44</sup> Salka, 2003.

<sup>45</sup> Banzhaf et al., 2010.

In addition to political philosophy, scholarly research suggests that the Old West-New West paradigm could influence environmental preferences in the American West.<sup>46</sup> Studies have indicated that place-based identity is evolving in the West due to a shift from extractive-resource-based economies (i.e., mining, logging, grazing, and farming) to service- and technology-based economies (i.e., tourism, retirement, and telecommunications).<sup>47</sup> Old West communities are generally characterized as having natural resource-based economies and rural, working populations. New West communities are perceived as having service- or technology-oriented economies, a professional population, a greater proportion of amenity-driven population growth, and more urban-like residents.<sup>48</sup>

Shanahan (2010) regressed socioeconomic factors onto the percent of counties voting in support of open space initiatives in the West during the period 1991 to 2009.<sup>49</sup> Shanahan reported that New West communities, measured by population growth changes, are statistically more likely than Old West communities to support open space ballot initiatives. However, the study cautioned that the strict dichotomy of the Old West-New West did not accurately capture differing levels of support for ballot initiatives. Regression results from the study indicated that affluent communities and commuter communities, which are traits that traditionally characterize the New West, were less likely to support open space initiatives.

Most scholarly research has not distinguished whether specific finance mechanisms are more successful in generating support for open space protection. Only one study, performed by Banzhaf et al. (2010), examined the success rate of ballot initiatives at the local level in relation to funding tool.<sup>50</sup> The authors used data from the Trust for Public Land's LandVote database, U.S. Census Bureau, and U.S. Department of Agriculture to compare factors contributing to the success rate of 1,550 local ballot measures throughout the U.S. during the period 1998 to 2006. The authors used an empirical strategy of a log-odds ratio and found that ballot measures using bonds as a financing tool achieved the most successful passage rate. The study reported that financing a ballot measure with bonds as opposed to property taxes increased the percentage of voters in support of an initiative by an average of 6 percentage points in counties and 10 percentage points in municipalities.

While the current body of literature seeks to address which socioeconomic factors might influence the success of local referenda, the research does not differentiate how ballot initiatives relate to the conservation value of land. This study differs from previous research for two primary reasons: a) it delineates the extent to which open space initiatives have supported the protection of land for ecological integrity (as defined by the Hewlett Foundation), and b) it examines which combination of funding mechanisms and government level has been most effective in protecting land of high ecological value.

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<sup>46</sup> Shanahan, 2010.

<sup>47</sup> Shumway and Otterstrom 2001; Power and Barrett, 2001.

<sup>48</sup> Alm and Witt, 1995.

<sup>49</sup> Shanahan, 2010.

<sup>50</sup> Banzhaf et al., 2010.

## 4. DATA AND METHODOLOGY

The first research question analyzes ballot measures used to raise dedicated funding for land protection and acquisition that have been considered in the West over the past 25 years. The second research question distinguishes whether parcels that have been protected using public conservation funding align with the Hewlett Foundation's three priority areas. Parcels located within any of the Foundation's three priority areas, and at least 5 miles outside of an urban area, are classified as improving ecological integrity. The third research question expands upon the previous question by investigating characteristics of parcels that fall in overlapping categories, which represents an optimal area for protection from the Foundation's perspective.

### 4A. Data

**LandVote Database:** LandVote is a database which is maintained by TPL and contains a comprehensive history of conservation finance measures that have been placed on ballots across the United States since 1988. The database features information on jurisdiction, funding mechanism, approval rate, and funds at stake for each ballot measure.<sup>51</sup>

**Conservation Almanac:** Whereas the LandVote database indicates how much public funding has been authorized for land conservation, the Conservation Almanac indicates where and how this funding has been spent on the ground to protect individual land parcels. There is often a delay of a few years between funding authorization and the protection of private lands. The Conservation Almanac, also maintained by TPL, links spatial and attribute data for private lands that have been protected using public funding. Geographic Information Systems (GIS) data was available for all 12 Western states, with the exception of California, for which comparable data was obtained from TPL staff in tabular format for the period 1998-2008. Attribute information featured in the Conservation Almanac database includes: parcel close date, acres protected, funding mechanism, purchase amount, purchase type (e.g., easement or fee simple acquisition), and government level.

**Priority Areas of the Hewlett Foundation:** Collectively, these three GIS layers make up lands in the West that the Hewlett Foundation has identified as high priority for conservation action. Each priority level has distinct conservation purposes, and the Foundation does not assign greater ecological weight to one level over another.

- a) **Focal areas:** The focal areas are a set of 10 ten well-defined regions throughout the western United States and Canada that provide a portfolio of options for the Foundation to concentrate place-based investments.<sup>52</sup> These areas were created as part of a strategy planning process that the Foundation undertook in 2011 in collaboration with the consulting agency Redstone Strategy Group. The intent of the strategy process was to identify a set of investments that would maximize environmental and cost-efficiency objectives for the Foundation. The focal areas take into account current landownership and potential threats.
- b) **Core areas and corridors:** The core areas and corridors were also identified as part of the Foundation's Western Strategy planning process in 2011. Core areas refer to intact lands with

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<sup>51</sup> In counting ballot measures that authorize a new tax, LandVote uses a conservative estimate of revenue generated for the full duration of the tax (or 20 years, for those without a defined duration). For bond measures, LandVote calculates the face value of the bond, instead of the bond's adjusted net present value. The average bond duration is 20-30 years.

<sup>52</sup> The William and Flora Hewlett Foundation and Redstone Strategy Group, 2011.

high conservation value—largely located in wilderness areas, national parks, and roadless areas—that are often home to species, such as grizzly bears, made vulnerable by even minimal levels of human impact. Though most core areas are already well-protected, they can be susceptible to fragmentation and degradation. The Foundation therefore selected a set of core areas to monitor for new threats. Additionally, the Foundation identified major and local corridors to link habitats of core areas and to ensure protection for species migrations.

- c) **Ecoregions:** The ecoregion layer is a ranking of 53 ecoregions in the West that were identified by a panel of 11 experts on Western conservation.<sup>53</sup> The panel of experts ranked the ecoregions through a consensus-based exercise requested by the Foundation in 2010. Ecoregions are grouped into four score categories according to their ecological importance: Low-Medium (<700), High (700-800), Higher (801-900), and Highest (>900). Based on this review process, the panelists recommended 25 ecoregions, which scored in the category ‘high’ or above, as conservation priorities for improving the ecological integrity of the West.

**Urbanized Areas:** A GIS shapefile of Urban Areas, based on the 2010 U.S. Census, was used to create a 5-mile buffer around urban entities throughout the West. The U.S. Census defines urbanized areas as jurisdictions containing 50,000 or more people.

**American Community Survey:** The American Community Survey (ACS) is conducted annually by the U.S. Census Bureau to provide timely information intended to assist in planning government investments and services. The addresses of nearly 3 million U.S. citizens are randomly selected to participate in the survey each year. This study used the ACS 2006-2010 5-year Estimates, the most recent version publicly available, to link socioeconomic factors at the county level to protected parcels listed in the Conservation Almanac

**State Expenditure Report:** Total state expenditures, provided by the National Association of State Budget Officers, were used for fiscal years 2009-2011 for each of the 12 Western states.

**Table 1. Summary of data used as inputs for analysis**

<i>Data</i>	<i>Source</i>	<i>Purpose</i>
LandVote	Trust for Public Land (2012)	Funding raised for land acquisition and protection.
Conservation Almanac	Trust for Public Land (2012)	Funding spent for land acquisition and protection.
Focal areas*	Hewlett Foundation (2012)	Listing of 10 discrete areas prioritized as place-based investments, based on biological and political threats.
Ecoregions*	Hewlett Foundation (2012)	Ranking of 53 ecoregions based on ecological values.
Core areas and corridors*	Hewlett Foundation (2012)	Set of intact wild lands and corridors for migration.
Urbanized Areas	U.S. Census Bureau (2012)	Threshold used to create 5-mile urban buffer.
TIGER/Line <sup>©</sup> Counties	U.S. Census Bureau (2012)	Boundaries used to link spatial/socioeconomic data.
American Community Survey	U.S. Census Bureau (2010)	Collection of socioeconomic data at the county-level.
State Expenditure Report	National Association of State Budget Officers (2012)	Total state expenditures during FY 2009-2011.

\* Indicates a priority area layer, used to guide planning and grantmaking at the Hewlett Foundation.

<sup>53</sup> Hunter and Wilcove, 2010.

## **4B. Methodology**

The methodology used for each corresponding research question is presented below.

### **I. How has conservation funding generated through ballot measures changed by year and across each Western state? Which conditions may support increased public funding in the future?**

This study analyzed 462 measures placed on ballots between 1988-2012 across the 12 Western states (Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming). Data was obtained from the LandVote Database and exported to Microsoft Excel, where a pivot table was created. Individual queries were performed to track changes in ballot passage rate, funding mechanism used, government level, and amount of funding approved over time and across each of the Western states. Additionally, state budget expenditures were compared with the amount of conservation spending by state, obtained from the Conservation Almanac, during fiscal years 2009-2011.

### **II. Of total public conservation dollars expended in the U.S. West, what fraction has protected land that falls within any of the Hewlett Foundation's three priority areas and thus, is viewed as improving ecological integrity of the West? Which combinations of funding mechanism (e.g., bonds, sales taxes, and appropriations) and government level have been most effective in protecting acreage for ecological integrity?**

ArcGIS Desktop (10.0) was used to distinguish which protected parcels contributed to the Hewlett Foundation's goal of improving ecological integrity. The GIS data layers used for this analysis were: Conservation Almanac, focal areas, ecoregions, core areas and corridors, and the Hewlett Foundation's West Program boundary. References to spatial operations that were performed denote tool names in ArcGIS.

Protected parcel data from the Conservation Almanac was analyzed in two separate timeframes: 1998-2011 and 2009-2011. The earliest year for which GIS data of protected parcels is available is 1998, while 2011 is the latest available year. The Hewlett Foundation initiated its Western Conservation Program Strategy in 2009, and thus, a second breakdown was used to track changes in protection within the latter time period.

Using GIS, the first step was to project each of the data layers into the North American Albers Equal Area Conic projection. Next, the U.S. Census Urbanized Areas file was used to define a 5-mile buffer around urban areas, since the Foundation interprets land in urban areas as not improving the overall ecological integrity of the West. The 'Select by Location' tool was used to identify protected parcels in the Conservation Almanac that fell within the 5-mile buffer. These parcels were assigned an ecological integrity score of '0' and were retained in the dataset for comparison purposes. For the 1998-2011 dataset of protected lands, there were initially 6,667 parcels, of which 2,473 parcels fell within the urban buffer. In the 2009-2011 dataset, 439 of the initial 927 parcels were located within the urban buffer.

The Spatial Join tool was run sequentially with the Conservation Almanac, West Program boundary, and the Foundation's three priority layers to identify parcels that intersected any of the Foundation's priority areas. The results of each Spatial Join operation were recorded in the attribute table of the amended Conservation Almanac dataset.

Next, spatial data from the Conservation Almanac was linked to socioeconomic data at the county level from the American Community Survey (ACS) 2006-2010 5-year Estimates. In order to associate the spatial data and ACS data, the Conservation Almanac was matched to the 2012 U.S. Census TIGER/Line<sup>®</sup> Counties Boundaries using the Spatial Join tool. This function supplied a Geographic Identifier (GEOID) to each parcel in the Conservation Almanac. Then, the Join function in ArcGIS was used to link the ACS data with the Conservation Almanac (previously intersected with the Foundation's priority layers). The entire attribute table of the Conservation Almanac was exported to Microsoft Excel. Tabular data for land protected in California was appended to the table in Excel, as GIS data was not available for the state.

Within Excel, each parcel was assigned an ecological integrity score according to the following scheme:

- a) If a parcel falls within the Foundation's West Program boundary, assign 1; if not, assign 0.
- b) If a parcel falls within a core area or corridor, assign 1; if not, assign 0.
- c) If a parcel falls within one of the focal areas, assign 1; if not, assign 0.
- d) Assign 0.25 for parcels in the 'low/medium' ecoregion category; 0.5 for 'high' category; 0.75 for 'higher' category; and 1 for the 'highest' category.

A cumulative ecological integrity score was assigned to each parcel. Any parcel located within an urban buffer received an automatic score of 0, while all remaining parcels were assigned a score between 0 to 4 based on the classification scheme. Thus, a score of 0 signified a parcel that did not improve ecological integrity, while scores of 1-4 represented parcels that enhanced ecological integrity, with increasing levels of robustness. Given that the California data lacked a spatial dimension, an ecological integrity score could not be assigned to protected parcels in that state.

Lastly, individual queries were performed using pivot tables in Excel to analyze the number of acres that improved ecological integrity during the respective time periods, the amount of funding spent and the number of acres protected through each combination of funding mechanism and government level, and the breakdown of lands protected through fee simple versus easements.

### **III. Considering that the Hewlett Foundation views protected lands that fall in multiple priority areas as more robust in improving ecological integrity, do differences exist concerning funding mechanisms and county socioeconomic characteristics for parcels located in overlapping priority areas?**

Using the final Conservation Almanac dataset developed for the previous research question, new queries were performed in Microsoft Excel to examine whether protected parcels exhibited differences on account of their ecological integrity score. Parcels located in overlapping priority areas (i.e. integrity score of 2 or above) were compared using summary statistics to parcels with a score of 0 or 1 along the following dimensions: number of acres protected, purchase amount, purchase type (i.e. easement or acquisition), government level, county educational attainment, county per capita income, division of county workforce by industry, and commuting time. The data was examined separately for the time periods 1998-2011 and 2009-2011.

As a supplement to the aforementioned quantitative data analysis, a series of interviews were conducted with Foundation staff, grantees, and a consultant to gather information on intangible factors, such as timing and politics, which are important influences on conservation finance

campaigns. Interviews were conducted between September 2012 and February 2013 with the following experts: Hazel Wong, Director, Conservation Campaigns (TNC); Eleanor Morris, Senior Policy Representative (TNC); Dee Frankfourth, Associate National Director of Conservation Services Program (TPL); Andrew du Moulin, Conservation Finance Research Director (TPL); Michael Scott, Program Officer (Hewlett Foundation); and Valerie Hovland, Project Analytics and Knowledge Manager (Redstone Strategy Group).

## 5. ANALYSIS

### 5A. Research Question 1: Conservation Funding Raised

#### *5A1. Funding Raised by Year*

During 1988-2012, voters in the 12 Western states approved 308 out of 462 (67 percent) ballot measures to provide funding for open space protection. These measures provided over \$74.2 billion in overall public funding, including \$24.9 billion in new funding for land conservation. This figure includes all funding for open space protection and thus may include measures that did not necessarily enhance ecological integrity, as defined by the Hewlett Foundation (Appendix 2).

The amount of public conservation funding generated in the West during the past decade (2002-2012) was roughly double that generated during the previous decade (Appendix 3). The Great Recession appears to have impacted conservation funding initiatives in the West and across the nation in different dimensions. Within the West, the public voted to approve over \$4 billion in dedicated conservation funding in 2006, which was greater than that approved during the following six years combined (2007-2012). However, conservation funding across the country peaked in the middle of the recession, in 2008, when voters approved roughly \$8 billion in conservation funds.

These two diverging narratives may suggest that financial pressures could potentially impact conservation finance initiatives within a region and cumulatively across the country in disparate ways. It is also important to note that while the amount of funding approved in the West tapered during the recession, public support for ballot measures remained strong. Thus, it is plausible that jurisdictions were more selective in proposing ballot initiatives amidst the financial uncertainty – resulting in a high ballot passage rate but generation of less funding.

While the ballot passage rate has fluctuated over the entire time period of 1988-2012, it has remained fairly consistent, in the 65 to 85 percent approval range, during the past decade (Appendix 4). A robust passage rate of 81 percent in the recent November 2012 election may provide evidence that a) public support for land conservation remains healthy, despite the country's economic stagnation, and b) ballot measures are being proposed in strategic areas where they are poised to receive strong public support.

Considering year-to-year variation in funding more broadly, the number of initiatives considered and the amount of funding approved is generally higher during presidential and even-year elections. According to TNC staff, elections during off-years tend to attract more polarized voters opposed to new taxes.<sup>54</sup> Thus, the conservation community often pursues a greater number

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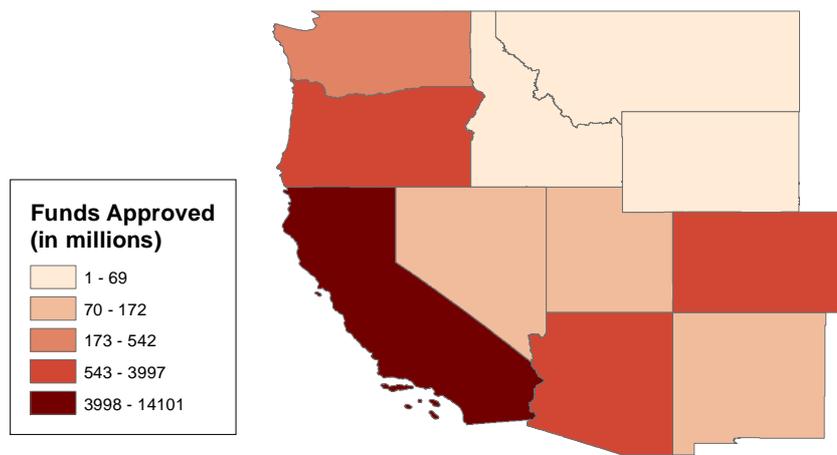
<sup>54</sup> Interview with Eleanor Morris, The Nature Conservancy, February 8, 2013.

of ballot initiatives during even-year elections due to the overall higher voter turnout and more balanced political representation at the polls.

### 5A2. Funding Raised by State

The amount of approved conservation funding varies widely by state across the West. California, for instance, approved more conservation funding than all other Western states combined during 1988-2012. Colorado, Oregon, and Arizona were the states which most closely trailed California, while the amount of funding approved in Idaho, Wyoming, and Alaska ranked lowest (Figure 1 and Appendix 5).

**Figure 1. Conservation Funding Approved in West (1998-2012)**



**Figure 1:** Amount of conservation funding approved in the 11 westernmost states during 1988-2012. Funding raised in Alaska during this time period was \$0.95 million. Source: LandVote Database (2012).

States with dedicated statewide funding programs, such as Great Outdoors Colorado, generated significant conservation funding during the examined period. In 2010, the state of Oregon approved Ballot Measure 76, which secured lottery funds in perpetuity for the Oregon State Parks Department.<sup>55</sup> The funding measure, which was set to expire in 2014, dedicates 15 percent of annual lottery funds to protect open spaces and wildlife habitat throughout the state. From the perspective of the voting public, an important feature of such lottery programs is that they result in no new annual taxes for residents and do not crowd out provision of other public services.<sup>56</sup>

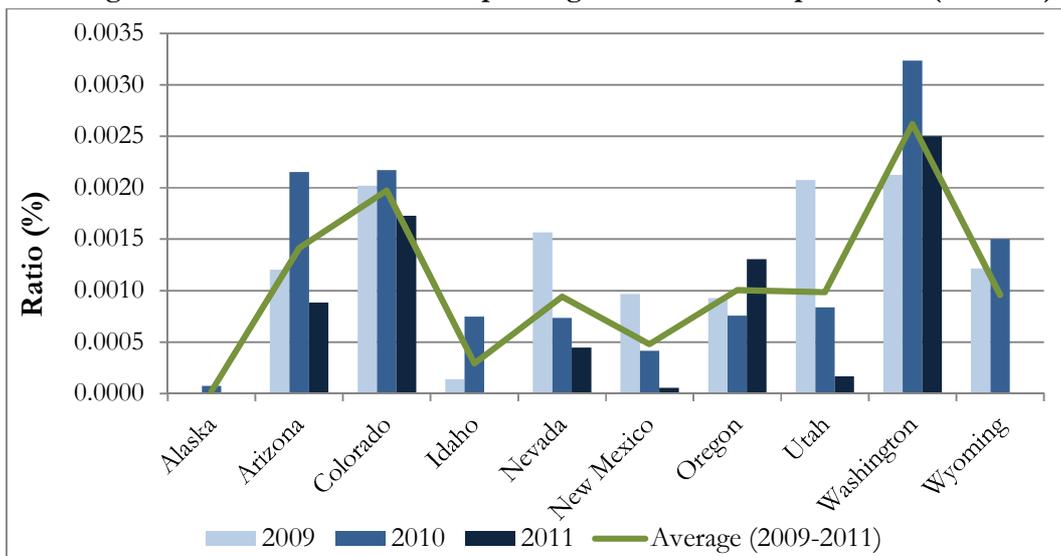
In considering future conservation finance activities, it is a challenge to empirically estimate whether continuing campaigns in highly-funded states or proposing measures in states that have passed fewer initiatives offers greater potential. Examining the ratio of conservation spending for private land protection to a state's annual budget expenditures provides perspective on the priority historically assigned to land conservation as a share of total budget outflows. As demonstrated in Figure 2 on the following page and in Appendix 6, the four states with the highest ratios during fiscal years 2009-2011 were Montana (0.67%), Washington (0.26%), Colorado (0.20%), and Oregon (0.10%). However, past ratios may not necessarily be indicative of future budget allocations and thus, this measure may not provide the most reliable proxy for planning future campaigns.

<sup>55</sup> Oregon Secretary of State, 2010.

<sup>56</sup> Interview with Andrew du Moulin and Dee Frankfourth, The Trust for Public Land, February 8, 2013.

According to TPL staff, its organization does not assign a priority ranking to either pursuing initiatives in well-funded states or in untapped states because it views both approaches as essential to obtaining widespread funding geographically.<sup>57</sup> Its staff highlights the importance of leveraging funding infrastructure across government levels, such that funds approved at the local level can be matched at the state level, where applicable. Staff from TNC proposes that the ecological value of land, coupled with judgment on future political opportunities, guide decisions on which campaigns to pursue.<sup>58</sup>

**Figure 2. Ratio of Conservation Spending to Total State Expenditures (FY 09-11)**



**Figure 2:** Ratio of private land conservation spending to total expenditures by state during fiscal years 2009-2011. A lack of three bars per state indicates a minimal or zero ratio level. Spending in Montana removed for visualization purposes (see Appendix 6 for state figures). Data on conservation spending in California not available. The total state budget is capital inclusive and comprised of the general fund, federal funds, other state funds, and bonds. Sources: Conservation Almanac (2009-2011) and National Association of State Budget Officers (2012).

### **5A3. Funding Raised by Funding Mechanism and Jurisdiction**

Of all funding mechanisms used to pass ballot measures in the West, bonds have been the most frequently used mechanism and have also raised the greatest proportion of conservation funding. Among all successful ballot measures in the West during the period 1988-2012, bonds were used for 45 percent of measures and accounted for 51 percent of the amount of conservation funding approved (Appendix 7). Across jurisdiction type, bonds at the state level have generated approximately 40 percent of all new conservation funding in the West during this period. Sales taxes at the county level placed second among the identified funding mechanisms.

The success of bond measures for land conservation initiatives mirrors the mechanism's broader success on ballot measures for other public services, such as education.<sup>59</sup> Drawing on

<sup>57</sup> *Ibid.*

<sup>58</sup> Interview with Eleanor Morris, The Nature Conservancy, February 8, 2013.

<sup>59</sup> Levinson and Stern, 2010.

behavioral economics principles, one reason for the popularity of bonds may relate to voters’ notion of “reap the benefits now, pay for the costs later.” One immediate advantage of bonds, for land conservation projects, is that parcels can be immediately acquired if necessary, since bonds provide funds upfront whereas sales and property taxes require a waiting period as the revenue accrues. However, the availability of mechanism types varies by jurisdiction, and thus, organizations like TPL and TNC verify which suite of funding options are available before pursuing a ballot initiative.

**5B. Research Question 2: Lands Protected for Ecological Integrity**

Protected parcels in the Conservation Almanac dataset were intersected using GIS to identify areas of alignment with any of the Hewlett Foundation’s three priority areas. The data was examined during the full timeframe of 1998-2011 as well as during 2009-2011, which included the scope of the Hewlett Foundation’s investments in conservation finance. Data for California was only available for parts 1, 3, and 4 below during the time period 1998-2008.

**5B1. Acres Protected for Ecological Integrity**

Between 1998-2011, there were roughly 6 million acres of private land protected in the West using public funding. Of this amount, 2.5 million acres improved ecological integrity, meaning a parcel fell within any of the Hewlett Foundation’s three priority areas and at least 5 miles outside of an urban area. Between 2009-2011, approximately 427,000 acres of private land were protected in the West, of which 311,022 acres improved ecological integrity. As indicated in Appendix 8, the acres of land protected for ecological integrity consistently outnumbered those protected for non-ecological purposes on an annual basis across the West. The ecological integrity of land protected in California could not be assessed due to the lack of associated spatial data for the state.

**Table 1. Acres Protected by Ecological Purpose in the West**

<b>Purpose</b>	<b># Acres in 1998-2011</b>	<b># Acres in 2009-2011</b>
Ecological Integrity	2,521,311	311,022
Non-Ecological Integrity	1,016,894	116,405
Other (land in California)	2,475,747	n/a
<b>Total</b>	<b>6,013,952</b>	<b>427,427</b>

**5B2. Acres Protected by Ecoregion**

Intersecting the Conservation Almanac data with the ecoregion priority layer indicates that the vast majority of acres protected in the West during 1998-2011 were within the low-medium ecoregion category (Appendices 9 and 10). Over 70 percent of private lands protected during this time period fell in a low-medium ecoregion score category.

**5B3. Acres Protected by Purchase Type**

Fee simple acquisitions were used to purchase 56 percent of total acres protected in the West during 1998-2011, while easements accounted for 34 percent of acres protected (Appendix 11). Considering only land protected for ecological integrity, the percentage increased slightly for

easements (41 percent), while acquisitions accounted for the protection of 47 percent of ecologically important acres during this time period.

During 2009-2011, fee simple was used as the purchase type for 47 percent of total acres protected, while easements made up 42 percent of protected acres (Appendix 11). Among ecologically important lands alone, acquisitions accounted for the protection of 61 percent of acres, while easements made up 31 percent. A table of average cost per acre by purchase type for each state is provided in Appendix 12 to support the Hewlett Foundation in forecasting the cost-effectiveness of potential future investments.

The fact that easements accounted for only one-third of total acres protected in the West since 1998 may be surprising, given that easements are traditionally perceived as more cost-effective than purchasing land outright. However, there are several factors that government entities and land trusts may consider in determining the appropriate purchase type.

First, there are occasionally rare opportunities—as in the case of the Montana Legacy Project in 2008—to acquire lands at an unprecedented scale or price, and acquisitions may provide the most expedient means for closing a deal. Secondly, an acquisition may represent the only viable method for obtaining lands of high ecological value.

A 2012 study by TNC found that conservation easements had 64 percent alignment with the organization's priority areas, whereas fee simple acquisitions had 84 percent alignment.<sup>60</sup> Thus, one advantage of acquisitions is that they may lead to a more careful assessment of a parcel's ecological value to ensure that it represents a competitive investment. On the other hand, benefits of easements include their cost effectiveness—on average, easements cost 2-3 times less per acre than fee simple—and their ability to cultivate community support by permitting public recreation access or certain approved uses as working land.<sup>61</sup>

#### ***5B4. Acres Protected by Jurisdiction and Funding Mechanism***

Between 1998-2011, the top six combinations of funding mechanisms and jurisdictions that contributed the most acreage toward ecological integrity in the West were, in descending order: federal appropriations, federal bonds, appropriations (multiple levels), state lottery, lottery (multiple levels), and local bonds (Figure 3).

During the scope of the Foundation's investments in this field in 2009-2011, the top six funding mechanisms and jurisdiction combinations, in descending order, were: federal appropriations, appropriations (multiple levels), state donation, lottery (multiple levels), state lottery, and state bonds (Figure 4).

These findings substantiate the generally observed trend that governments at higher levels usually protect both a higher number of acres and more ecologically important land. However, this pattern is not universally true: local government, for instance, was more effective than the state level in using bonds during 1998-2011. Overall, the results demonstrate that certain combinations of

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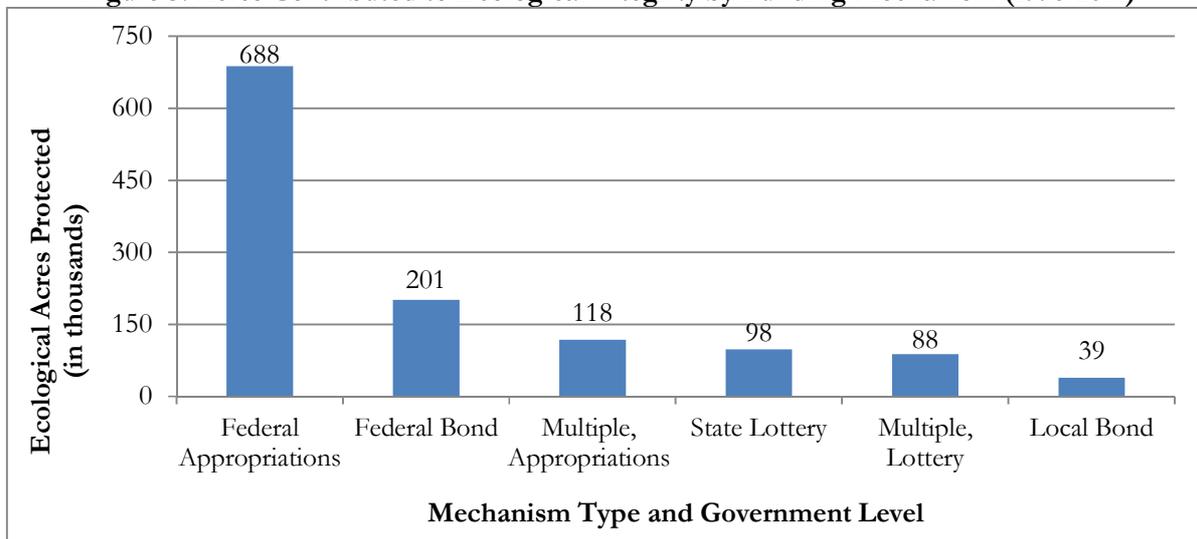
<sup>60</sup> Fisher, 2012.

<sup>61</sup> *Ibid.*

mechanisms and jurisdictions—such as federal appropriations and multiple-level appropriations—have been consistently successful in protecting land for ecological integrity.

These results also highlight the importance of leveraging contributions from multiple government levels. For instance, the Land and Water Conservation Fund (LWCF) at the federal level can be used to provide federal, state, and local matching grants. In Colorado, LWCF has been used to match 1,000 grants worth more than \$58 million to fund investments in both local and state open space protection projects.<sup>62</sup> While targeting federal sources, such as LWCF, could represent an attractive strategy for pursuing future conservation activities, working at the federal level is not without its challenges. For instance, the process of receiving funding through LWCF is highly politicized and competitive, as essentially the only projects approved are those which all members of the Appropriations Committee in Congress agree to support. Partly as a consequence, LWCF has only twice met its funding cap of \$900 million in over 40 years.

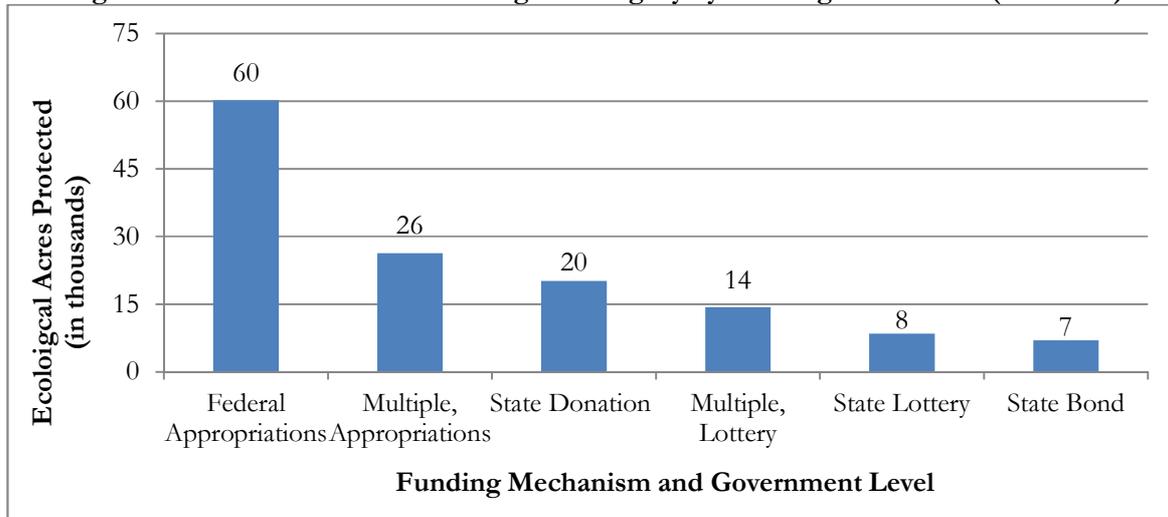
**Figure 3. Acres Contributed to Ecological Integrity by Funding Mechanism (1998-2011)**



Sources: Conservation Almanac (1998-2011), Hewlett Ecoregions, Hewlett Core Areas and Corridors, and Hewlett Focal Areas (2012).

<sup>62</sup> Colorado Department of Natural Resources, 2013.

**Figure 4. Acres Contributed to Ecological Integrity by Funding Mechanism (2009-2011)**



Sources: Conservation Almanac (1998-2011), Hewlett Ecoregions, Hewlett Core Areas and Corridors, and Hewlett Focal Areas (2012).

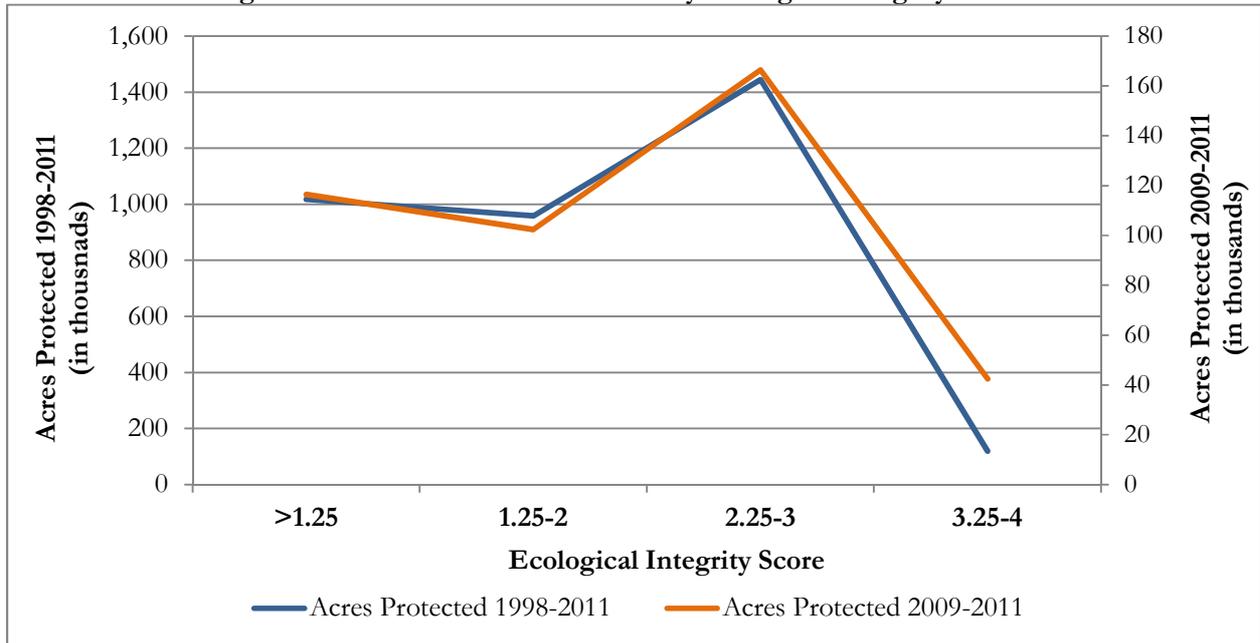
### 5C. Research Question 3: Protected Lands in Overlapping Priority Areas

In contrast to the previous research question which considered only whether a parcel fell in a single priority area, this analysis investigated the attributes of parcels located in overlapping priority areas, which signifies an optimal investment from the Hewlett Foundation’s perspective. The data was examined during the full timeframe of 1998-2011 as well as during 2009-2011. Data for California was excluded from this analysis, due to the lack of spatial data necessary for assigning an ecological integrity score to parcels.

#### 5C1. Acres Protected by Ecological Integrity Score

After assigning a weighted ecological integrity score to each parcel, it was determined that the two time periods—1998-2011 and 2009-2011—followed a nearly identical distribution for the number of acres protected by integrity score (Figure 5). Scores of 1.25 or greater are counted as improving ecological integrity. Parcels with scores less than 1.25, or between 1.25-2, each make up about 25 percent of the land protected for the respective time periods. Parcels in the 2.25-3 score category make up the largest share of land protected, at roughly 40 percent, while parcels with a score greater than 3.00 account for less than 10 percent of land protected during each time period.

**Figure 5. Number of Acres Protected by Ecological Integrity Score**



Sources: Conservation Almanac (1998-2011), Hewlett Ecoregions, Hewlett Core Areas and Corridors, and Hewlett Focal Areas (2012).

**5C2. Ecological Acres Protected by Jurisdiction and Funding Mechanism**

The various combinations of jurisdictions and funding mechanism were examined to determine the respective number of acres protected within each ecological integrity score. During 1998-2011, the funding mechanisms and jurisdictions that protected the highest share of the most ecologically important land (e.g. integrity scores above 3.00) were: state appropriations (26 percent), state donation (20 percent), and private donation (17 percent).

Evaluating the combinations of funding mechanisms and jurisdictions used across all integrity score categories during 1998-2011 reveals the following findings: lottery funds were used in a higher proportion for non-ecological land; local bonds and local sales taxes were used for less ecologically important land; and the percentage of land protected through donation increased with land’s ecological importance. Please see Appendix 13 for a complete listing of the top six combinations of funding mechanisms and jurisdictions used by each ecological integrity score category.

During 2009-2011, the combinations of funding mechanism and government level used for the most ecologically important land (e.g. integrity scores above 3.00) were: state donation (33 percent), multiple level appropriations (25 percent), and federal appropriations (10 percent). Consistent with previous findings from the full time period, lottery funds were used in a higher proportion for non-ecological land; donations are used with increasing prevalence for land of higher ecological importance; and appropriations across federal and multiple levels protected a large share of the most ecologically important land. Please see Appendix 14 for a complete listing of the top three combinations of funding mechanisms and jurisdictions used by each ecological integrity score category.

## *5C2. Ecological Integrity Score and Socioeconomic Characteristics*

Using the American Community Survey, county-level socioeconomic data were matched to parcels in the Conservation Almanac dataset to determine whether any community characteristics differentiate lands of higher ecological importance. Population density, median household income, and educational attainment show a relatively weak inverse relationship with ecological integrity, while commuting time exhibits a positive relationship with ecological integrity. These results align with the conventional notion that lands of higher ecological importance are typically located in more sparsely populated areas, where educational and professional opportunities are more limited. Please see Appendix 15 for a graphical representation of the relationship between the ecological integrity score of parcels and county-level socioeconomic characteristics.

## RECOMMENDATIONS

As the Hewlett Foundation prepares its five-year strategic plan (2014-2018) for its Western Conservation Program, the following recommendations are proposed in relation to its conservation finance activities:

1. **Prioritize the re-authorization of funding with a near-term expiration date** to maximize the generation of public funding for private land conservation in the future. Creating an entirely new source of funding can entail several years of effort, and upwards of a decade, to build adequate support and provide technical assistance to jurisdictions. However, jurisdictions that have already approved public funding measures represent low-hanging fruit. As suggested by the 2010 renewal of lottery funding in the state of Oregon and the 2011 sales tax renewal in Arapahoe, Colorado, voters who have already chosen to support conservation finance programs usually have a higher proclivity to approve funding renewal.
2. **Continue to use feasibility studies to ascertain the optimal funding mechanism type for ballot initiatives.** In the past 25 years, bonds were the most successful funding mechanism, generating 50 percent of dedicated conservation funding in the West. However, future ballot measure initiatives should take into account the shifting economic and political landscape when considering the viability of a particular funding mechanism. For instance, potential changes in the federal interest rate, which have made bonds very attractive in recent years, could influence that mechanism's competitiveness in the future. Feasibility studies will continue to play an important role in also assessing voter's perception of a jurisdiction's fiscal condition, which is distinct from its actual fiscal condition and holds significant influence on ballot passage rates.
3. **Collaborate with TNC's Conservation Lands Program to jointly identify mutual targets for ecosystem-level conservation.** In the last 13 years, roughly 2.5 million acres have been protected for ecological integrity through conservation finance programs—which, although not a trivial sum, does highlight the time-intensive demands of this work. The Foundation may consider engaging in more concerted planning with grantees such as TNC's Conservation Lands Program, which focuses exclusively on securing large land deals. While both the Hewlett Foundation and TNC do not disregard the important value of protecting

smaller land parcels such as migration corridors, mutual planning efforts may help identify conservation opportunities that would yield compelling returns in terms of acres protected for ecological integrity. In turn, this coordination would support the Foundation in attaining progress toward its long-term goal of protecting 300 million high-priority acres in the West by the year 2035. As demonstrated by the Montana Legacy Project—which protected over 310,000 acres of private lands—deep scientific expertise, political competence, and planning capacity are necessary to coordinate the diverse agencies and arrange funding packages across government levels for the protection of large systems.

4. **Continue to fund data collection and standardization efforts for private land conservation, such as the LandVote and Conservation Almanac databases.** As demonstrated by the analysis in this report, most notably through the lack of available spatial data for the state of California, it is impossible to measure results without complete and accurate data on protected lands. While the philanthropic sector at large has only recently begun to embrace the burgeoning “big data” movement, the Hewlett Foundation itself has held a long-standing commitment to internal evaluation and data-driven assessments.<sup>63</sup> Given the diversity of government levels and agencies involved in private land conservation, it is critical to maintain databases updated in a near real-time basis and in a standardized format to allow for cross-state comparisons and to encourage more informed conservation planning.
5. **To assess ecological and political threats, consider a model on a finer scale than that of the 12 Focal Areas.** Of all 6,667 parcels which were protected during the 1998-2011 time period, only 410 parcels fell within a focal area. While the focal areas priority layer currently fulfills the purpose of demarcating distinct areas in the West that warrant keen attention, a finer-grained threats model may provide a more nuanced guide for future planning efforts.
6. **To broaden stakeholder engagement and recruit more public funding, expand the messaging platform of conservation finance to target forest restoration** as a means of reducing catastrophic wildfire threat and protecting public drinking water supplies. In November 2012, residents of Flagstaff, Arizona approved a \$10 million bond to finance forest restoration work within important watersheds on the Coconino National Forest and State of Arizona lands. In Denver, Colorado, the “Forests to Faucets” Program is a \$33 million partnership between the U.S. Forest Service and Denver Water that will protect watersheds on U.S. Forest Service lands that are the primary water supply source for Denver Water’s 1.3 million customers. As challenges over water supply availability and wildfire threats intensify throughout the West, the Hewlett Foundation may consider evaluating if and how it could leverage its regional expertise to simultaneously protect forest land and watersheds. This strategy may represent untapped potential for the Foundation in that it could significantly improve the integrity of the West by engaging urban tax bases to protect ecologically important lands.

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<sup>63</sup> Twersky and Linblom, 2012.

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Dee Frankfourth, The Trust for Public Land. 25 September 2012 and 8 February 2013.

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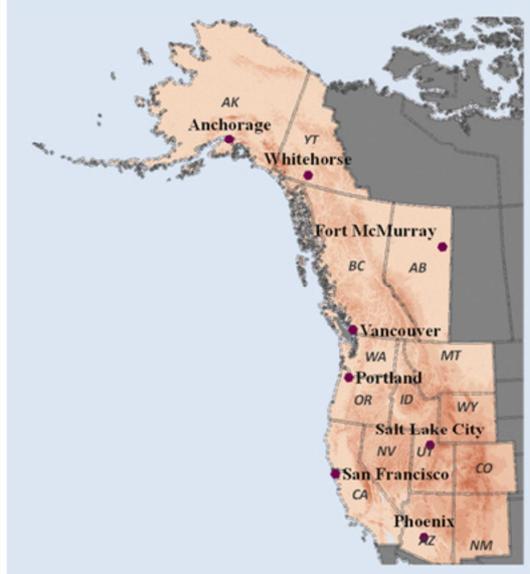
## APPENDIX 1

### Scope of the Hewlett Foundation's Western Conservation Program

Figure 1: Ecological Scope



Figure 2: Political Scope

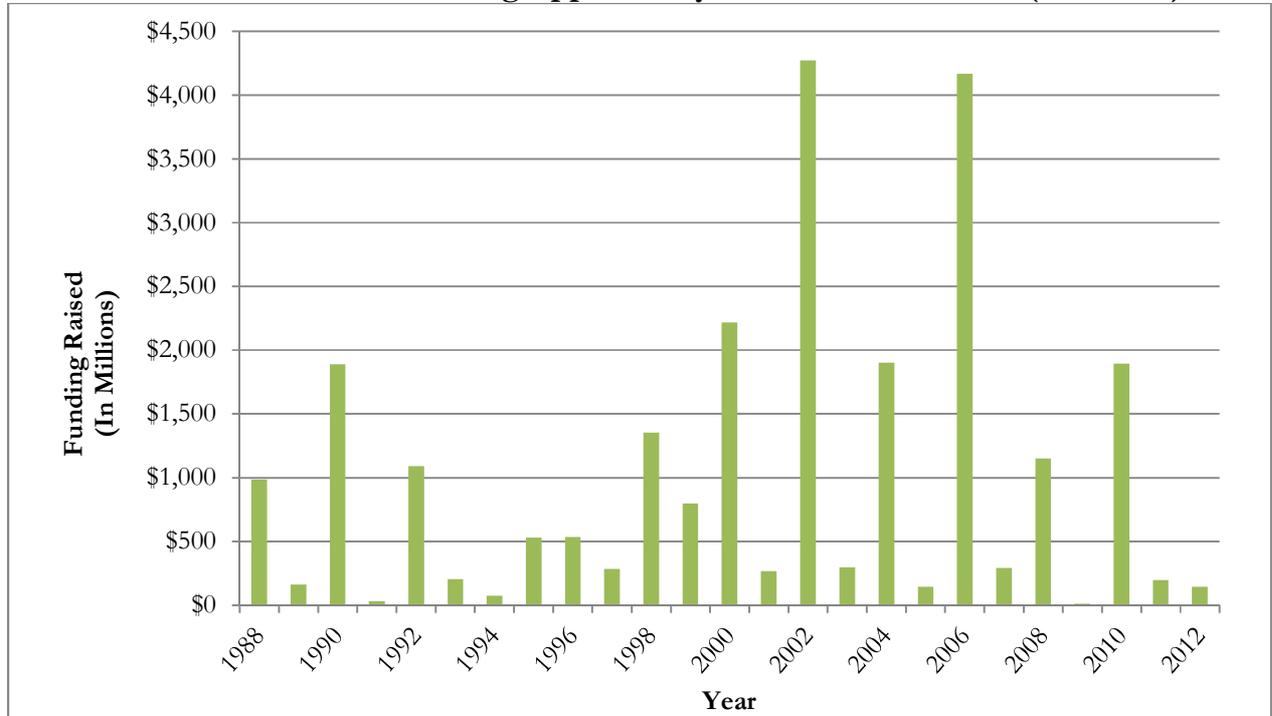


Sources: The William and Flora Hewlett Foundation and The Redstone Strategy Group (2011).

Note: The Hewlett Foundation's Western Conservation Program covers approximately 1.5 billion acres of the North American continent. This area includes the 12 westernmost states in the U.S., three Canadian provinces, and the Colorado River Delta in Mexico.

## APPENDIX 2

Conservation Funding Approved by Year across the West (1988-2012)



Source: LandVote Database (2012).

Note: Between 1988-2012, voters in the 12 Western states approved ballot measures that provided over \$74.2 billion in overall public funding, including \$24.9 billion in new funding for land conservation. This figure includes funding for all open space protection and thus may include funding for projects such as urban parks and playgrounds, which did not necessarily improve ecological integrity.

## APPENDIX 3

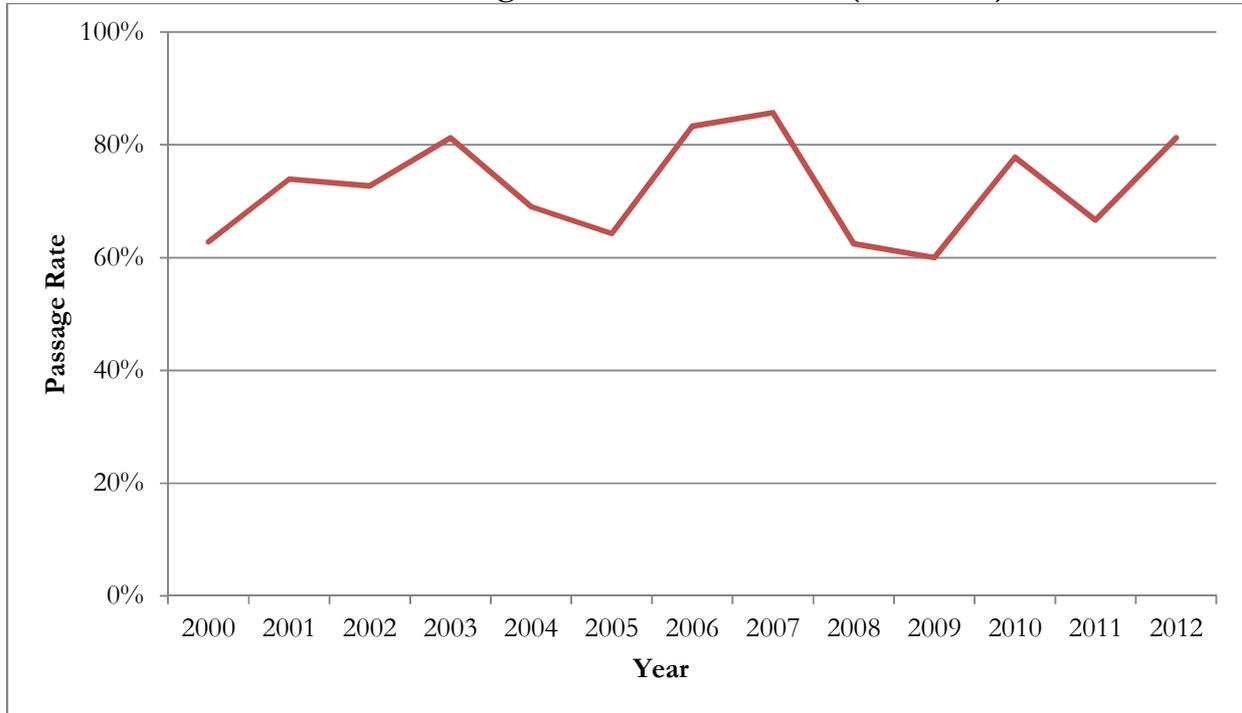
Funding Approved by Year across the West (1988-2012)						
Year	# Pass	# Fail	Total Ballots Considered	Ballot Passage Rate	Total Public Funds Approved	Conservation Funds Approved
1988	7	1	8	87.50%	\$1,145,365,000	\$986,685,000
1989	3	5	8	37.50%	\$209,589,301	\$159,964,301
1990	13	9	22	59.09%	\$1,887,577,162	\$1,887,577,162
1991	1	3	4	25.00%	\$31,307,360	\$31,307,360
1992	5	6	11	45.45%	\$1,159,100,000	\$1,091,130,000
1993	5	2	7	71.43%	\$221,389,000	\$203,363,000
1994	9	9	18	50.00%	\$74,990,830	\$74,990,830
1995	10	7	17	58.82%	\$641,114,560	\$530,071,060
1996	18	15	33	54.55%	\$2,180,584,200	\$536,997,520
1997	17	3	20	85.00%	\$337,037,289	\$285,215,302
1998	17	13	30	56.67%	\$1,386,907,380	\$1,354,325,000
1999	17	5	22	77.27%	\$819,456,880	\$797,721,180
2000	27	16	43	62.79%	\$5,143,565,000	\$2,217,262,667
2001	17	6	23	73.91%	\$332,834,546	\$268,774,960
2002	24	9	33	72.73%	\$6,861,860,719	\$4,272,910,719
2003	13	3	16	81.25%	\$399,540,000	\$297,827,208
2004	29	13	42	69.05%	\$20,346,937,640	\$1,903,287,640
2005	9	5	14	64.29%	\$274,580,000	\$142,380,000
2006	25	5	30	83.33%	\$25,656,635,000	\$4,167,140,000
2007	6	1	7	85.71%	\$345,274,000	\$292,783,000
2008	15	9	24	62.50%	\$2,110,360,090	\$1,151,058,090
2009	3	2	5	60.00%	\$34,984,000	\$10,984,000
2010	7	2	9	77.78%	\$1,906,400,000	\$1,893,000,000
2011	2	1	3	66.67%	\$196,320,000	\$196,320,000
2012	13	3	16	81.25%	\$497,160,000	\$142,596,600

Source: LandVote Database (2012).

Note: Public funding generated for private land conservation during the period 2002-2012 is nearly double the amount generated during the previous decade. Although the impacts of the Great Recession appears to have reduced the amount of conservation funds approved in the West, the passage rate for ballot measures remained relatively robust during this timeframe. Nationwide, public funding peaked in 2008, when roughly \$8 billion in conservation funding was approved.

## APPENDIX 4

**Ballot Passage Rate across the West (2000-2012)**

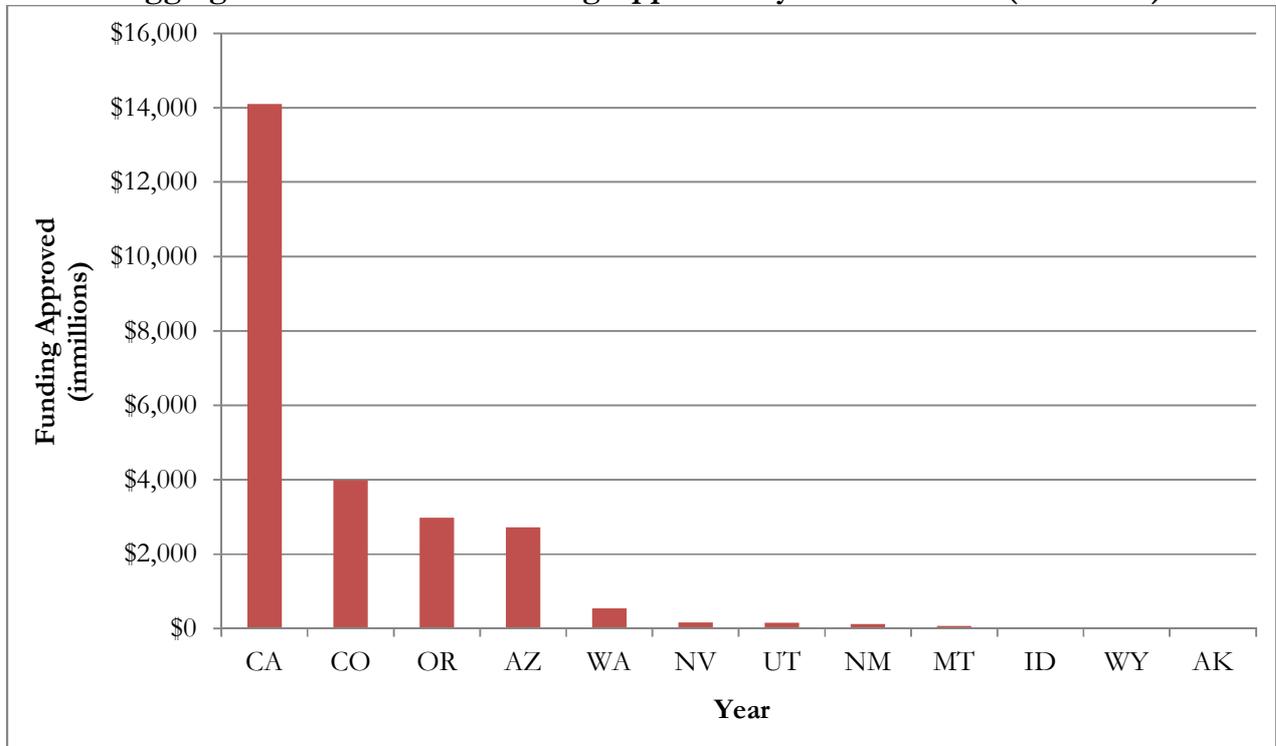


Source: LandVote Database (2012).

Note: During the past decade, the approval rate for land conservation measures considered in the West has remained in the 65-85 percent range. This consistency may indicate that ballot measures are being proposed only in areas where they are likely to succeed, which can be ascertained through feasibility and polling studies performed by organizations such as The Trust for Public Land.

## APPENDIX 5

Aggregate Conservation Funding Approved by Western State (1988-2012)



Source: LandVote Database (2012).

Note: The amount of approved conservation funding varies widely by state across the West. Between 1988-2012, California approved more conservation funding than all other Western states combined.

## APPENDIX 6

Ratio of Conservation Spending to Total State Expenditures (FY 09-11)

	2009 Conservation Spending		2010 Conservation Spending		2011 Conservation Spending		Average Ratio of Conservation Spending to Total State Budget (2009-2011)
<b>Alaska</b>	\$0		\$733,000		\$172,000		0.0025%
<b>Arizona</b>	\$32,793,281		\$59,562,281		\$24,927,362		0.1413%
<b>Colorado</b>	\$58,231,971		\$67,498,232		\$53,433,147		0.1973%
<b>Idaho</b>	\$890,577		\$4,790,408		\$0		0.0294%
<b>Montana</b>	\$21,469,163		\$86,740,618		\$10,178,120		0.6674%
<b>Nevada</b>	\$14,884,794		\$6,083,048		\$3,807,615		0.0943%
<b>New Mexico</b>	\$14,848,348		\$6,385,749		\$851,400		0.0480%
<b>Oregon</b>	\$22,766,234		\$24,652,913		\$43,637,558		0.1006%
<b>Utah</b>	\$23,981,205		\$12,562,172		\$2,118,822		0.0985%
<b>Washington</b>	\$71,673,556		\$108,637,581		\$84,054,966		0.2620%
<b>Wyoming</b>	\$8,091,870		\$11,492,800		\$0		0.0959%
<b>TOTAL</b>	\$269,630,999		\$389,138,802		\$223,180,990		

Sources: Conservation Almanac and National Association of State Budget Officers (2012).

Note: The amount of private land conservation spending is compared to each state's total budget expenditures to yield an average ratio for FY 2009-2011. The states with the highest ratios, in descending order, are: Montana, Washington, Colorado, and Oregon. Data on conservation spending in California is not available for this time period.

## APPENDIX 7

### Funding Approved in West by Jurisdiction and Funding Mechanism (1988-2012)

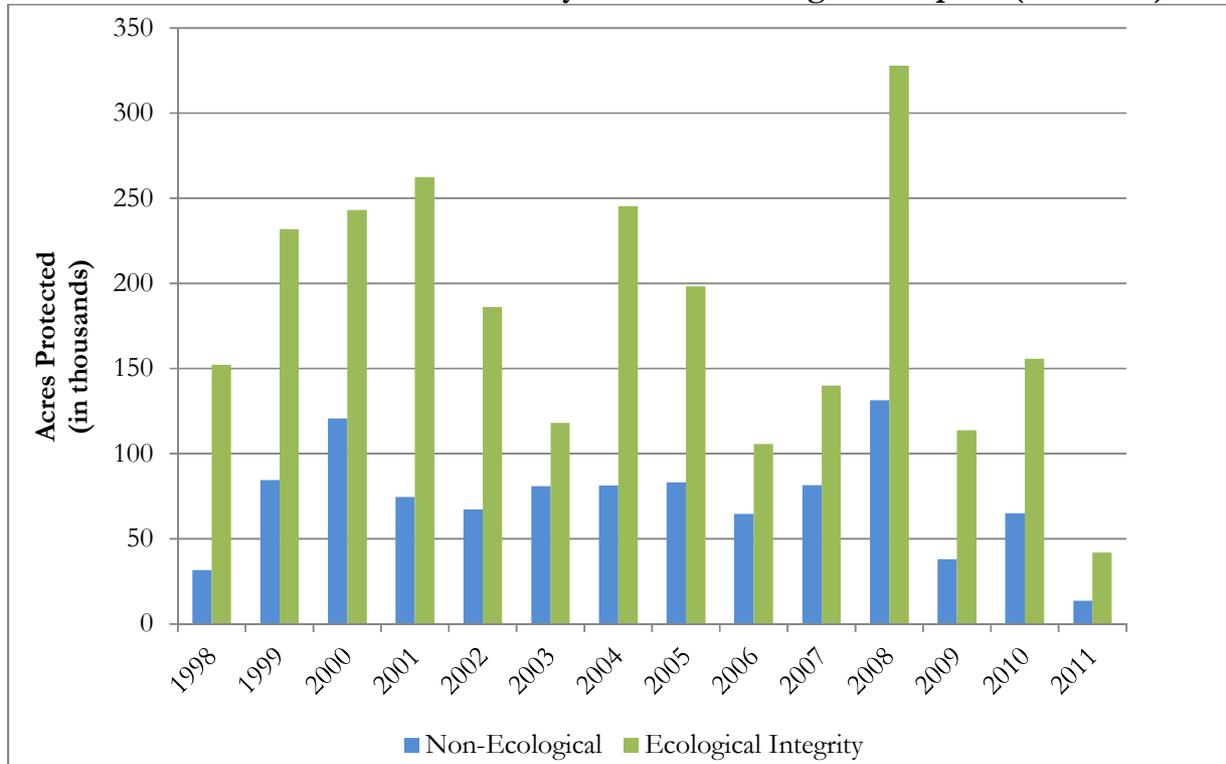
	<i>Jurisdiction</i>				
	County	Municipal	Special District	State	Total
<b>Bond</b>					
Number Approved	25	86	15	14	140
Total Funds Approved	994,061,000	2,805,910,000	1,388,600,000	24,571,625,000	29,760,196,000
Conservation Funds Approved	889,726,000	1,260,485,500	995,925,000	9,676,125,000	12,822,261,500
<b>Sales Tax</b>					
Number Approved	30	43	0	0	73
Total Funds Approved	32,775,541,422	3,214,811,987	0	0	35,990,353,409
Conservation Funds Approved	3,282,487,640	2,176,111,274	0	0	5,458,598,914
<b>Property Tax</b>					
Number Approved	23	16	6	0	45
Total Funds Approved	553,878,881	423,605,298	89,100,000	0	1,066,584,179
Conservation Funds Approved	504,532,089	221,542,107	79,100,000	0	805,174,196
<b>Other</b>					
Number Approved	7	27	7	6	47
Total Funds Approved	1,408,400,000	1,334,161,009	64,048,000	4,560,000,000	7,366,609,009
Conservation Funds Approved	737,010,000	390,447,629	53,253,000	4,560,000,000	5,740,710,629
<b>Real Estate Transfer Tax</b>					
Number Approved	2	1	0	0	3
Total Funds Approved	34,320,000	31,307,360	0	0	65,627,360
Conservation Funds Approved	34,320,000	31,307,360	0	0	65,627,360
<b>Total</b>					
Number Approved	87	173	28	20	<b>308</b>
Total Funds Approved	35,766,201,303	7,809,795,654	1,541,748,000	29,131,625,000	<b>74,249,369,957</b>
Conservation Funds Approved	5,448,075,729	4,079,893,870	1,128,278,000	14,236,125,000	<b>24,892,372,599</b>

Source: LandVote Database (2012).

Note: During the past 25 years, bonds have generated half the share of conservation funding in the West.

## APPENDIX 8

Acres Protected Across the West by Year and Ecological Purpose (1998-2011)

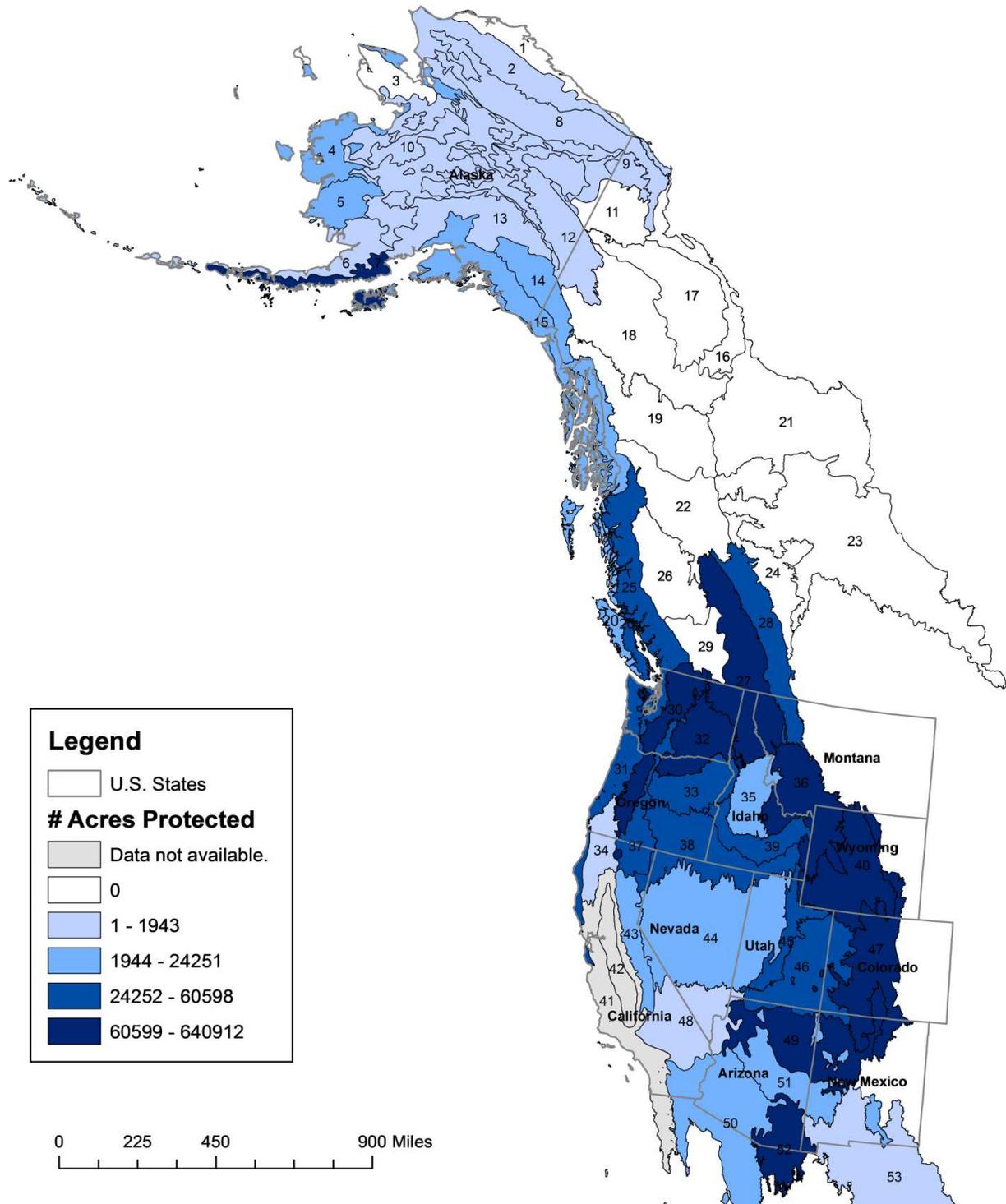


Sources: Conservation Almanac (1998-2011), Hewlett Ecoregions, Hewlett Core Areas and Corridors, and Hewlett Focal Areas (2012).

Note: The acres of land protected for ecological integrity consistently outnumbered those protected for non-ecological purposes across the West during the examined time period.

## APPENDIX 9

### Map of Acres Protected by Ecoregion, 1998-2011



Sources: Conservation Almanac (2012) and Hewlett Foundation's Ecoregions (2012). Note: Data for ecoregions located exclusively in California not available (#41 and #42 indicated in gray). Area in Canada excluded from analysis.

## APPENDIX 10

### Number of Acres Protected by Ecoregion, 1998-2011

Ecoregion Number	Level II Ecoregion Group and Individual Ecoregion Name	Low - Medium (<700)	High (700-800)	Higher (801-900)	Highest (>900)	Total # Acres Protected
	<b>Alaska Boreal Interior</b>	<b>1,370.25</b>	<b>724.17</b>			<b>2,094.43</b>
10	Interior Bottomlands-Yukon Flats	1,370.25				1,370.25
9	Interior Forested Lowlands and Uplands		724.17			724.17
	<b>Alaska Tundra</b>	<b>14,053.66</b>		<b>99.82</b>		<b>14,153.48</b>
2	Arctic Foothills			60.44		60.44
6	Bristol Bay-Nushagak Lowlands-Aleutian Islands			39.38		39.38
4	Subarctic Coastal Plains	14,053.66				14,053.66
	<b>Boreal Cordillera</b>	<b>5,348.38</b>				<b>5,348.38</b>
13	Alaska Range	252.21				252.21
14	Copper Plateau -Wrangell and St. Elias Mountains	4,785.80				4,785.80
12	Interior Highlands and Klondike Plateau	310.37				310.37
	<b>Brooks Range Tundra</b>			<b>484.10</b>		<b>484.10</b>
8	Brooks Range/Richardson Mountains			484.10		484.10
	<b>Cold Deserts</b>	<b>504,865.01</b>	<b>94,297.03</b>	<b>24,250.83</b>		<b>623,412.87</b>
49	Arizona/New Mexico Plateau	189,047.97				189,047.97
44	Central Basin and Range			24,250.83		24,250.83
46	Colorado Plateaus		56,688.78			56,688.78
32	Columbia Plateau	184,040.56				184,040.56
38	Northern Basin and Range		37,608.25			37,608.25
39	Snake River Plain	24,596.05				24,596.05
40	Wyoming Basin	107,180.43				107,180.43
	<b>Upper Gila Mountains</b>				<b>15,123.58</b>	<b>15,123.58</b>
51	Arizona/New Mexico Mountains				15,123.58	15,123.58

Ecoregion #	Level II Ecoregion Group and Individual Ecoregion Name	Low - Medium (<700)	High (700-800)	Higher (801-900)	Highest (>900)	Total # Acres Protected
	<b>Marine West Coast Forest</b>	<b>84,787.69</b>		<b>84,448.79</b>		<b>169,236.48</b>
5	Ahklun and Kilbuck Mountains	5,296.84				5,296.84
7	Alaska Peninsula Mountains	79,490.85				79,490.85
31	Coast Range -Willamette Valley			40,543.28		40,543.28
20	Coastal Western Hemlock-Sitka Spruce Forests			10,096.97		10,096.97
15	Pacific Coastal Mountains-Cook Inlet			7,614.04		7,614.04
25	Strait of Georgia/Puget Lowland-Pacific and Nass			26,194.50		26,194.50
	<b>Warm Deserts</b>			<b>1,570.65</b>	<b>23,864.38</b>	<b>25,435.03</b>
53	Chihuahuan Desert				208.78	208.78
48	Mojave Basin and Range			1,570.65		1,570.65
50	Sonoran Desert				23,655.60	23,655.60
	<b>Western Cordillera</b>	<b>1,404,598.14</b>	<b>442,800.10</b>	<b>31,848.66</b>		<b>1,879,246.90</b>
33	Blue Mountains	53,934.73				53,934.73
28	Canadian Rockies	36,050.78				36,050.78
30	Cascades	151,699.96				151,699.96
27	Columbia Mountains/Northern Rockies		420,097.10			420,097.10
37	Eastern Cascades Slopes and Foothills			27,802.84		27,802.84
35	Idaho Batholith		22,703.00			22,703.00
34	Klamath Mountains			1,943.33		1,943.33
36	Middle Rockies	640,911.63				640,911.63
43	Sierra Nevada			2,102.49		2,102.49
47	Southern Rockies	461,403.07				461,403.07
45	Wasatch and Uinta Mountains	60,597.97				60,597.97
	<b>Western Sierra Madre Piedmont</b>				<b>61,785.64</b>	<b>61,785.64</b>
52	Madrean Archipelago				61,785.64	61,785.64
	<b>Grand Total</b>	<b>2,015,023.13</b>	<b>537,821.31</b>	<b>142,702.86</b>	<b>100,773.60</b>	<b>2,796,320.89</b>

Sources: Conservation Almanac (2012) and Hewlett Foundation's Ecoregions (2012).

## APPENDIX 11

### Acres Protected by Purchase Type (1988-2011)

Purchase Type	Ecological Integrity Acres	Non-Ecological Integrity Acres	Land in California	Total Acres
Fee Simple	1,194,006	349,255	1,840,694	3,383,955
Easement	1,046,379	395,350	635,053	2,076,782
Other	279,354	272,073		551,427
Donation	1,574	0		1,574
Unknown	0	216		216
<b>Total</b>	<b>2,521,313</b>	<b>1,016,894</b>	<b>2,475,747</b>	<b>6,013,952</b>

### Acres Protected by Purchase Type (2009-2011)

Purchase Type	Ecological Integrity Acres	Non-Ecological Acres	Total Acres
Fee Simple	135,934	62,881	198,815
Easement	69,952	113,596	183,548
Other	17,236	27,829	45,064
<b>Total</b>	<b>223,122</b>	<b>204,305</b>	<b>427,427</b>

Sources: Conservation Almanac (1998-2011), Hewlett Ecoregions, Hewlett Core Areas and Corridors, and Hewlett Focal Areas (2012).

Note: During 1998-2011, fee simple acquisitions accounted for 56 percent of total acres protected in the West, while easements protected 34 percent of total acres. During 2009-2011, fee simple was used as the purchase type for 47 percent of total acres, and easements were used for 42 percent of total protected acres.

## APPENDIX 12

Average Cost per Acre by Purchase Type (1998-2011)

State	Total Purchase Amount	Total Acres Protected	Average Cost per Acre
<b>Alaska</b>	<b>\$45,353,584</b>	<b>124,724</b>	<b>\$363.63</b>
Fee Simple	\$45,353,584	124,721	\$363.64
Other	\$0	3	\$0.00
<b>Arizona</b>	<b>\$250,433,847</b>	<b>106,291</b>	<b>\$2,356.11</b>
Easement	\$7,135,376	40,361	\$176.79
Fee Simple	\$238,756,326	65,699	\$3,634.04
Other	\$44,000	13	\$3,263.47
Unknown	\$4,498,145	215	\$20,825.85
<b>California</b>	<b>\$3,857,089,493</b>	<b>2,475,747</b>	<b>\$1,557.95</b>
Easement	\$607,268,491	635,053	\$956.25
Fee Simple	\$3,249,821,003	1,840,694	\$1,765.54
<b>Colorado</b>	<b>\$1,406,416,511</b>	<b>961,099</b>	<b>\$1,463.34</b>
Easement	\$460,555,072	460,907	\$999.24
Fee Simple	\$842,292,897	415,732	\$2,026.04
Other	\$103,568,542	84,459	\$1,226.25
<b>Idaho</b>	<b>\$81,904,389</b>	<b>115,757</b>	<b>\$707.55</b>
Donation	\$0	1,503	\$0.00
Easement	\$44,630,964	101,638	\$439.12
Fee Simple	\$37,267,414	12,014	\$3,101.99
Other	\$6,011	601	\$9.99
<b>Montana</b>	<b>\$320,862,870</b>	<b>1,435,912</b>	<b>\$223.46</b>
Easement	\$121,049,257	495,495	\$244.30
Fee Simple	\$199,728,813	496,845	\$401.99
Other	\$84,800	443,571	\$0.19
<b>Nevada</b>	<b>\$66,207,519</b>	<b>40,530</b>	<b>\$1,633.51</b>
Easement	\$1,035,000	1,195	\$865.77
Fee Simple	\$63,291,063	34,446	\$1,837.37
Other	\$1,881,456	4,888	\$384.85

State	Total Purchase Amount	Total Acres Protected	Average Cost per Acre
<b>New Mexico</b>	<b>\$159,240,378</b>	<b>38,257</b>	<b>\$4,162.31</b>
Easement	\$4,351,484	5,179	\$840.07
Fee Simple	\$154,888,894	33,077	\$4,682.56
<b>Oregon</b>	<b>\$307,935,367</b>	<b>113,702</b>	<b>\$2,708.26</b>
Easement	\$16,064,113	7,931	\$2,025.31
Fee Simple	\$291,871,254	98,052	\$2,976.69
Other	\$0	7,718	\$0.00
<b>Utah</b>	<b>\$203,321,998</b>	<b>82,150</b>	<b>\$2,474.99</b>
Easement	\$99,199,726	66,189	\$1,498.71
Fee Simple	\$104,122,272	15,960	\$6,523.64
<b>Washington</b>	<b>\$686,297,978</b>	<b>397,765</b>	<b>\$1,725.38</b>
Donation	\$0	69	\$0.00
Easement	\$68,027,835	150,638	\$451.60
Fee Simple	\$611,147,863	237,287	\$2,575.56
Other	\$7,122,280	9,770	\$728.98
<b>Wyoming</b>	<b>\$105,825,886</b>	<b>122,011</b>	<b>\$867.34</b>
Easement	\$83,569,802	112,191	\$744.89
Fee Simple	\$22,008,713	9,421	\$2,336.08
Other	\$247,372	399	\$619.87

Sources: Conservation Almanac (2012).

Note: In providing an historical overview of average cost per acre by purchase type, this table is intended to supplement information on the ecological value of land and to support the Hewlett Foundation in forecasting the cost-effectiveness of potential future investments.

## APPENDIX 13

### Acres Protected by Top 6 Funding Mechanisms and Jurisdictions, within Ecological Integrity Score Category (1998-2011)

Ecological Integrity Score: >1.25		
Funding Mechanism and Jurisdiction	Acres Protected	Percentage of Lands
Multiple, Lottery	79,912	7.86%
Federal Appropriations	69,251	6.81%
State Lottery	42,275	4.16%
Local Bond	27,089	2.66%
Local Sales Tax	27,089	2.66%
Multiple, Appropriations	21,106	2.08%

Ecological Integrity Score: 2.25-3.00		
Funding Mechanism and Jurisdiction	Acres Protected	Percentage of Lands
Federal Appropriations	218,597	22.81%
Multiple, Lottery	64,552	6.74%
Federal Bond	63,445	6.62%
Multiple, Appropriations	39,632	4.14%
State Lottery	36,391	3.80%
Multiple, Donation	20,611	2.15%

Ecological Integrity Score: 1.25-2.00		
Funding Mechanism and Jurisdiction	Acres Protected	Percentage of Lands
Federal Appropriations	452,449	31.34%
Federal Bond	138,006	9.56%
Multiple, Appropriations	63,220	4.38%
State Donation	61,926	4.29%
Local Bond	34,888	2.42%
Multiple, Donation	23,284	1.61%

Ecological Integrity Score: 3.25-4.00		
Funding Mechanism and Jurisdiction	Acres Protected	Percentage of Lands
State Appropriations	31,572	26.45%
State Donation	23,925	20.05%
Private Donation	20,329	17.03%
Federal Appropriations	16,644	13.95%
Local Appropriations	14,690	12.31%
State Bond	11,270	9.44%

Sources: Conservation Almanac (1998-2011), Hewlett Ecoregions, Hewlett Core Areas and Corridors, and Hewlett Focal Areas (2012).

Note: 'Percentage of lands' refers to the share of acres protected by each combination of funding mechanism and jurisdiction within each ecological integrity score (as opposed to across the aggregate acreage protected in the West during 1998-2011). Percentages do not equal 100, given that only the top six funding mechanism combinations are featured.

These charts suggest the following: lottery funds are used in less prevalence for land of higher ecological importance; appropriations across all levels of government consistently protect land across all integrity score categories; and the use of donations increases with the ecological importance of land.

## APPENDIX 14

### Acres Protected by Top 3 Funding Mechanisms and Jurisdictions, within Ecological Integrity Score Category (2009-2011)

Ecological Integrity Score: >1.25		
Funding Mechanism and Jurisdiction	Acres Protected	Percentage of Lands
Multiple, Lottery	32,375	27.81%
Local Property Tax	8,421	7.23%
State Lottery	8,078	6.94%

Ecological Integrity Score: 2.25-3.00		
Funding Mechanism and Jurisdiction	Acres Protected	Percentage of Lands
Federal Appropriations	24,496	14.72%
State Lottery	7,455	4.48%
State Donation	4,367	2.62%

Ecological Integrity Score: 1.25-2.00		
Funding Mechanism and Jurisdiction	Acres Protected	Percentage of Lands
Federal Appropriations	33,167	32.42%
Multiple, Lottery	12,388	12.11%
Multiple, Appropriations	10,591	10.35%

Ecological Integrity Score: 3.25-4.00		
Funding Mechanism and Jurisdiction	Acres Protected	Percentage of Lands
State Donation	15,793	32.66%
Multiple, Appropriations	11,959	24.73%
Federal Appropriations	4,971	10.28%

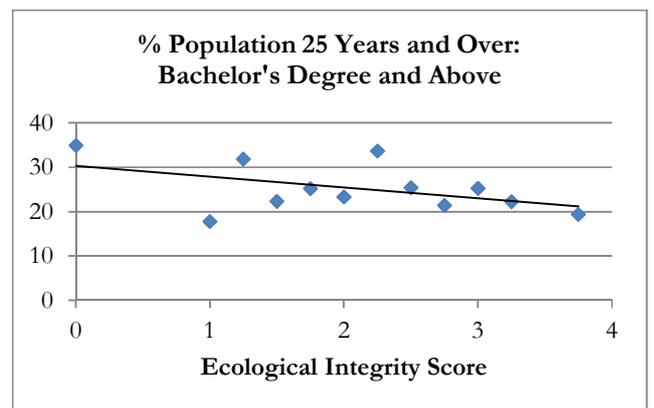
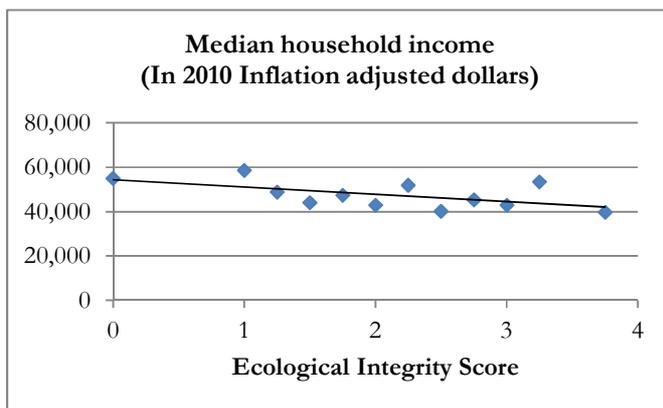
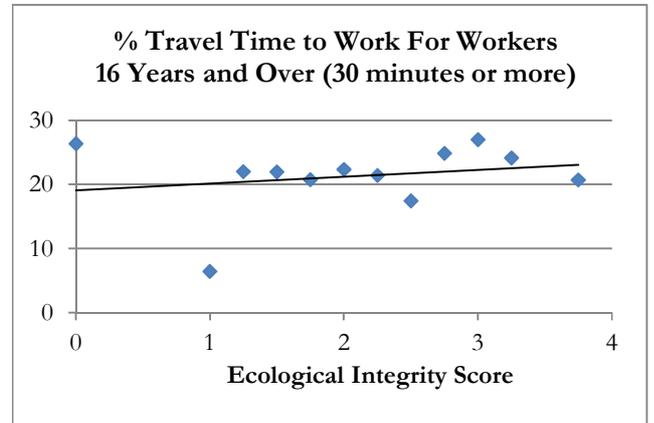
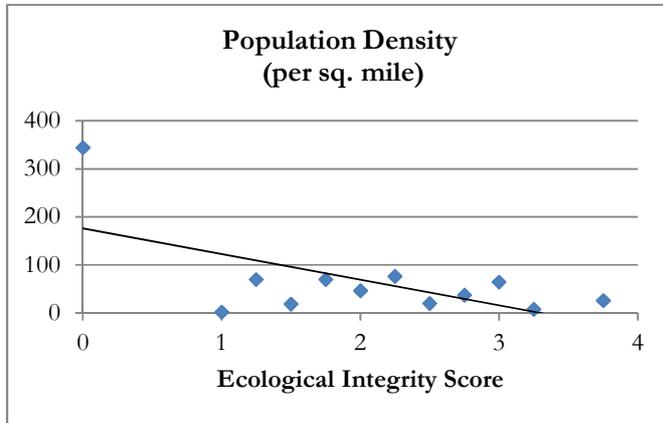
Sources: Conservation Almanac (1998-2011), Hewlett Ecoregions, Hewlett Core Areas and Corridors, and Hewlett Focal Areas (2012).

Note: 'Percentage of lands' refers to the share of acres protected by each combination of funding mechanism and jurisdiction within each ecological integrity score (as opposed to across the aggregate acreage protected in the West during 1998-2011). Percentages do not equal 100, given that only the top six funding mechanism combinations are featured.

These charts suggest the following: lottery funds tend to be used in a higher proportion for non-ecological land; donations are used with increasing prevalence for land of higher ecological importance; and appropriations across both federal and multiple levels protect a large share of ecologically important land.

## APPENDIX 15

### Relationship between Socioeconomic Characteristics and Ecological Integrity for Parcels Protected across the West (1998-2011)



Sources: Sources: American Community Survey 5-Year Estimates (2006-2011), Conservation Almanac (1998-2011), Hewlett Ecoregions, Hewlett Core Areas and Corridors, and Hewlett Focal Areas (2012).

Note: Population density, median household income, and educational attainment show a relatively weak inverse relationship with ecological integrity, while commuting time exhibits a positive relationship with ecological integrity. All socioeconomic characteristics were calculated as averages across counties in the West. All urban areas received an automatic ecological integrity score of '0.'