

# Birds of a Feather Flock Together

*Using StoryMaps to Migrate Towards a Conservation Culture  
With the Washington Audubon Society*

Mickey Ross, Greg Schundler, Paris Williams



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## **Recommended Course of Action**

Since the Washington Audubon memberships are aging, we recommend providing more hands-on programs to expand “youth” interest in saving the environment; thus resulting in gaining their membership. This can be achieved by having each Audubon territory in Washington, arrange a conservation information day at all schools ranging from elementary to university, to get the youth more involved with conserving nature and birding. Another suggestion is to visit all low-income communities in Washington, through organizing town hall meetings about the Audubon organization, and how the community can get involved. Lastly, we recommend visiting state, city, and county legislatures, to propose that all persons requiring public assistance throughout the state, become actively involved with Audubon or the like; in order to receive their aid. Our story map conveys a dramatic outline of major habitat loss causes like: forest, wetland, ice/snow losses; combined with census demographic data, of various low-income minority communities that are outlying from protected areas. This should pinpoint areas the Washington Audubon organization will need to address for new membership and youth involvement.

## **Introduction**

Washington State is home to a set of diverse and robust ecosystems. People who live here and visit here, take inspiration and pride in the abundance of fish, the legendary old growth forests, the vast and liberating shrub steppe of Eastern Washington, the shores of the Salish sea, and the towering often snow capped peaks of the famous volcanoes (Mt. Rainer, Mt. Baker, and Mt. St Helens), the Olympics, and the Cascades. The abundance of resources was a valued and integral part of indigenous culture and was observed among early European settlers.

## **History of the National Audubon Society and their correlation with GIS**

The National Audubon Society is a century old conservation group committed to protecting bird's population and habitat throughout the United States. Audubon started as a loose knit network of state level groups in the 1890s. Currently, the entire Audubon organization has a total of 467 local chapters; 25 of which are located within the state of Washington. However, on average, those 25 Washington Audubon territories is aging in membership. On estimate an attribute of an example of an active member within Washington Audubon is: woman, middle to upper economic class, age 50 and older, and non-minority. This is problematic because in order to provide conservation of an entire state habitat, having only one "category" of persons in the organization, will not allow the organization to reach it's full potential; and seek out to achieve what is needed- preservation of the environment. Audubon Washington is in dire need of youth involvement.

In 2010, Audubon reinvented themselves, by beginning to incorporate geographic information systems as a way to gather data collection and analysis. An enterprise GIS strategy was set up to fit Audubon's culture. Inside of that culture, consisted of data management skills, data needs, and technology access by chapter. Doreen Whitley, Audubon's geospatial information officer, stated that, "Our goal wasn't to create more spatial data experts, but to make it easier to access and use data. For us, the starting point was the idea of the value of authoritative data. In any organization, whether it's decentralized or centrally focused, the key is [that] understanding value and recognizing the datasets [is what] drive[s] your mission. Focus on those and flexible ways to distribute them. Everything grows from there. Soon everyone in the organization appreciated that there weren't five answers to

the same question. At that point, no one's resistant, and people are looking to using geospatial data to create solutions. That's how GIS builds connective tissue (ESRI ArcUser, Summer 2015, p. 37-38)."

## Conservation Culture

"Conservation culture" has been defined as "a series of distinct aesthetic, technical, and ideological positions", which determines how people feel about important conservation issues such as the role and importance of wilderness areas, anthropogenic development, and the use of natural resources. Conservation culture varies over time and space. Washington Audubon, part of the National Audubon, has been a stalwart purveyor and protector of "Conservation Culture" by organizing and educating citizens, collecting and sharing data, taking political action, and more, through the appreciation of birds. Part of conservation culture involves understanding, teaching, and sharing this rich natural history. Audubon Washington is one of many advocacy organizations that have taken up the mission of spreading the appreciation of nature through the enjoyment of birding.

Yet, conservation culture is not the only aspect of human culture in Washington State, and the health of ecosystems has been weighed against other human priorities. Logging and development have facilitated the growth of personal prosperity as well as a dramatic growth in population. These activities in aggregate have resulted in major habitat fragmentation through deforestation, loss of wetlands, and urban sprawl. Conservation culture expresses itself in part through political action and governmental policy, regulation of these habitat loss drivers have increased over time. In spatial terms, urban growth has been regulated through the Urban Growth Act, which has established Urban Growth Areas and boundaries. Conservation efforts at different scales (private, municipal, county, state, and federal) have resulted in a rich tapestry of "protected areas". These areas have different provisions for managing timber and development.

Deforestation is the loss of forest habitat and in Washington State, the primary driver of this landcover change is the timber industry, which logs, replants, and re-logging large tracts of land. Until forests are replanted, they revert to grassland or scrub/shrub land-covers. Around urban, suburban, and exurban areas, new residential and other developments have also displaced forests closer to the population. The loss of forests not only threatens forest-dwelling species like the Barn Owl, but it also has devastating direct and indirect effects like landslides, erosion of soil, and the

sedimentation of rivers. Forest ecosystems provide valuable “ecosystem services” for far away downstream areas like filtering drinking water or flood risk reduction.

Awareness of the importance of wetlands has guided the prioritization of their conservation in recent history. Nonetheless, urbanization has resulted in the displacement of wetlands, which are often drained to provide dry land for development. Other human activities can threaten wetlands, such as the increasing use of water from underground aquifers and wells. When water is drawn from below the ground, it causes water above it to settle, which could result in a reduction of the water level in wetlands. Climate change that affects weather patterns, such as reduced rain, reduced snow pack, and prolonged droughts can alter landscape hydrology, or the way water flows over a landscape, and thus the ability for water to fill and sustain wetland habitats. Lastly, we convey the importance of Washington’s bio-capacity footprint as it relates to ecological debt. Washington was once thought to be a sustainable state; however, according to the Global Footprint Network; Washington needs ecological conservation improvement. From a global standpoint, if humanity keeps its current living condition behaviors, there would need to be 1.5 Earths to sustain the habitat of the world’s population. Therefore, our project explores deeply how conservation culture can be measured at multiple scales. Our story is to show how habitat loss can be identified and quantified at all scales and how access to nature is actually a privileged activity and is not available to many different communities, particularly, people of color, school enrolled age students, and veterans (including disabled).

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## Design & Methods

### Landcover

The Washington landcover data was accessed from the 2011 National Land Cover Database (NLCD). We decided to analyze the specific landcover losses as it relates to forests, wetlands, and urbanization. The NLCD 2011 database conveyed a significant amount of habitat losses between each of our projective categories. It was also needed to make projections of how landcover loss will expand over the next hundred years, as population increases and humans continue with their current environmentally unhealthy behaviors. To show the dynamic significance of that, we designed our landcover webmaps to be flexible that it shows at multiple scales (from statewide all the way to street level). Inside of the maps, the NLCD data was overlaid with protected areas to show how much loss occurs within those protected areas and how that affects the habitat. The landcover changes were measured in percent change over time, a measure of exponential growth, and the implications of which most people do not understand. Even a 1% growth rate equates to a doubling of about 70 years.

It was also imperative to include exponential growth graph ('Figure 15') into the story map to express to the readers the extreme need to improve population density as the population increases over an average of 200 years. The calculations for our results within the graph conveying projected population increase, population density increase with no sprawl, status quo of developed landcover, and status quo density increase over a 200 year span was done in Microsoft excel with numerical data already provided from the United States Census Bureau. As of 2011, about 63% of forests ('Figure 16') within the state of Washington was eliminated to accommodate for urban sprawl; 28% of grassland; and 8% of agricultural lands was used to adjust to the population growth of 32% from 1992. Those are vast percentages researched of the landcover and habitat loss. We wanted to project that zero acreage would be available to build on if the current living conditions continued, and we were able to show that.

Lastly, we analyzed the wetland regions of Washington. The importance of wetlands has been realized not only for their value as wildlife habitat, but also for valuable ecosystem services or the benefits provided to humans from natural eco-systems. Recharging aquifers, carbon sequestration, and reducing the risk of flooding are a few examples. We created webmaps that convey the wetland loss story in our storymap. According to the Earth Economics organization, Puget Sound as a natural

asset for example, has been valued at between \$305 billion and \$2.6 trillion. Included in that value are Puget Sound Wetlands and Salt Marshes, which can provide annual non-market value between \$381.75 and \$71,103.69 per acre per year. Our analysis on the specific landcover losses directly relates to the population growth, and accessibility of four main demographic groups in which, the Washington Audubon Society has expressed interest in gaining more membership from. Those groups are: low-income communities with median incomes of \$30,000 a year, school enrolled children, disabled veterans, and people of color. We then analyze the demographic Census block group data and their proximity/accessibility to protective areas for recreational purposes.

### **Census**

Trina and Jennifer requested that we create a series of web maps and one story map for our final deliverable. They also wanted us to first identify the demographic characteristics of Washington so that we could then pinpoint the areas that need to be addressed for more enrollment into Audubon Washington. It was communicated to us that Audubon Washington membership is aging with little to no diversity within the organization. Figures 1 through 5 depicts the unique percentage of demographics: age, ethnicity, education attainment, veteran status and language spoken at home. The 2013 data used in the demographic graphs was access from the American Community Survey, which is a subset of the United States Census Bureau.

Once the demographic graphs were completed, we gathered the state of Washington Census block group data from the United States Census Bureau. We acquired their latest available Census block group dataset, which was 2013. There were 4,783 total features (census blocks groups) in the dataset. However, the dataset was coded per category, so we decoded each category of interest for easier access and analysis. The fields we decided to decode and include in our dataset were: total population, total male, total white, total median age, total Hispanic, total number of working individuals, median income, total enrolled in school, total number of education attainment, total population with at least a Bachelor's degree, total persons on public assistance, total persons on social security, total of English only speaking homes, total number of married couples, total number of single households, total number of households with at least one child, total number of individuals with income below poverty level, total number of homeowners, total number of renters, total number of veterans, and total number of disabled veterans. Two additional fields were added: total number of female and total number of minority. The total number of female field was added by creating a text

field and field calculating total population subtracted by total male. The total number of minority field was added by also producing a text field, then using the field calculator; except this time, it was total population subtracted by total white.

Finally, after the tedious task of decoding each category of interest-the mapmaking could begin. Each map was first created in ArcMap for desktop and then converted to an ArcGIS online web map to be uploaded into our story map. Figure 6 through 11 are the demographic Census block groups we decided to make with ArcMap for desktop. The maps conveyed each majority of the highest percentages of each Census block group category compared to the proximity to protected land areas. Due to the fact that the symbology from ArcMap for desktop and ArcGIS online differed greatly, we decided to keep both software versions of the map, as some were unable to be shown in the National Audubon Society ArcGIS online account, because of either redundancy of maps already published, or technical issues. This affected how we organized our story map. Our final workable database is comprised of all 4,783 Census block groups (with two added fields: total female and total minority) and the Audubon Washington territory outlines. This database can be used in the future for feature analysis on various Census block group data field (as there are thousands) inquires amongst the state of Washington and its habitat loss. Upon accessing the National Audubon Society ArcGIS online organizational account, we were able to use the organizations layer services data to incorporate into our webmaps and story maps.

## **Results**

### **Landcover**

The NLCD 2011 database conveyed a significant amount of habitat losses between each of our projective categories. The urban sprawl map conveyed the spread of urbanization from 1992 to 2011. The 20-year landcover change data showed an 8.6% increase in urban landcover. Population growth in Washington State over the last 20 years was 32.2% and is projected to increase at a similar rate. The data revealed that over the last 20 years, the State of Washington has increased its population density 21.7%. That is compared to adding 1 new Washingtonian for every 5 Washingtonians in a given land space over 20 years. Our research found that the total acreage of forest has declined 9.3% over the past 20 years. About 81.1% of these losses are to forestry (conversion to barren or grassland), 10.4% of these losses are to urbanization, and 6.6% to agriculture. According to our calculations, our results

show that under status quo extraction rates, we would reach zero acreage to build on upon 2200 ('Figure 17'). We found that Although Washington State has lost 31% of its wetland areas since 1780; their conservation has been prioritized in recent history. In the past 20 years, 3.4% of wetlands have been lost. Though somewhat related, one big area of debate is whether natural assets "depreciate", "appreciate", or hold a steady value. Ecosystems that are older often provide more diverse species and accumulate soil and biomass. As time goes on, we see that natural capital, whether parks or forests, are becoming scarce.

## Census

The demographic graphs conveyed the following:

- Figure 1. The greatest age group prevalence within the state of Washington is the 45-54 year age bracket, followed by the 25-34 year age bracket.
- Figure 2. There is higher percentage of Caucasian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and Asian prevalence in Washington than in the entire USA. As a whole, the minority presence is very minimal compared to the majority within the state of Washington.
- Figure 3. The highest number of educational attainment within in Washington is a individual who attended college but never sustained a degree.
- Figure 4. A miniscule percentage of disabled veterans within Washington. However, disabled veterans (and veterans in general) make up great a great deal of the homeless population in Washington.
- Figure 5. 81% of the population within Washington speaks English only in their homes. This is to be expected as English is the official language of the United States of America. However, Spanish followed by Asian/Pacific Island languages follow; but there is a big percentage gap from English at 81% to Spanish at 8% followed by Asian/Pacific Island at 6%.

These graphs can be used for area analysis purposes to propose an ideal overall consensus of Washington's demography. Upon making the maps of some of the similar demographic data conveyed in the graphs, it was found that the National Audubon Society ArcGIS online account already had all of the layer services we had previously acquired. However, in order to complete a

more of a general decision of our analysis we chose to make a few maps inside of ArcGIS for desktop for our own use. Those maps are shown in Figures 6-11.

Inside of 'Figure 6', it was expressed that communities that average under \$30,000 typically are very far from protected areas. Reasons for this may include: transportation access, lack of diversity in protected areas, and cost of living (incorporating extreme recreational activities). It is hypothesized that lower income communities are also not as intrigued in creating a conservation culture as higher income communities. This is possibly due to a lack of education within the lower income communities about environmental preservation. Within 'Figure 8', shows the median age within the lower income communities. This is extremely important for the Audubon society because they are aging and need to incorporate ways to involve the younger generation. The census block groups that encompass a younger community also indicate that it is distant from protective areas. 'Figure 9', communicates the proximity of low-income pay scales (less than \$30, 000 a year), to the minority communities that are in the shades of orange. Miniscule protected areas are located throughout, but rarely is there a high minority population within or near it.

In a report on quality of teachers, the USNews.com stated that, the minority communities generally have the worst standardized test scores and low quality teachers. This is extremely problematic for the youth for a number of reasons; but from an ecological standpoint, if they are placed with low quality teachers, they are probably not being educated on conservation and the importance sustainability has on the environment. Thus not exuding interest in creating a conservation culture through Audubon or another environmental program. In 'Figure 10', it showed Washington's population on public assistance as of 2013. It correlates with the low-income communities and how they are distant from the protected areas. Holding town hall seminars on preserving the earth, creating a conservation day at schools with hands-on activities, and making it mandatory to become and stay an active member in an environmental group in order to receive public assistance, might increase conservation participation in the lower income communities whether on public assistance or not. Lastly, in 'Figure 11', the map shows the percentage of renters in communities under \$30, 000 in median income. This map also shows that the population that participates in renting is also quite a ways from protected areas, but majority of homeowners are in more rural areas and thus have a closer proximity to protected areas. Collaborating all of the prior maps with this one, indicates that lower income combined with minority communities are most likely

to lease their residence then to become a homeowner. The cause of this is endless. For example: it may be because of the median age in the lower income areas where people are not as established; people with lower incomes may have more debt and not hold the appropriate FICO scores to gain a mortgage loan; or simply the cost of living is just too high to live rurally near protected lands.

After the ArcGIS for Desktop maps were created, we then created maps for the National Audubon Society's online GIS account to then create a story map. These maps assist in telling a story of how the community can integrate towards creating a conservation culture for Washington Audubon. The results of our findings all correlated with another, our data showed that the census block groups of school enrolled aged children, people of color, disabled veterans, and low- income communities with a median income of \$30,000 or less are not within economic access or proximity to protected lands for recreational use.

### **Story Map**

Our story map (complete story map is multiple figures listed as 'Figure 19') explores how conservation culture can be measured and cultivated. Our exploration shows that: 1) conservation culture is not yet strong enough in land use management to sustain Washington's environment for future generations; and 2) the spread of conservation culture is inhibited by access to protected wilderness areas, which is acute for low income communities, who cannot afford the vehicle and fuel expenditures associated with traveling to nature areas. Public transit from inner city to trail riders could provide many benefits including strengthening conservation culture across economic and demographic borders. Given that Audubon has recently made the switch from paper reference maps to online GIS, which provides a magnitude of access to maps for their members to view, we decided to make a story map conveying the overall story of creating a conservation culture. Our story map is user friendly and it depicts areas of extreme concern of habitat loss (NCLD raster data) and demographic regions of low- income communities, with a younger median age throughout Washington. The demographic regions also portray how far in proximity the lower income communities are from protective lands. The story map will become a useful tool for Audubon chapter members to locating specific target areas needed to recruit younger generation membership; and get the community involved in caring more about the environment.

### **Discussion**

To fully support the National Audubon Society's interest of address membership in a way by which they could fundamentally give merit to the mammoth compassion and commitment to preserving the environment in a sustainable way while recognizing the immense social economic perspectives in an integrative way is the goal of this project within the Washington chapters of the National Audubon Society. This biophysical social-ecological systems project attempts to advance the Washington chapters of the National Audubon Society in gaining more membership by seeing birds through the lens of not just how land use and land cover (LULC), climate change, and population growth has changed over time in relation to sustainability management, but that our group's GIS contributions will stimulate, motivate and generate a new perspective on moving membership forward while addressing complex and demanding challenges. We accepted the challenge to use GIS technology in a simplistic way to address the salient message of more membership. Through the National Audubon Society we better understand the sustainability management concerns underscored by their effort to define how and where to target public outreach. Although we focused on bird related land use issues, urban-regional issues were treated as they arose from our readings and discussions with the Washington Audubon Society leaders for this endeavor. The Washington based chapters and centers of the National Audubon Society have consistently integrated their National Field Conservation Program by focusing on programming related to five strategies critical for birds:

1. Putting working lands to work for birds and people: partnering with landowners to make working lands work for birds, people, and communities. Action alert related to Lummi Tribe campaign against the Cherry Point coal terminal:  
[http://wa.audubonaction.org/site/MessageViewer?dlv\\_id=63722&em\\_id=50861.0](http://wa.audubonaction.org/site/MessageViewer?dlv_id=63722&em_id=50861.0)
2. Sharing our seas and shores: protecting the vital habitat along America's coasts where people and birds intersect.
3. Saving Important Bird Areas: identifying and protecting the most important places for birds.
4. Shaping a healthy climate and clean energy future: reducing and mitigating the impacts of climate change and fostering a clean energy future.

5. Creating bird-friendly communities: working with communities to improve habitats for birds and other wildlife. (Financial Statement Template - national\_audubon\_society\_inc.\_6-30-14\_final.pdf, 2015).

### **Forest Loss**

Forests provide important habitat for diverse communities of plants, fish, and wildlife. The loss of forests to timber and development not only threatens forest-dwelling species like the Barned Northern Spotted Owl, but it also has devastating direct and indirect effects like landslides, soil erosion, and the warming and sedimentation of rivers. Community forests have been presented as potential solution to the relatively low value secured by selling logs instead of manufactured wood products.

### **Wetland Loss**

The resilience of the birds affected by wetland loss has brought attention to bird migration paths and times changing due to sea level changes, more human interactions, pollution, and storm influences. In turn the visible impacts to the bird population are fewer species, lower breeding success, and threatened survival (Actionbioscience, 2015).

### **Urbanization**

Increased urbanization over a generation depicts significant migration away from protected areas which is possibly a challenge for seniors who want opportune living and comforts, younger adults who want stabilized careers, exceptional schools for their children, and in effect urbanization is removing green space which is making the land more isolated zaps local resources and destroys open space.

### **Demographics**

Below median income population (\$30K) tend to be disproportionately distanced from the protected areas of Washington. This causes the need for transportation access, cost of travel (gas and insurance), and jobs with people who need to work having only the weekend to travel in most cases. Recreation is one of the greatest values we receive from natural assets and Washingtonians feel "wealthy" when they consider the options available to them. Indeed, outdoor recreation is the reason that many advocates feel passionate about nature in the first place. Wildlife viewing, hiking, and camping provide formative experiences in establishing both a cognitive understanding and emotional relationship with Nature. Yet, these experiences are likely unaffordable for low-income



communities. A recent study on the economics of outdoor recreation in Washington State from Earth Economics shows how much money is spent getting "outdoors". About 28% of expenditures are associated with Motor Vehicles, Boats, Parts, and Gas & Oil alone. The US Fish & Wildlife Service survey on birding in the US, found that transportation accounted for 34% of the cost for birding. The average annual cost of vehicle ownership in the USA is \$7,800. Also, low-income communities may not be able to afford access to local parks, since many low-income individuals afford the premium paid in rent or mortgages for real estate located near parks ("gentrification"). Wildlife viewing, hiking, camping, and other experiences central to connecting with nature could be unaffordable given the activity (per day) and equipment (per year) related expenditures ('Figure 18'). It's hard to believe, but golf and hiking are equally economically "exclusive". People with incomes less than \$30,000 per year participate in birding at a rate of 15-16%, whereas folks with incomes exceeding \$75,000 participate in birding at a rate of 24%. A similar skew exists for highest levels of education attainment: 15% among high school graduates and 28% college graduate. Regardless of income, people within metropolitan statistical areas (MSAs) participate in birding at a rate of 12-15%, whereas folks outside those areas participate at a rate of 22%. We concluded that limited access to nature is correlated to exposure to environmental pollution, and together, speak to "environmental inequality".

### **Research and Citizen Scientist**

The public interest in the research and information provided by the bird observations and bird counts of the youth, within the Citizen Science organization of the Audubon Society is located on Lake Washington in South-East Seattle the Audubon Center at Seward Park is a 277 acre playground with the last stand of old growth forest in Seattle. Seward Park Audubon Center is part of national Audubon's vision (as depicted in Figure 12): Make conservation the path to a better future by building a constituency as diverse as nature to help protect nature. (Seward Park Audubon Center Washington, 2015)

### **Audubon Chapter Success Stories**

In addition to all of the demographic and land cover maps to convey the prevalence of habitat loss in relation to people of color and low income proximity to protected lands are a few of Washington's Audubon chapter success stories geocoded with each address of the main office building or post office box number. Our sponsors, Jennifer and Trina provided each story. The chapter success stories touch on nine territories and relate a method in which that chapter is giving

back to the community and attempting to gain new active members through “spreading the word” about the Audubon organization and endeavoring more involvement in conserving the environment.

The Rainier Audubon Society hosted a water festival for 4th and 5th grade students, which seemed like a great opportunity for the Rainier Audubon Society to bring the message of birds and climate change to young people. Calen Randell, Rainier Audubon’s preeminent 16 year old birder, kicked off their presentation explaining how Audubon science allows us to see species ranges of the future, and how having the correct “habitatititude” can help birds adapt to a warming world. The chapter is looking forward to NAS birds and climate materials that they can use for outreach specifically to children.

The Dungeness River Audubon Center talked about the Dungeness watershed, and how it is a unique area of the northeast Olympic Peninsula with distinct features that define it as our home. We believe all residents of the watershed should be filled with a sense of pride, ownership, and a feeling of stewardship for this lovely area. Unfortunately many problems caused by human activities, like degraded water quality, water shortages, and loss of wildlife habitat, threatens the Dungeness River and it’s associated watershed.

The Whidbey Audubon Society conveyed that the Pigeon Guillemots are an important indicator species for the Puget Sound because they are one of the few seabirds that breed here and many remain through the winter. In the spring, approximately 1000 birds gather at 24 breeding colonies around Whidbey Island where they nest in bluff burrows. Whidbey Audubon Society volunteers monitored those colonies since 2004 as part of the Pigeon Guillemot Research Group. The chapter studies these birds to help educate island residents and others about the importance and joy of having Guillemots in our waters. Their group of citizen science volunteers spread the word with their friends and neighbors as well as beach walkers. They monitor the disturbances to the birds and work to decrease human-caused disturbances.

Led by the Pilchuck Audubon Society, Vaux's Happening is an Audubon and community citizen science project attempting to locate the chimneys in Washington State that are used as group "communal" roosts, during migration. The project also looks to count how many birds are using which chimneys, and when.

The Seward Park Audubon Center (also known as the Audubon Washington) held a Teen Advocacy Day, which focused on building on Audubon Washington’s very successful Audubon

Advocacy Day. In February 2015, the state office and the Seward Park Audubon Center worked together to provide the same training and advocacy opportunities to local teens, specifically Seward Park's Climate Leaders cohort and Tenacious Roots group, and the Seattle Aquarium's Youth Ocean Advocates. Audubon Teen Advocacy Day began with a briefing on Audubon's 2015 legislative priorities, followed by a day of constituent meetings, gallery viewings, flyer dropping, and a surprise visit with Governor Jay Inslee who designated one teen climate leader as "Washingtonian of the Day", "I learned that I have more power to change things than I had previously thought. I now know that I can approach my representatives and they do care and will listen!" Liz A., Washingtonian of the Day for April 14, 2015.

The Tahoma Audubon Center, sprinted to the public-outreach line with a creative idea to engage the general public at community events using a life size cut-out display board that visually catches people's attention and invites them to have their picture taken with an exhibit that features birds threatened by climate change. The project aims to increase interaction and engagement with visitors, attract new members, and help spread the word about the impact climate change is having on birds and wildlife.

Black Hills Audubon Society is undertaking a new initiative to mitigate the impacts of climate change on birds by empowering people to provide increased and species-appropriate habitat in neighborhoods throughout their communities. By 2020, the Black Hills Audubon Society hopes to see an accumulation of habitat improvements in their area accomplished by asking residents, home-owner associations, realtors and condominium managers to commit to making three habitat improvements each year from 2016 through to 2020 – actions such as pulling weeds instead of using a herbicide, planting a bird friendly native bush, and removing an invasive plant from their yard or neighborhood.

The Central Basin Audubon Society partakes in Bird friendly communities are the action piece of Audubon's climate change message – implementing local change and building environments where both birds and people thrive. Inspired by fellow chapter energy around Central Basin Audubon Society was so inspired by fellow chapter energy around Audubon's bird friendly community initiative, Central Basin Audubon Society planned, organized, and co-hosted a multi-partner event in June 2015 to help encourage appreciation of wildlife and natural habitats.

Participants went on a scavenger hunt where they learned how to identify local birds, and discovered native plants they like best.

Lastly, the Kittitas Audubon Society is working to implement the importance of conserving water, and preserving birds initiative involving local vegetation specialists and fire professional input. Eastern Washington is a beautiful, but threatened ecosystem hosting millions of acres of important bird habitat. As global warming continues, water conservation for both birds and people has become a priority issue of concern for conservationists and, indeed, all residents. Kittitas Audubon Society's project aims to develop a collaborative, regionally specific best practices guide for creating habitat that is simultaneously bird-friendly, water-conserving, carbon sequestering, and also fire-wise. This resource will help guide neighborhood, school, and city landscaping efforts, and will be relevant to all eight Audubon chapters located in Eastern Washington.

The story map ends with encouraging viewers to join the National Audubon Society, whether in Washington or their own home state. It provides a website for prospective members to view and enter their information to join. This story map incorporates all essences of a conservation culture just from the natural data we collected and analyzed. We hypothesize that lower income, young, and minority communities are the locations that need to entice to join the National Audubon Society and help create a living conservation culture. According to Christine Dell'Amore at the National Geographic, a few Unconventional Ways to Get People Hooked on Nature are to relate to the children, either through a song or skit, create nature inspired fashion (perhaps, fashion with birds on it will be better for those seeking to join Audubon), engaging prisoners to be mandated into learning about nature, and incorporating sports with nature. Whilst in the age of social media and new technology updates daily, the National Audubon Society, can reach out to a mass audience very quickly resulting in the gain of new membership and interest.

### **Business Case for Implementation and Development**

People of color have historically possessed an immense sensitivity and commitment to preserving the environment in a sustainable way. Exploitations brought to the already occupied continent of North America set in motion a colossal human injection of a series of perturbations to the ecological biosphere where . Superimposed upon the natural environment, impacts to the existing biosphere within the United States, particularly Washington can be traced to habitat fragmentation that exists today. Consider the time when climate change, habitat loss, social and economic

challenges will be most detrimental to the human coexistence with the avian population. Research predicted the state of the habitat, the effects of urbanization, and climate change has selected National Audubon Society the clarion voice of the environmental protectionist. This voice employs a strategic propose of demonstrative changes for the greater good today for a stable future which would either stabilize or reverse the cataclysmic effects of habitat loss, bird reproduction depletion, migration pattern normalization, and Land Use Land Cover (LULC) sustainable solutions. The National Audubon Society has implemented a strategy to amass the change needed today for the envisioned future, which encompasses the biophysical, sociological, and economic sustained management of Washington birds whose business case principles may stand as transformational enough to be adopted at the National Audubon Society level.

What are the business case principles to employ?

1. Focus on the greatest threat to the future homeostasis of the bird population to facilitate creation a plan programmed implementation of change which addresses resilience and sustainability management not just well into the next century, but in perpetuity. The Washington Audubon Chapters and Centers grew from 53 Important Bird Areas (IBA) in 2001 to 74 IBAs in 2015. Whether a terrestrial or aquatic site, IBAs provide critical habitat for one or for several species of birds when breeding, wintering, or migrating with natural resilience. The IBA program sites maintain naturally occurring populations of birds, to steward those sites, thereby sustainably managing their conservation. (Important Bird Areas (IBAs) Washington, 2015)
2. Take on the project to assess the Audubon Society member effectiveness in making impactful change through member advocacy from, community, business, land development, and LULC protections. Create a needs assessment which allows the Audubon to identify the resources needed to sustain the partnership in the long-term with a multitude of organizations, such as: non-profit originations serving needs based communities, faith based organizations working with diverse audiences or tribal organizations which would welcome additional education opportunities, particularly leading to employment development (10 Steps to Form and Sustain a Partnership | Dynamic Partnerships for a New Economy, 2015).
3. Utilize educating, stimulating bird appreciation with an understanding of in perpetuity sustainment independent of the constraints which impact the growth and living of the birds.

The Audubon Society can be the catalyst for the future by sustaining the educational development of our future zoologist wildlife biologist and ornithologist from an early age. The leaders of the Citizen Scientists can evangelize government, industry, and academia as well as other nonprofit organizations such as urban area zoos, the faith based community and tribal organizations to partner in stimulating the importance of education to become ecologists, geneticist and land managers relating every aspect of birds as part of their research, as they grow up studying the physical characteristics of bird habitats, migration patterns and feeding and reproduction. (Job Description of Ornithology, 2015)

4. The 29 federally recognized Washington Tribes are a tremendous Audubon resource for bird research, sightings and collaborating for implementing strategic plans for a better coexistent future. Each tribe is adamant about maintaining the environment and their culture in perpetuity. The interactive map of Washington's 29 Tribes, Figure 13, could be overlaid with the Washington 25 Audubon Society Chapters and Centers to show the latent collaboration opportunity for ecological progress with federally protected areas (Map of Washington's Tribes, 2015).

The Washington Audubon creation of a well-informed youth population will build the future leadership base of tomorrow. Education and building of relationships across multiple boundaries, geographic and social, will allow the preservation of our natural resources into multiple next generations. The youth of today capitalize on transparency of information exchange in any dimension available. Technology is an elastic commodity which is always present to meet the needs of one or many at any time knowledge transfer accompanies layers of intelligence. (Knowledge Transfer Presentation, 2015)

Through mentorship opportunities, value of the environment and avian species will be realized today and into the future. These values ensure that membership within the National Audubon Society will continue through time as a framework is put in place to provide relationships between well-established members and future members. Explore the possibilities of tribal memberships with a potential outreach program with career development opportunities to educate and employ individuals interested in sustaining the avian population.

A mobilized population of members who recognize the value of healthy avian populations, which use the landscape for habitat and rearing needs, will have a greater impact on sustainability

efforts. Starting today instead of waiting until avian species begin disappearing will have a greater impact. How can the Audubon Society redirect the power of these land managers to envision and commit their power to partnering? These leaders should initiate a thorough strategic collaboration to address the future concerning population growth, habitat loss, and overconsumption. Also, press forward with environmental concerns which include the species extinction crisis and climate change. Public outreach raising awareness about runaway human population growth and unsustainable consumption and their close link to the endangerment of other species is the stimulus to mobilize the Audubon Society population of members who recognize the value in adamantly fulfilling this initiative. It was just two centuries ago we witnessed the abundance of the passenger pigeon and Puerto Rico's Culebra parrot being eradicated by a growing human population (Population and Sustainability, 2015).

### **Future Implementation**

Recruiting youth is an increasing strength to the perpetual success of the Audubon Society's membership increase. Organizational demands invoke consideration for the way youth rely upon social media and mobile apps to communicate efficiently, effectively and responsibly. Mobile applications which tap into existing databases, which provide information about avian species, habitat needs and life cycle information, provide a tool to teach youth about the environment around them. Quick access to mobile applications, which are efficient and effective, allow for the transfer of knowledge to youth who will become the future decision makers. These types of apps will reach out to youth, not limited to just one but to many who would be interested in this subject matter. The Audubon Society attracts a diverse youth who are more tech-savvy than older members of today. By unleashing mobile apps with features, which integrate bird appreciation, environmental solutions to population growth, habitat loss, and overconsumption, youth will gain an understanding of current day threats to avian populations through capitalizing scientific information. Education programs will capitalize on these information products to play upon the social dynamics, which relate to the youth being interested in the environment around them. After the first generation of this mobile application is developed, future implementations will benefit from continually changing technology such as faster hardware, internet speeds, vast data management schemes, and easy scenario modeling through gaming (Mobile Applications: What Is The Future Of Mobile Apps?, 2015).

Commit to the children of today to ensure that there is a landscape that supports avian populations of tomorrow. The children's use of technology will endow them with vast amounts of knowledge and avian expertise much earlier than the millennial generation, which empowers them to implement vast environmental avian specific biophysical, social, and economic sustainable transformational change. The advantage of committing to the children of today is accepting the immense Field Conservation Program constraints the youth are facing today can be turned to a trajectory of restoration, recuperation, and generalized resilience.



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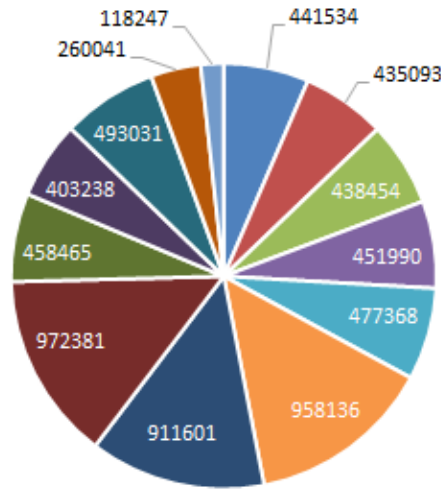
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**Figures**

**Number of Total Number of Population Age Distribution within the State of Washington, 2013.**



Data Accessed from ACS, US Census Bureau

- Under age 5
- Age 5 - 9
- Age 10 - 14
- Age 15 - 19
- Age 20 - 24
- Age 25 - 34
- Age 35 - 44
- Age 45 - 54
- Age 55 - 59
- Age 60 - 64
- Age 65 - 74
- Age 75 - 84
- Age 85+

Figure 1: Total Number of Population Age Distribution within the State of Washington, as of 2013.

### PERCENTAGE OF ETHNICITIES WITHIN THE STATE OF WASHINGTON, COMPARED TO THE UNITED STATES OF AMERICA IN 2013

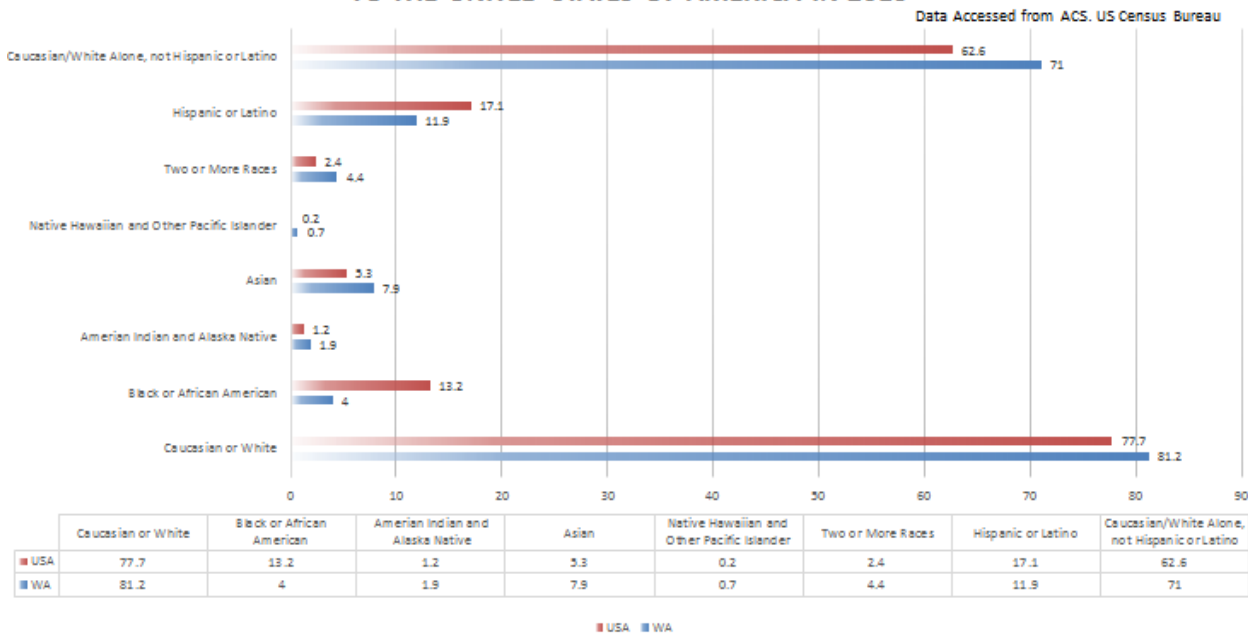


Figure 2: Percentage of Ethnicities within the State of Washington, Compared to the USA in 2013

### Total Number of Education Attained within Washington, Compared to the USA, 2013

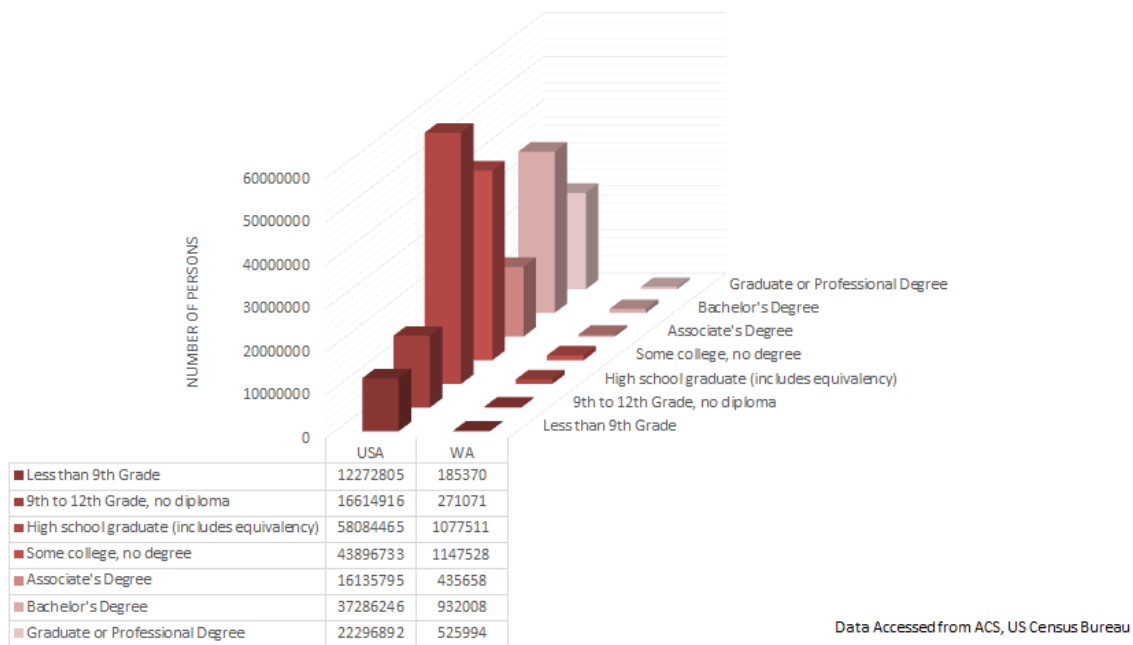
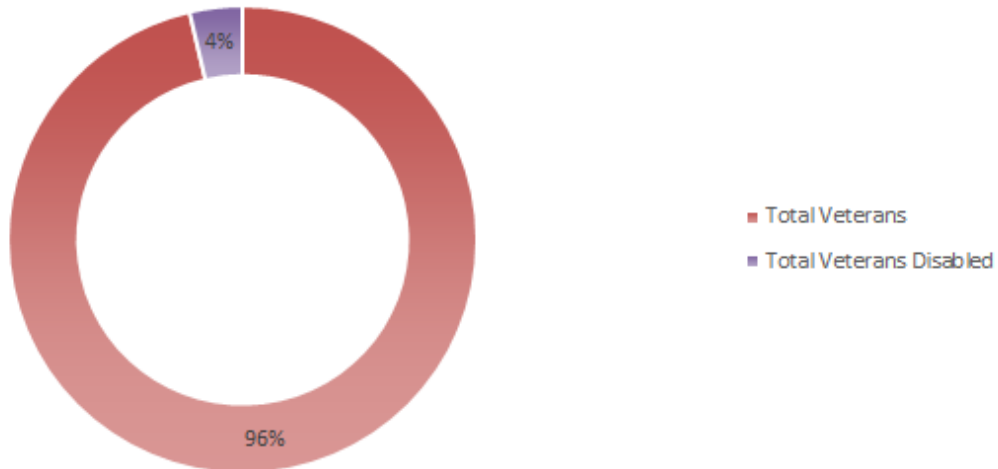


Figure 3: Total Number of Education Attained within Washington, Compared to the USA as of 2013.

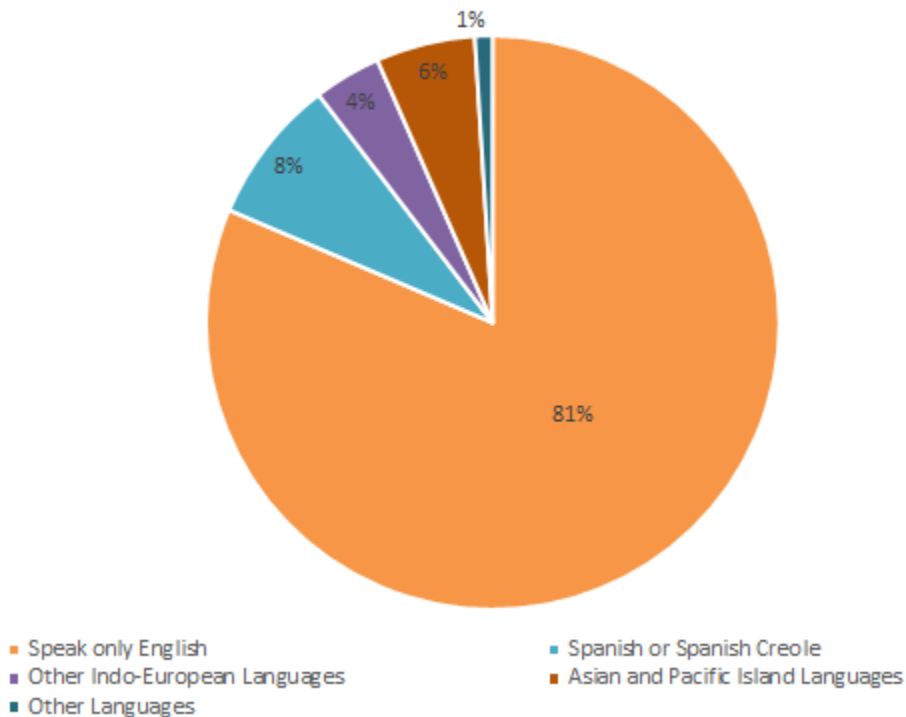
### Percentage of Disabled Veterans Compared to the Percentage of Veterans within the State of Washington, 2013.



Data Accessed from ACS, US Census Bureau

Figure 4: Percentage of Disabled Veterans Compared to the Percentage of Veterans within the State of Washington as of 2013.

### Percentage of Languages Spoken in Washington Homes, 2013



Data Accessed from ACS, US Census Bureau

Figure 5: Percentage of Languages Spoken in Washington Homes, as of 2013.

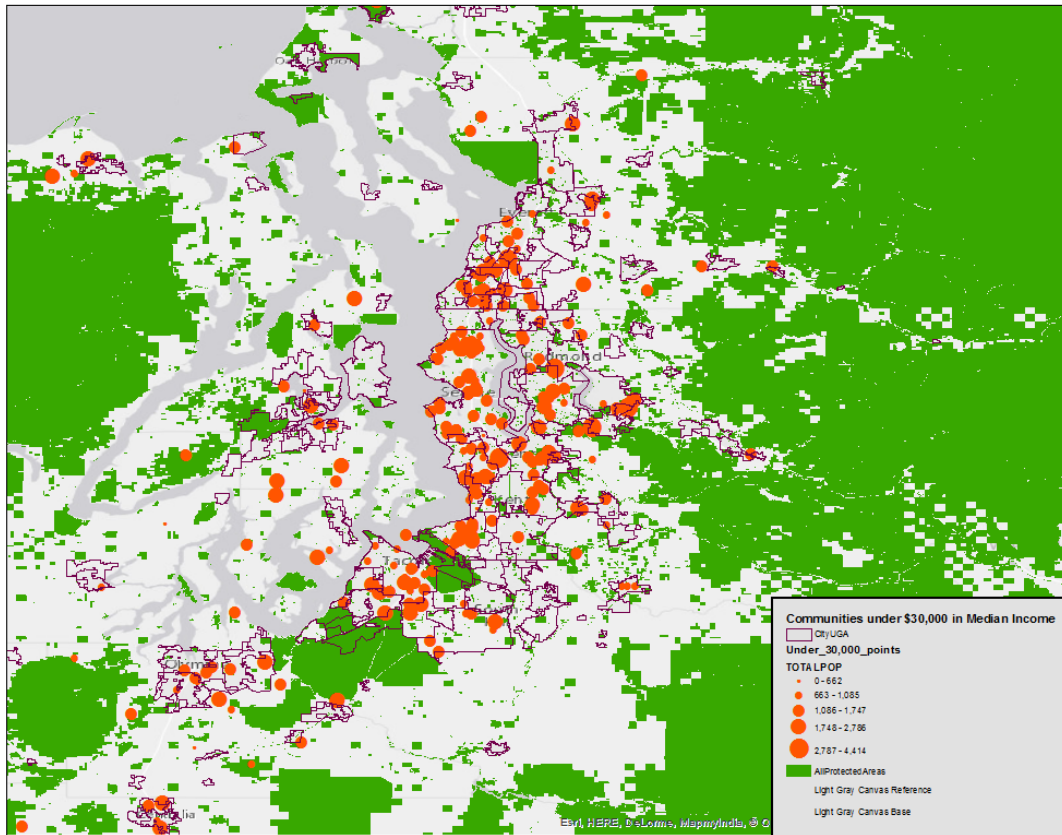


Figure 6: Communities under \$30, 000 in Median Income.

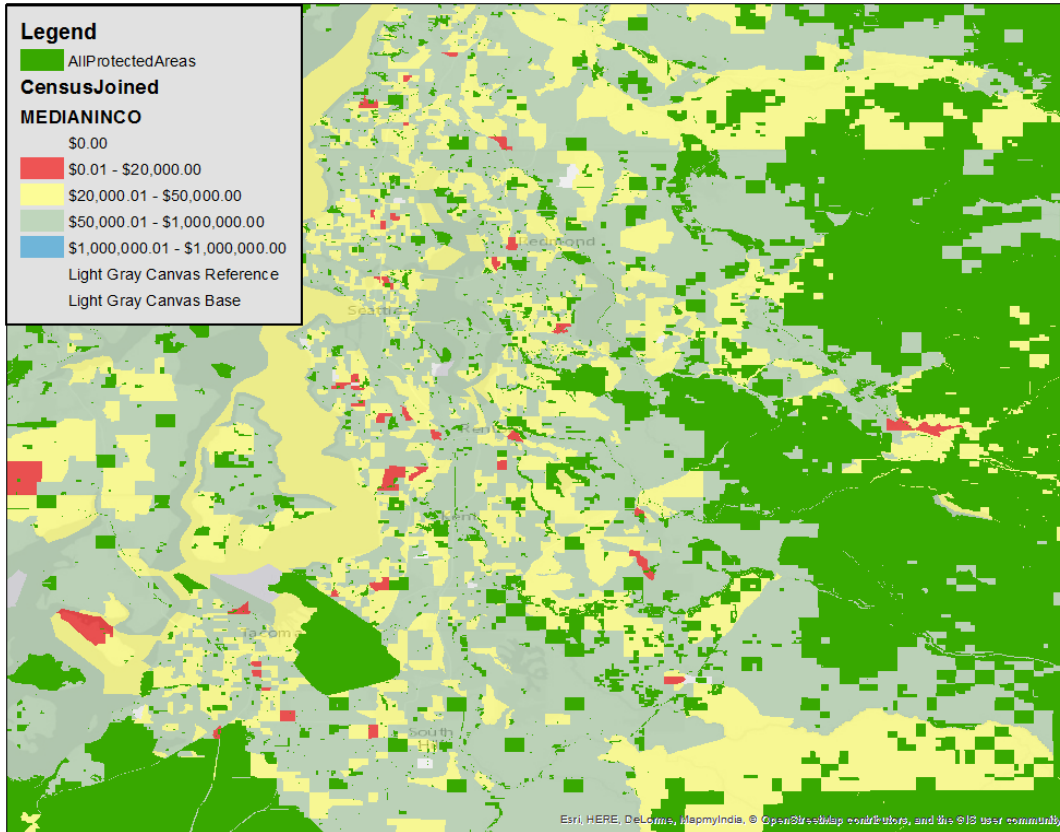


Figure 7: Low Income Communities and its Proximity to Protected Lands.



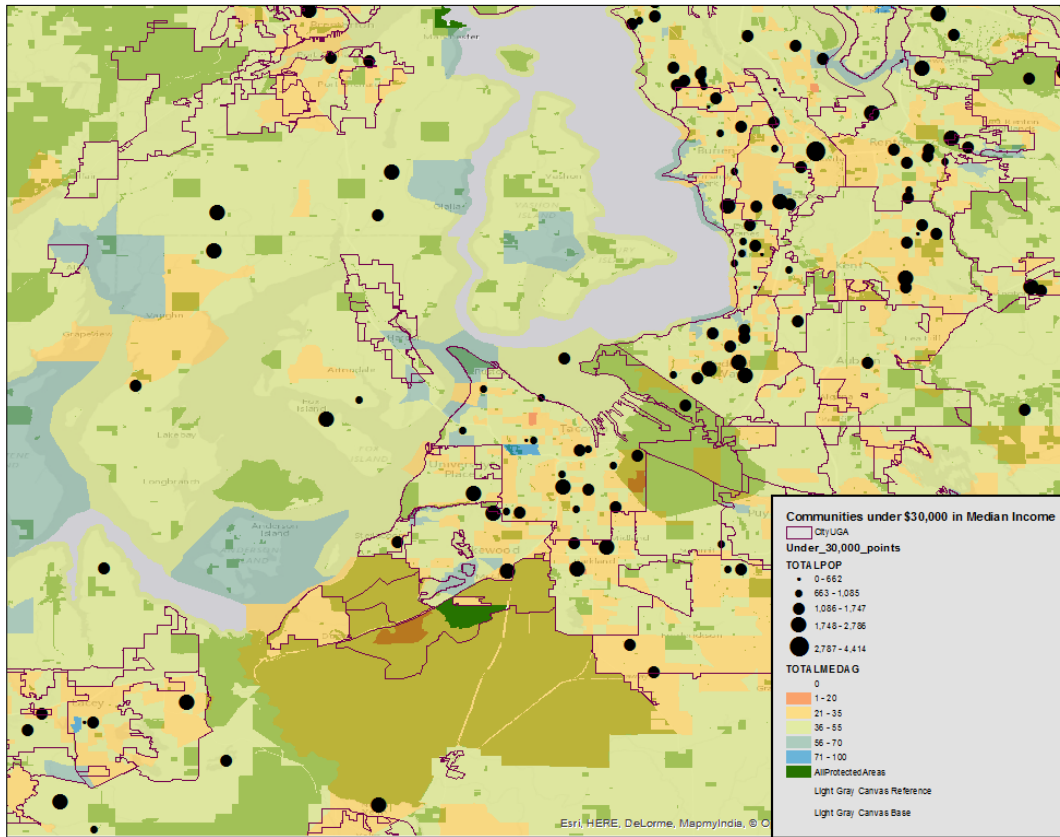


Figure 8. Younger Census Block Communities and its Proximity to Protected Lands.

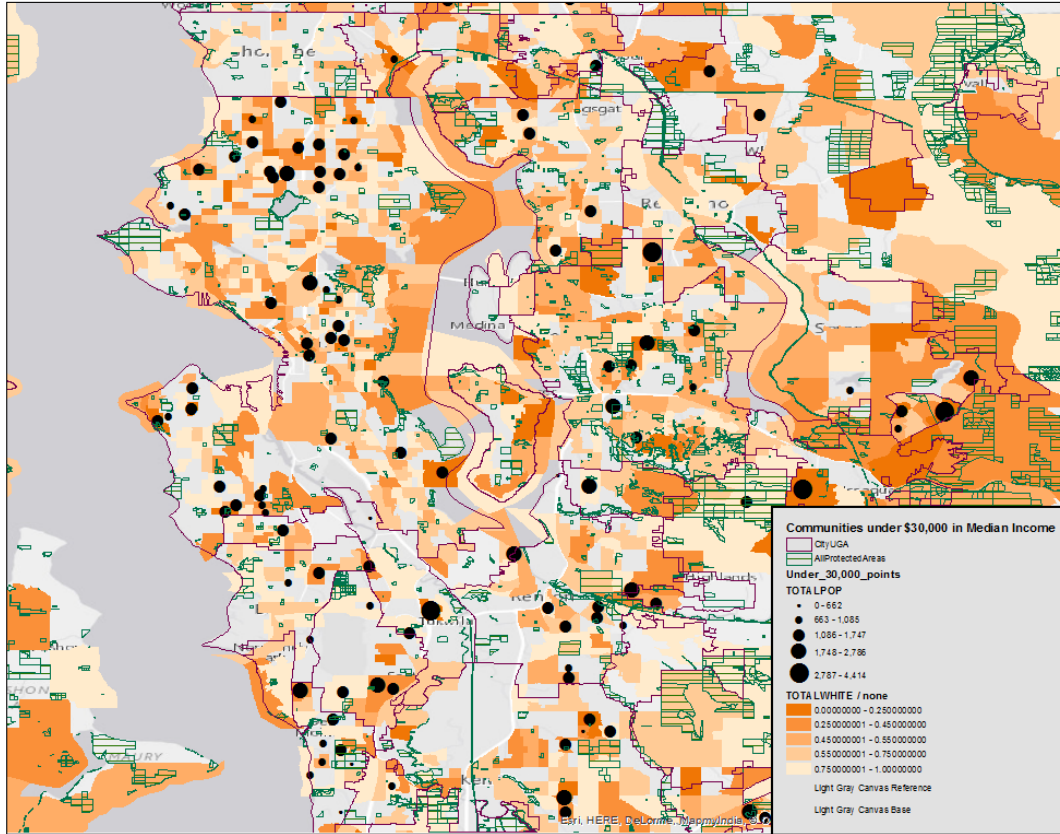


Figure 9: Low Income Communities were found in Minority Communities.

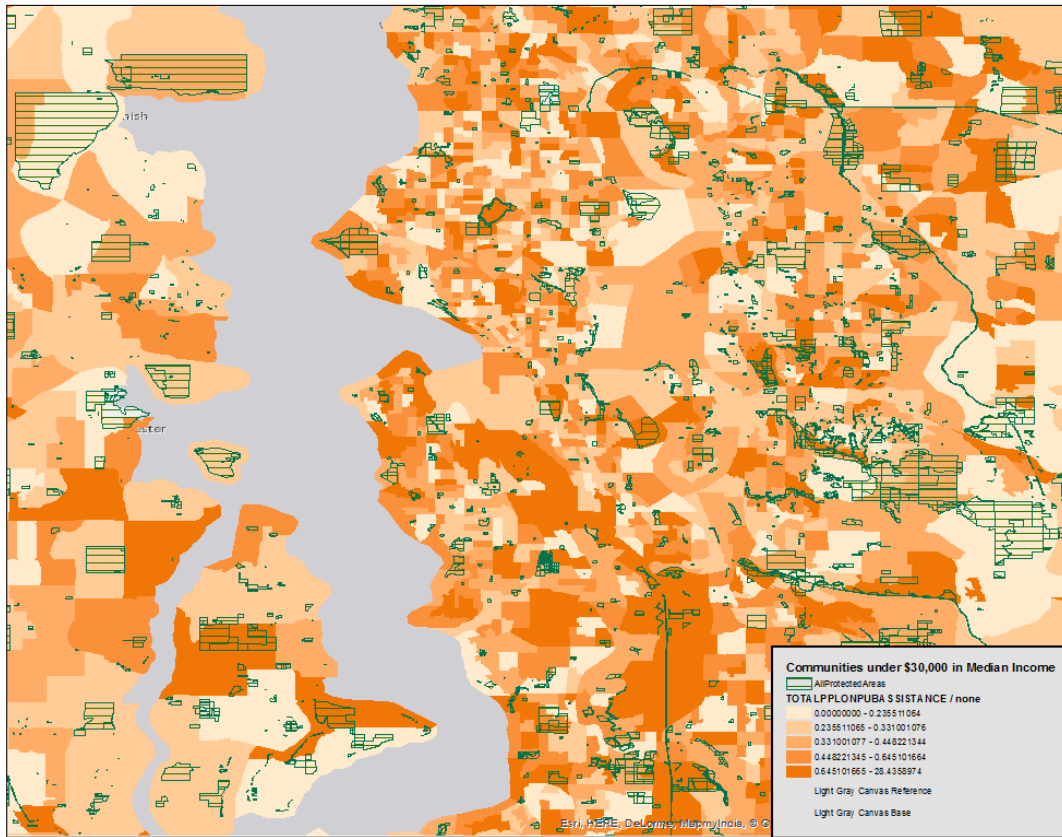


Figure 10: Census Block Group Population on Public Assistance in Proximity to Protected Lands.

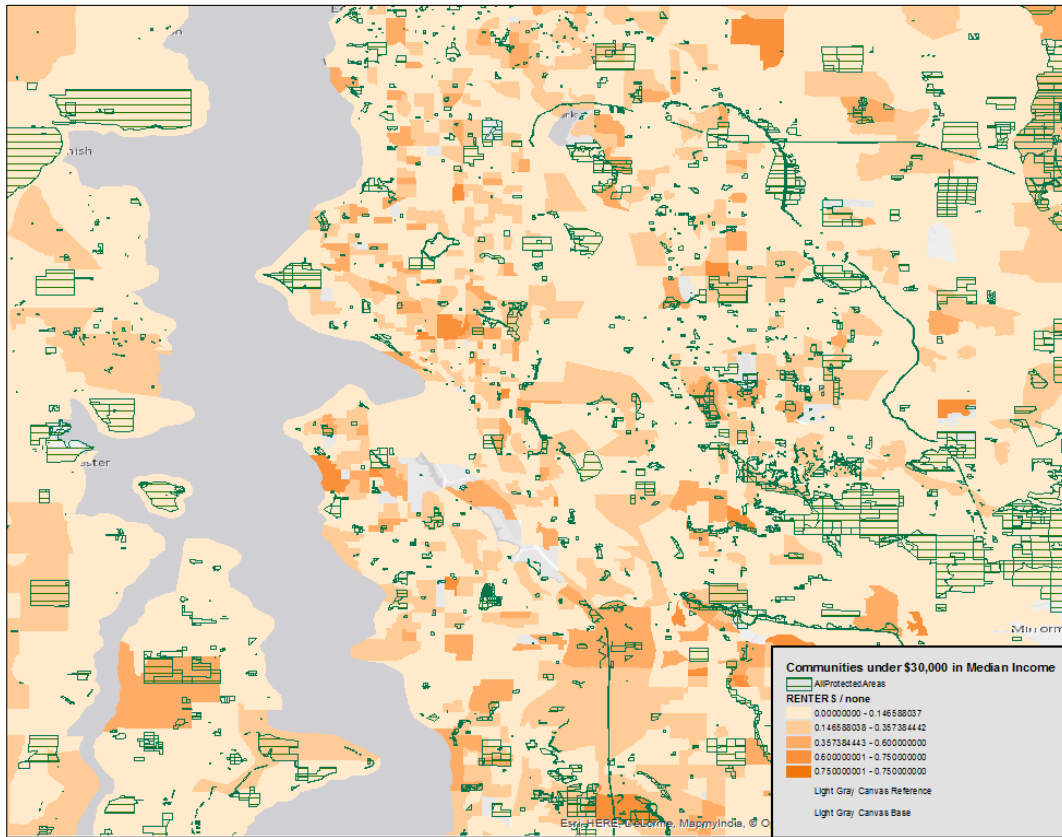


Figure 11: Proximity of Renters and Homeowners to Protected Lands.



Figure 12: Seward Park Audubon Center Citizen Scientist



Figure 13: Map of Washington's Tribes

The Lummi Nation Natural Resources Division's GIS Department is committed to sustaining the Great Blue Heron population as shown in Figure 14. (Lummi Natural Resources, 2015)



Figure 14: Lummi Nation Great Blue Heron Nesting

A wide variety of birds are in abundance within the Confederated Tribes of the Colville Reservation, a confederation of First Americans. (The Confederated Tribes of the Colville Reservation, 2015)

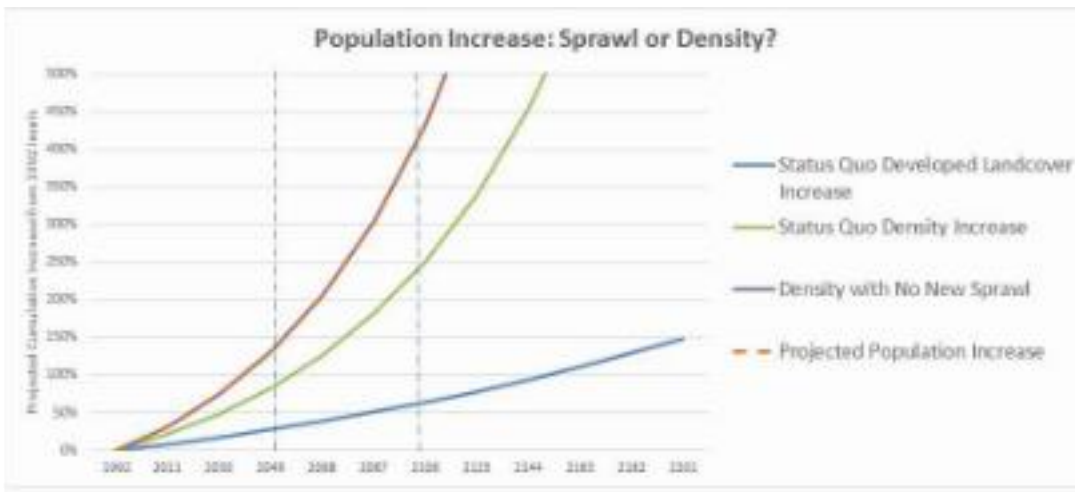


Figure 15: Projected Population Increase as it relates to Status Quo Developed Landcover Increase and Status Quo Increase.

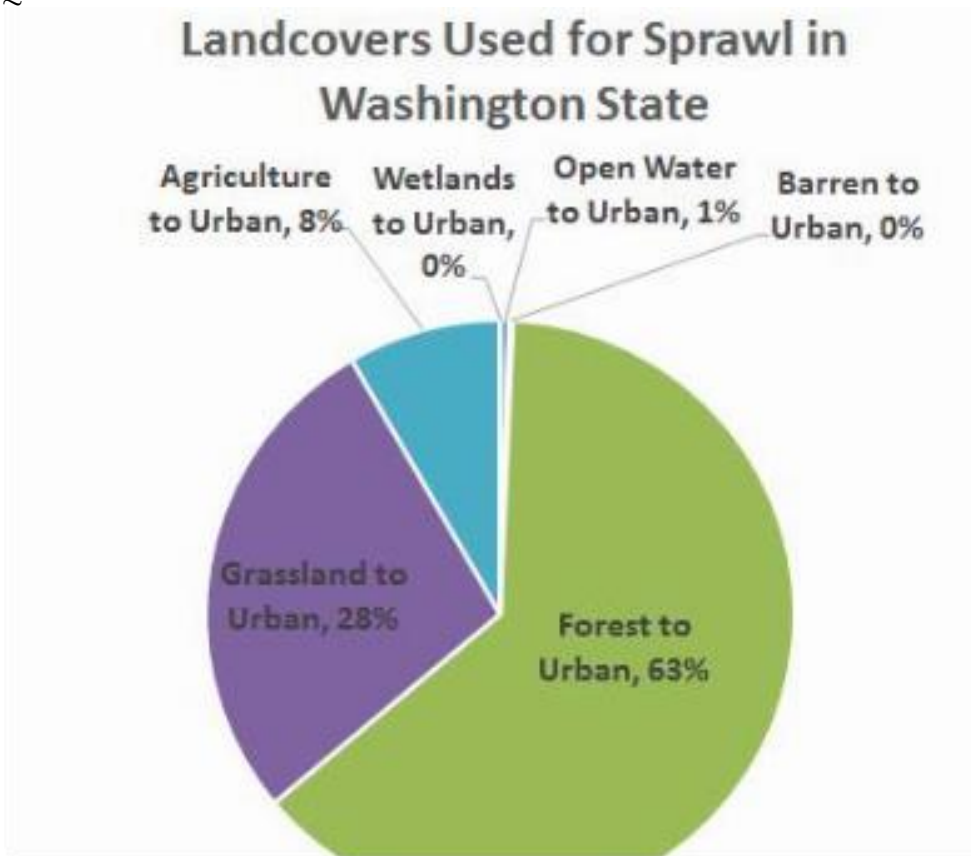


Figure 16: Landcover Used for Urban Sprawl in Washington State.

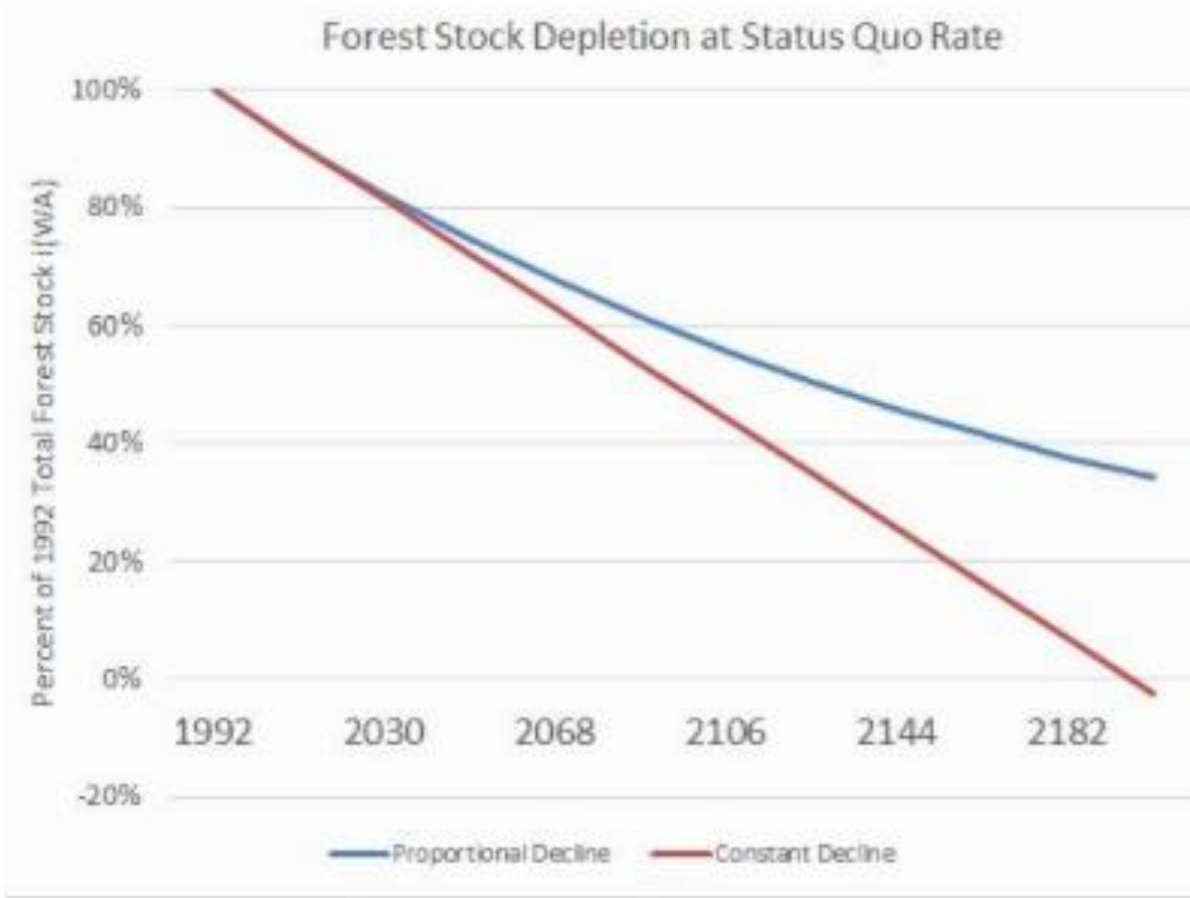


Figure 17: Forest Stock Depletion at Status Quo Rate as it Relates to a Proportional and Constant Decline.

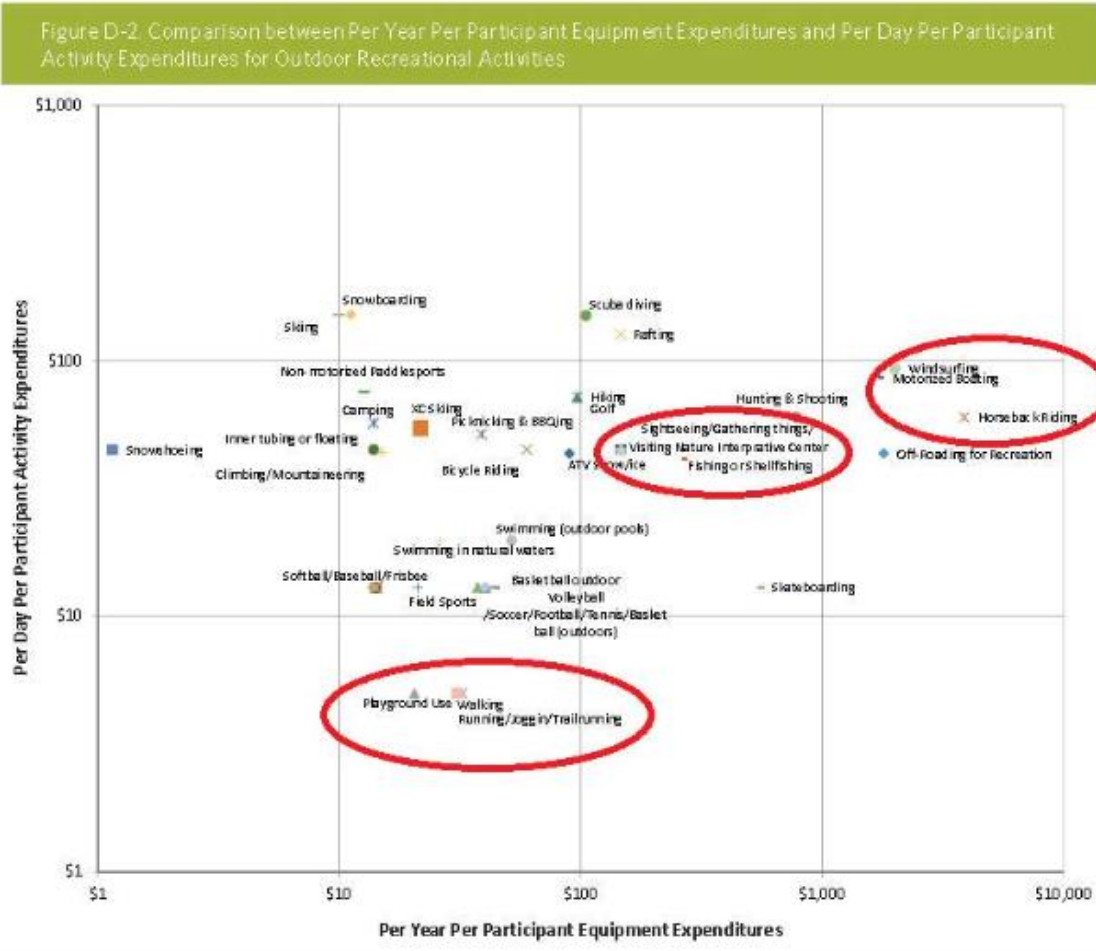


Figure 18: A scatterplot of various outdoor activities and the average per day and per year expenditures associated with participation in that activity. This ranges from inexpensive recreational activities such as walking to the privileged activities such as snowboarding.



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A story map

## Birds of a Feather Flock Together: Migrating Towards a Conservation Culture with the Washington Audubon Society

The **National Audubon Society** is a century old conservation group committed to protecting bird's population and habitat throughout the United States. National Audubon is one of many nonprofit entities that seeks to support and spread a **conservation culture**. However, in addition to climate change and bird habitat displacement, the Audubon is concerned that its **membership is aging and lacking diversity**.

This Story Map explores how **conservation culture** can be measured and cultivated. Our exploration suggests that:

- 1) **Landuse management strategies**, like protecting conservation areas and enforcing urban growth boundaries have helped guide favorable land cover changes
- 2) The spread of conservation culture is inhibited by economic, demographic, and geographic **barriers to accessing parks and wildlife areas**.

**What is Conservation Culture?**

Conservation culture, exists at all scales, from the global to personal, and has been defined as "a series of distinct aesthetic, technical, and ideological positions" which influence how people think about and interact with wilderness areas, anthropogenic development, and the use of natural resources. Conservation culture can describe philosophical beliefs and environmental awareness, but manifests personally in lifestyle choices, and politically as environmental intervention, conservation, restoration, and activism.

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ACOW 2015 will take place in Mount Vernon, WA, October 23-24. Register today!  
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**SAVE the DATE** Saturday, October 24, 2015  
Audubon Council of Washington  
Best Western Plus, Mount Vernon  
Hosted by Skagit Audubon and NW I Chapters

**HALF OF BIRDS AT RISK**

**Audubon Works**  
Audubon's new online community built to facilitate collaboration across the entire Audubon network.  
Read more

**Washington Chapter Network**  
Audubon Washington has a network of 25 local chapters throughout Washington State.  
Read more

**Birds & Climate Change**  
Speak up for birds and demand strong action on climate change!  
Read more

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**Ecological Creditors**  
Biocapacity exceeds Ecological Footprint by 100%  
0 50 100 150 200%

**Ecological Debtors**  
Ecological Footprint exceeds Biocapacity by 100%  
0 50 100 150 200%

**Biocapacity**  
Global acres per capita  
0 5 10 20 30 100

**Ecological Footprint**  
Global acres per capita  
0 14 18 22 24

NO DATA SOURCE: GLOBAL FOOTPRINT NETWORK

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**How does Washington's Conservation Culture compare?**

This map shows the biocapacity and footprints at the state level. Although Washington State is renowned for its beautiful and abundant Pacific Northwest ecosystems, its people, as a whole, are living in **ecological debt**.

Below is a list of US States by birding participation rate.

How are birding, biocapacity, and footprint related?

State	Rate
Vermont	19%
Wisconsin	18%
West Virginia	18%
Wyoming	11%
Alaska	10%
Connecticut	10%
Texas	10%
New Hampshire	10%
Oklahoma	10%
Colorado	10%
Minnesota	10%
Illinois	10%
Michigan	10%
Pennsylvania	10%
South Dakota	10%
Washington	10%
Arkansas	10%
Indiana	10%
Oregon	10%
Tennessee	10%

U.S. Average: 20%

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2:08 PM 8/20/2015

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**Birds of a Feather Flock Together: Migrating Towards a Conservation Culture**  
 with the Washington Audubon Society

**Biocapacity and Footprint: Understanding Landcover**

**Legend**

- Forest & Woodland
- Shrubland & Grassland
- Semi-Desert
- Polar & High Mountain Vegetation
- Alpine Vegetation
- Nonvascular & Sparse Vascular Rock Vegetation
- Agricultural Vegetation
- Developed & Other Human Use
- Introduced & Semi-Natural Vegetation
- Recently Disturbed or Modified
- Open Water
- Mixed physiognomy wetlands

Legend for the USGS Protected Area Database

This map shows the current landcover interpretation given by the US Geological Survey. **Zoom in** on your area and see how much of your area is for human use.

The State is now home to **7.06 million** people who live in a variety of communities from the densely developed inner city to the suburban town, exurban sprawl areas, and rural villages (salmon pink).

Non-agricultural human use (maroon) is characterized by millions of acre of timberland across the state. The large stretches of agricultural areas (beige) intermingled with shrubland/grassland and semi-desert ecosystems can be seen in Eastern Washington.

**Planning and Policy: Measuring and Directing Landcover Change**

This map shows Landcover change from 2006 to 2011. Zoom in to an area of interest. Immediately noticeable is the large number of new grassland and barren patches, which is

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**Birds of a Feather Flock Together: Migrating Towards a Conservation Culture**  
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**Planning and Policy: Measuring and Directing Landcover Change**

This map shows Landcover change from 2006 to 2011. Zoom in to an area of interest. Immediately noticeable is the large number of new grassland and barren patches, which is mostly due to **deforestation**. Few of these patches are reforested within 5 years, which one can see as green pixels.

Zooming in near cities, one can see new **urban expansion and sprawl**. Pink is characterized by sprawl whereas red is high density development.

The Landcover change data is overlaid with city (black), urban growth boundaries (grey), and protected outdoor recreation areas (green boundaries). You can see how different conservation management strategies have shaped these landcover changes. Click on the areas to identify which city, urban growth area, or protected areas are close to your home. You can see, the core areas of the National Parks are relatively untouched, while most new developed pixels occur within city and urban growth boundaries.

Landcover changes can be measured in percent change over time, a measure of exponential growth, the implications of which most people do not understand. Even a 1% growth rate equates to a doubling time of about 70 years. This video tells a good allegory for understanding exponential growth.

**How does this data enable measuring success and planning?**

**20 Years of Urban Development and Sprawl - Destination Density**

This map shows the spread of urban landcover from 1992 to 2011 in a spectrum of red

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 Birds of a Feather Flock Together: Migrating Towards a Conservation Culture with the Washington Audubon Society

### 20 Years of Urban Development and Sprawl - Destination Density

This map shows the spread of urban landcover from 1992 to 2011 (in a spectrum of red being high density development and pink being low density development). All the grey area shows landcover that was urban in 1992 and still was in 2011. The black lines are city boundaries and the white lines are Urban Growth Boundaries, which were established as part of the Washington State Growth Management Act in 1990.

The 20 year landcover change data shows an 8.6% increase in urban landcover. Population growth in Washington State over the last 20 years was 32.2% and is projected to increase at a similar rate. The data reveal that over 20 years, the State of Washington has increased its population density 21.7%. Think of this as for any land area adding 1 new Washingtonian for every 5 Washingtonians.

Rapid urban growth and sprawl is responsible for many environmental and social changes in the urban environment. We can use historical GIS data to determine the average population density of urban landcover, how its changing, and how we might model the future. Look at the graph below to see how these growth rates project into your future.

**Do you think Washington has been successful in managing growth?**

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### 20 Year Forest Losses: Modeling Rates and Stocks

The map on the right shows acreage that was forest in 1992 (pink) and in 2011 (green). The total acreage of forests has declined 9.3% over the past 20 years. About 81.1% of these losses are to forestry (conversion to barren or grassland), 10.4% of these losses are to urbanization, and 6.6% to agriculture.

Forests provide important habitat for diverse communities of plants, fish, and wildlife. The loss of forests to timber and development not only threatens forest-dwelling species like the Barred Owl, but it also has devastating direct and indirect effects like landslides, erosion of soil, and the warming and sedimentation of rivers.

Spatial data allows us to measure changes against the existing stocks of land covers. Under "status quo" extraction rates we would reach ZERO forest acreage in Washington State by 2200 (see graph below).

Community forests have been presented as potential solution to the relatively low value secured by selling logs instead of manufactured wood products.

**What do you think can be done to stop deforestation?**

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Birds of a Feather Together: Migrating Towards a Conservation Culture with the Washington Audubon Society

economically "exclusive".

People with incomes less than \$30,000 per year participate in birding at a rate of 15-16%, whereas folks with incomes exceeding \$75,000 participate in birding at a rate of 24%. A similar skew exists for highest levels of education attainment: 15% among high school graduates and 28% college graduate. Regardless of income, people within metropolitan statistical areas (MSAs) participate in birding at a rate of 12-15%, whereas folks outside those areas participate at a rate of 22%.

Limited access to nature is correlated to exposure to environmental pollution, and together, speak to "environmental inequality".

What can be done to make parks and nature more accessible?

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The Natural Wealth Gap: People of Color

This map shows the heat map of communities of color (from white) with Median Income less than \$30,000 with the USGS Protected Area Database, which includes federal, state, county, municipal, tribal, and private lands. Zoom in and out to note the geographic distance between the nodes and various protected lands at different scales.

Several sources show lower participation rates in outdoor recreation for people of color than for white people. For example, in 2011, the National Park Service found that only 22% of visitors were people of color, although the US population is 37% people of color.

The participation rate in birding is less than 10% for people of color and 24% for white people.

Nearly 50% of all outdoor recreation in the US is conducted by married couples. Both Hispanic and Black people of color have lower marriage rates, which may prove a burden to single parents in terms of the time available and resources for outdoor recreation.

A US Forest Service study out of Oregon found that "ethnic minorities have little awareness of the recreation opportunities available to them on public lands."

The Outdoor Foundation's 2013 Outdoor Participation report found different participation rates for various people of color surveyed:

www.outdoorfoundation.org/pdf/ResearchParticipation2013.pdf

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A story map  
 Birds of a Feather Flock Together: Migrating Towards a Conservation Culture with the Washington Audubon Society

**The Natural Wealth Gap: Young People**

This map shows a heat map of the lowest median age communities under \$30,000 in Median Income with the USGS Protected Area Database, which includes federal, state, county, municipal, tribal, and private lands. Zoom in and out to note the geographic distance between the nodes and various protected lands at different scales.

A US Fish & Wildlife Survey found that people under 34 participate in birding at a rate less than half of people over 55.

A US Forest Service study found that outdoor recreation usually happens in a social family context, but when the older generation is not interested, the rest of the family usually does not participate.

There is a tremendous body of research speaking to the benefits of outdoor play and exposure to nature for young people. Following is a summary of the many benefits that regular play in nature has for children:

- Children with symptoms of Attention Deficit Hyperactivity Disorder (ADHD) are better able to concentrate after contact with nature (Taylor et al. 2001).
- Children with views of and contact with nature score higher on tests of concentration and self-discipline. The greener, the better the scores (Wells 2000, Taylor et al. 2002).
- Children who play regularly in natural environments show more advanced motor fitness, including coordination, balance and agility, and they are sick less often (Grahn, et al. 1997, Fjortoft & Saguele 2001).
- When children play in natural environments, their play is more diverse with imaginative and creative play that fosters language and collaborative skills (Moore & Wong 1997, Taylor, et al. 1998, Fjortoft 2000).
- Exposure to natural environments improves children's cognitive development by improving their awareness, reasoning and observational skills (Pyle 2002).
- Nature buffers the impact of life's stresses on children and helps them deal with

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**The Natural Wealth Gap: Disabled Veterans**

This map shows the heat map of disabled veterans living in census tracts with Median Income under \$30,000 with the USGS Protected Area Database, which includes federal, state, county, municipal, tribal, and private lands. Zoom in and out to note the geographic distance between the nodes and various protected lands at different scales.

There is growing attention in the popular press to the positive effects of outdoor recreation on veteran mental health. More and more formal research is being conducted on this theme, as seen in this video. A recent study has shown that a group outdoor recreation expedition shows, on average, 10% improvement in psychological well-being, a 9% increase in social functioning, and a nearly 8% gain in positive life outlook.

These experiences provide camaraderie, a space for peaceful reflection, and can appeal to soldiers' mission-orientation with planning and preparation, equipment, and execution in their elements.

Programs started by veterans themselves have emerged across the U.S. Many of these programs have a focus on the healing power of interacting with nature through outdoor recreation. Examples include Wounded Warriors in Action Foundation, Project Healing Waters, Veteran Outdoors, Veterans Conservation Corps of Chicagoland, and Growing Veterans, among many others.

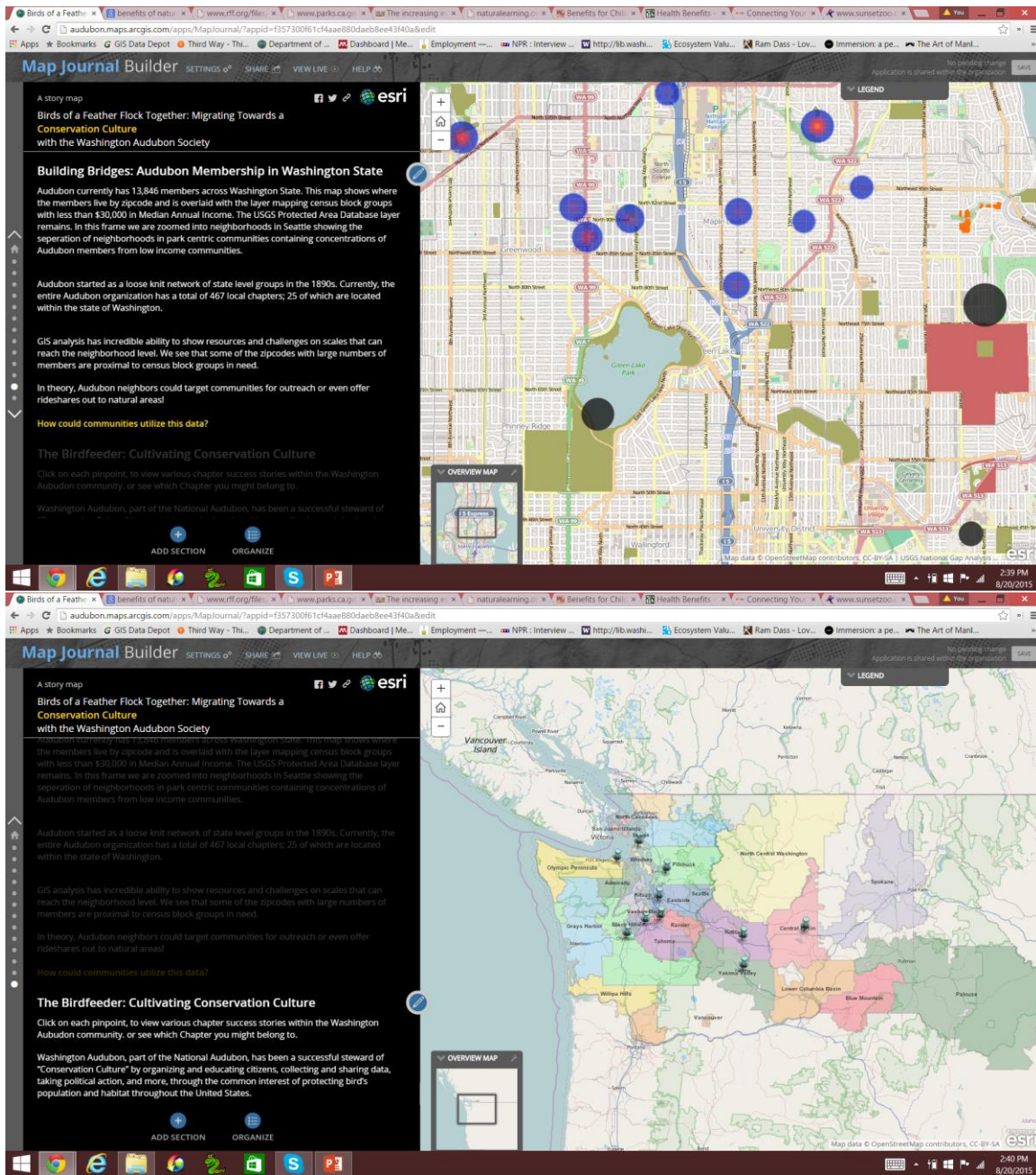
**Building Bridges: Audubon Membership in Washington State**

Audubon currently has 13,546 members across Washington State. This map shows where the members live by zipcode and is overlaid with the layer mapping census block groups with less than \$30,000 in Median Annual Income. The USGS Protected Area Database layer

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*“Figures 19: Birds of a Feather Flock Together: A Story Map Illustrating the Migration of Conservation Culture with Washington Audubon Society.*