



Flagstaff Watershed Protection Project: Public Perceptions

ERI Undergraduate Senior Research Project

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Abstract: The success of ecological restoration is heavily dependent upon public knowledge of restoration principles and perceptions of restoration treatments. In 2014, 74% of Flagstaff, Arizona voters passed a ten million dollar bond created to carry out a restoration based forest treatment project referred to as the Flagstaff Watershed Protection Project. This research project aimed to explore public perception, awareness, and support of the FWPP. Though the majority of the Flagstaff populous was initially supportive of FWPP, aesthetic landscape considerations and individualized metrics of forest health are important individual and collective factors to document to help land managers understand how perceptions and support of management practices fluctuate when these social considerations are visibly altered. Recreationists visiting the FWPP project site were surveyed to assess knowledge, perception, and support of forest restoration and FWPP. Survey results were varied but a few significant trends were identified within responses. Residential status was a major determinant in influencing recreationists' knowledge and perception of forest restoration and familiarity with FWPP. Though the majority of Flagstaff residents were familiar with FWPP, most participants could not articulate project specifics. Additionally, perception of FWPP was either supportive or not applicable due to lack of knowledge and progression of the project. Assessment of public perception, awareness, and support of FWPP will likely be more conclusive as the project progresses over time and more visible signs of treatment disturbance are detectable.

Keywords: Ecological restoration, public perceptions, wildland urban interface, disturbance based forest management, recreationists, Flagstaff Watershed Protection Project

Introduction

Ecological restoration represents an intentional effort on the part of human communities to “assist and/or accelerate the recovery of an ecosystem that has been degraded, damaged, or destroyed toward a healthier, more sustainable state, returning ecosystems to their historic trajectory” (Hill & Daniel, 2008, 34). Ecological restoration can at times be necessitated as a result of uncharacteristic, but natural processes or phenomena but most often it is human interaction with the landscape that pushes environments outside their historic range of variability.

It has been acknowledged in many scientific and scholarly research that one of the greatest barriers to effective ecological restoration is public perception and support (Olsen et. al, 2012). Public perception, values, and preferences have immense implications for restoration execution and success, “policies and practices lacking societal acceptance and approval will ultimately fail” despite being scientifically valid and economically feasible (Shindler et al., 2002, 1). Understanding societal perceptions and attitudes towards ecological restoration and human intervention within the environment can facilitate the development of land management policies and projects that are socially conscious of human considerations and preference while simultaneously accommodating and promoting the requirements of nature (Bright, et al, 2002).

Specifically within Southwestern forests, there is an evident need for ecological restoration. A number of historic factors have contributed to the current health condition of Southwestern forests that are extremely prone to uncharacteristically severe wildfire. European settlers instituted a number of land practices such as logging, fire suppression, and grazing that resulted in dense thickets of forest comprised primarily of small diameter trees. Historically, Southwestern forests were defined by open stands with large diameter trees and an abundant understory that carried low intensity, frequent fire throughout the surface of the forest floor. Ecological restoration practices in this region are characterized by disturbance based forest management that entails significant thinning to the forest and the reintroduction of fire to promote forest structures that more closely replicate historic dynamics, while simultaneously diminishing the likelihood of high severity wildfire.

Olsen, Mallon, and Shindler in “Public Acceptance of Disturbance based Forest Management: Factor Influencing Support” detail the various considerations that influence the social acceptability of restoration and land management. Some of the various factors explored by Olsen et. al include the level of trust in land management agencies and personnel, knowledge of ecological problems and solutions, citizen relations to *spatial context* (e.g. recreational sites, aesthetically valuable spots, occupational sites), perception of *temporal context* (e.g. alterations over time within specific or familiar spaces, “how soon

until a potential risk is likely to occur, and time until results of management activities are known”), and *social context* (e.g. decisionmaking process and implementation quality, risk perception, and uncertainty surrounding land management engagements) (Olsen et al., 2012, 3).

Aesthetic concerns are also closely related to acceptability of land management proposals and outcomes (Hill & Daniel, 2008). Arguments against restoration and human intervention in natural processes and ecosystems are related to perceptions of diminished recreational and aesthetic value (Bright, 2002). Cultural constructions and ideas of “naturalness” influence social acceptability and preference for certain landscape, people tending to prefer scenes that are perceived to be “natural” in appearance. “Naturalness” is generally associated with difficulty detecting “intense management, such as bare ground, downed wood or slash, or openings that appear to have been created by harvesting” (Kearney & Bradley, 2011, 149). Additionally, higher public preference is associated with a “higher number of mature trees, more vegetative ground cover, increased variation in tree and other plant species, and lower density” (Kearney & Bradley, 2011, 149). While physical indication of human intervention within natural spaces tends to result in lower public preference, if human modifications are perceived to be aesthetically or ecological appropriate within a specific space preference may increase (Kearney & Bradley, 2011). Though the importance of objective and ecological knowledge has been explored in influencing public acceptability of restoration and land management, pre-existing attitudes appear to be more significant when it comes to public acceptance (Bright, 2002).

Study Site

In November of 2012, approximately 74 % of Flagstaff, Arizona voters approved a ten million dollar bond to establish and implement the Flagstaff Watershed Protection Project (FWPP), originally identified on the ballot as Prop 405: “Forest Health and Water Supply Protection Project” (FWPP website). FWPP is a collaborative “partnership effort between the State, City and Coconino National Forest to help reduce the risk of devastating wildfire and postfire flooding in the Rio de Flag and Lake Mary watersheds” which encompasses significant portions of the Flagstaff community, including the downtown and southside neighborhoods (FWPP Website). Reducing the risk of catastrophic fire and subsequent flooding within these critical watersheds necessitates a fuel reduction approach to forest management that consists of reducing crown bulk density, canopy closure, surface floor fuel loading, and expected flame length while increasing canopy base height (USFS, 2014). The techniques employed specifically within FWPP aimed at reducing the risk of fire and subsequent flooding include traditional logging, hand thinning, prescribed burn, helicopter logging, and cable logging (FWPP website).

The condition of the FWPP project area focused upon within this research project, is characterized by “dense stands with numerous dog-hair thickets on steep slopes with high fire risk with a substantial wildland urban interface “(USFS, 2014, 5). According to stand surveys completed by the United States Forest Service in 2012 and 2013 on 6,621 acres of the project area, at least 71% of the surveyed land currently has fire hazard categorization of extreme. (USFS, 2014). Of the land surveyed identified with a fire hazard of extreme, 2,582 acres are contained within the Rio de Flag watershed project area (USFS, 2014).

The portion of the FWPP project contained within the Rio de Flag watershed is referred to as Dry Lake Hills. Just north of Flagstaff, Dry Lake Hills is an area heavily frequented and utilized by recreationists, both local and visitors. The FWPP project area and more specifically Dry Lake Hills, is of “high scenic, cultural, wildlife, and recreational value. Public use of the project area is very heavy, with many heavily-used trails (for both motorized and nonmotorized use), camping areas, and rock climbing areas” (USFS, 2014, 5). FWPP will entail a number of changes for roughly 7,569 acres within Dry Lake Hills including limited access to trail networks and dramatic alteration in forest aesthetic with the presence of logging equipment, vehicles, and forest thinning.

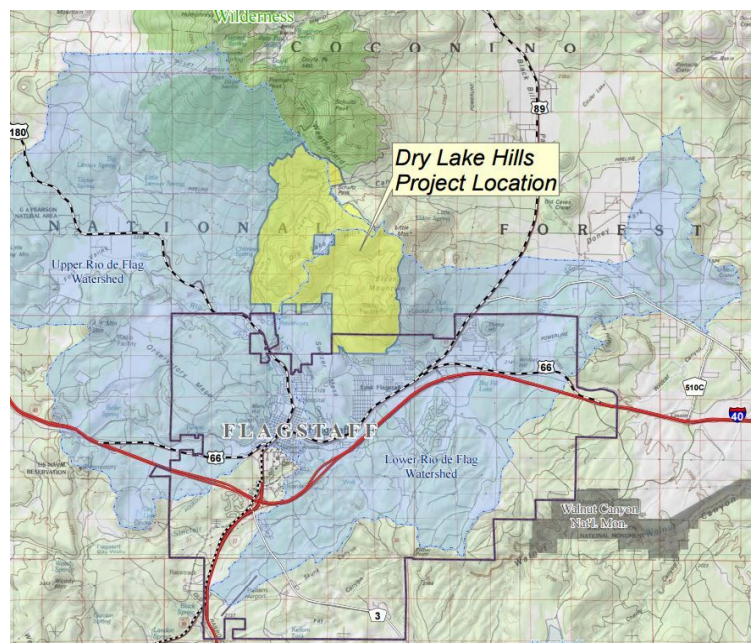


Figure 1. Flagstaff Watershed Protection Project: Rio de Flag Watershed in blue, Dry Lake Hills Project in yellow

Objectives

My research project focused on the perception of human intervention and the role of awareness and knowledge in influencing public support of the Flagstaff Watershed Protection Project. FWPP came into existence through the widespread support of the Flagstaff populous. A number of factors specific to Flagstaff can assume to be influential in contributing to the populous approval of Prop 405. A decade prior to the passage of the bond, both within and adjacent to Flagstaff, there was “notable success with forest thinning efforts, where emerging wildfires entered treated areas and were able to be effectively and safely suppressed with minimal damage” (USFS, 2014, ii). Additionally, the Schultz Fire of 2010 played a significant role in demonstrating to the Flagstaff community the need for forest treatment within the wildland urban interface. Burning over 15,000 forested acres on the east side of the San Francisco Peaks, the Schultz Fire resulted in severe flooding within the “unincorporated neighborhoods just outside of Flagstaff city limits, causing tens of millions of dollars in damage to infrastructure and private property” (USFS, 2014, ii & ERI, 2013).

Considering the circumstances specific to Flagstaff over the last decade, the community was initially supportive of the project, appearing to be aware of the need for land management to ensure the protection of our forests, watersheds, and human community. My research seeks to establish public knowledge, awareness, and support of FWPP, exploring the various social factors that influence perception, while documenting public concerns related to FWPP. Since Dry Lake hills is a major recreational area for Flagstaff residents and tourists alike and because treatment associated with FWPP will affect recreational access to the area, I decided to focus on recreationists as my selected user group. The survey targeted a wide range of recreationists in order to assess how recreational activities and interactions with nature affect knowledge, support, and perception.

Broader project objectives included:

- Assessing the general public’s understanding of forest restoration, as well as why it is occurring in the area.
- Assessing community concerns specifically about FWPP and forest restoration in general.
- Assessing how aesthetic landscape preferences factor into social acceptability of restoration.
- Assessing how recreational involvement affects knowledge, awareness, and support of FWPP and forest restoration in general.

-Assessing which recreational communities are least and most supportive, and what the various concerns of the Flagstaff's recreational community are.

-Assessing how the varying levels of knowledge about forest restoration/health and FWPP affect support.

Methods

Public perception and support was assessed by conducting an in-person survey in early July of 2016 before the majority of thinning operations occurred. An in-person survey was conducted to increase survey participation. There were three sites for survey collection, each site considered an access point to the Dry Lake Hills recreational areas and FWPP treatment sites. Three days were allotted for survey collection, one day per site. Each site was visited two times per day during peak use times to maximize the amount of recreationists encountered, the time slots for survey collection occurring from 7am to 11am and 3pm to 6pm. Surveys were collected during the weekend to increase the amount of recreationists encountered. The three sites selected for survey collection included:

-The "Y": The "Y" is the physical intersection in the road where Shultz Pass road and Elden Lookout road meet. The site is located on city land just outside of an entrance to Forest Service land and the Dry Lake Hills trail network. The "Y" is heavily frequented by recreationists, more specifically being utilized by mountain bikers.

-The backside of Buffalo Park: The backside of Buffalo Park is another location where city and Forest Service land converge. A significant amount of hikers utilize this entrance into the Dry Lake Hills area.

-Forces of Nature Trailhead: The Forces of Nature Trailhead is located at the northeast corner of the rear parking lot of Trinity Heights United Methodist Church, this site is frequented by recreationists and residents within the area and provides access to Elden/Dry Lake Hills trail network.

Survey Organization

The survey consisted of 30 questions. The survey was comprised mostly of closed-ended questions but did include three open-ended questions. Open-ended questions were employed to allow participants to unbiasedly elaborate on previous answers given during closed-ended questions or to voice general comments/concerns relate to or about FWPP.

The survey was organized into four sections: Forest Health and Management, Wildland Fire and Flooding, FWPP Familiarity and Exposure, and Demographics. The section pertaining to Forest Health

and Management consisted of four question, assessing participants' perceptions of forest health within Dry Lake Hills and their opinions on the need for/importance of forest management within the area. Wildland Fire and Flooding consisted of three questions assessing participants' knowledge of wildland fire and flooding interconnectivity and the risk of each of these phenomena to Dry Lake Hills. FWPP Familiarity and Exposure consisted of 14 questions. The various elements related to FWPP that were assessed included awareness of the project, ability to articulate project objectives, initial and continued exposure to FWPP, support and perception of FWPP, FWPP impact on recreational experience, and participation in 2012 City of Flagstaff elections that contained Prop 405 (FWPP). Demographics consisted of seven questions and were recorded at the end of the survey. Demographic information assessed the type of recreational activity participating in, frequency of recreation, place of residence, number of years in fire prone community (if applicable), age, gender, ethnicity, and level of education.

Data Analysis

Organization

Data was categorized based on the locale of the survey participant. Flagstaff residents were separated out from non-Flagstaff residents. Organization based on locale was done in order to assess how knowledge, perception, and support of forest restoration and health and FWPP was influenced by place of residence. Additionally data was categorized by recreational type and survey site to assess how these factors influenced response trends. Categorizing the data by recreational type allowed for me to analyze if recreational activity affected knowledge, perception, and support of forest restoration and health and FWPP, while categorizing the data by survey site allowed for me to explore which types of recreationists primarily utilized these sites in addition to speculating whether certain sites were primarily visited by Flagstaff or non-Flagstaff residents.

Closed-ended Questions

Data was organized by grouping survey responses by question. As previously mentioned, surveys were additionally categorized by place of residence, recreational activity, and survey site. An Excel pivot chart was used to summarize results for each question and to create a visual representation of the data. Following the organization of the data, descriptive analysis was employed to summarize survey results for close-ended survey questions.

Open-ended Questions

Opened-ended questions were analysed using open and focused coding of major themes encountered in survey results. Reviewing open-ended question responses, open coding was initially utilized to identify major themes persistent throughout the answers. Following the process of open coding, focused coding was employed to identify more specific themes or phrases indicated by participant responses. The next step in the coding process entailed the organization of the open and focused codes previously identified within larger umbrella themes. Similar themes that arose through open and focused coding were grouped together under said umbrella themes.

Results

Demographics

Out of the 31 people surveyed, 16 were surveyed at Buffalo Park, 12 were surveyed at The “Y”, and three were surveyed at Trinity Heights. Out of 31 survey participants, 19 were from Flagstaff. Out of the 31 people surveyed, 12 identified as female, 18 identified as male, and one person identified as gender neutral. Twenty-nine participants specified their ethnicity as white or caucasian and two participants specified their ethnicity as Hispanic. Out of the 31 people surveyed, one person had a high school diploma, nine people had some college, one person had an Associate’s degree, eight people had a Bachelor’s degree, nine people had a Master’s degree, two people had Doctorate’s degree, and one person specified their educational level as Post Graduate.

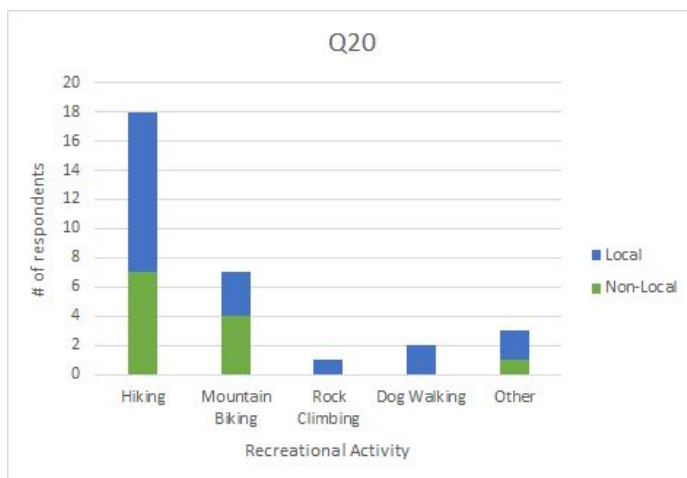


Figure 2: Question 20: *What brings you to the Dry Lake Hills area?* 58% of respondents, including both Flagstaff and non-Flagstaff participants answered hiking.

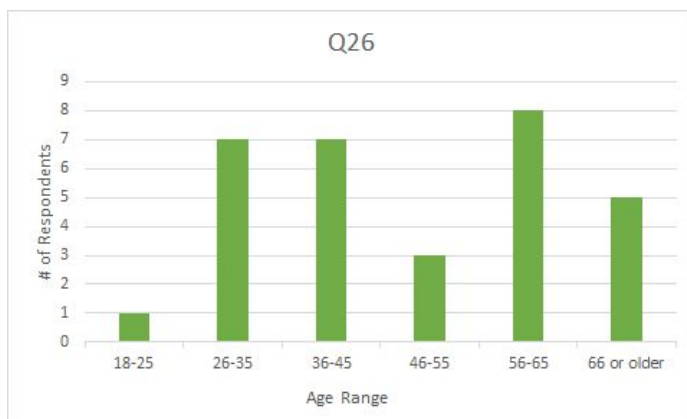


Figure 3: Question 26: *Please identify your age group.* Age range of participants varied with the most number of participants falling within 56-65 range.

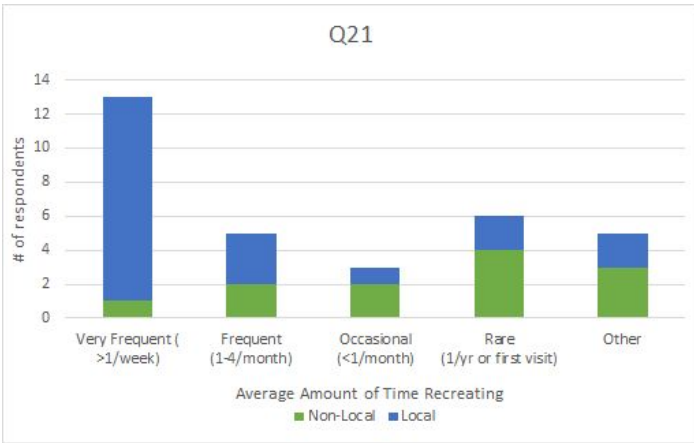


Figure 4: Question 21: *How often, on average do you recreate in Dry Lake Hills?* 42% of survey participants answered Very Frequent (>1/week). The remainder of responses were relatively evenly distributed across the additional answer selections.

Closed-ended Responses:

Forest Health and Management

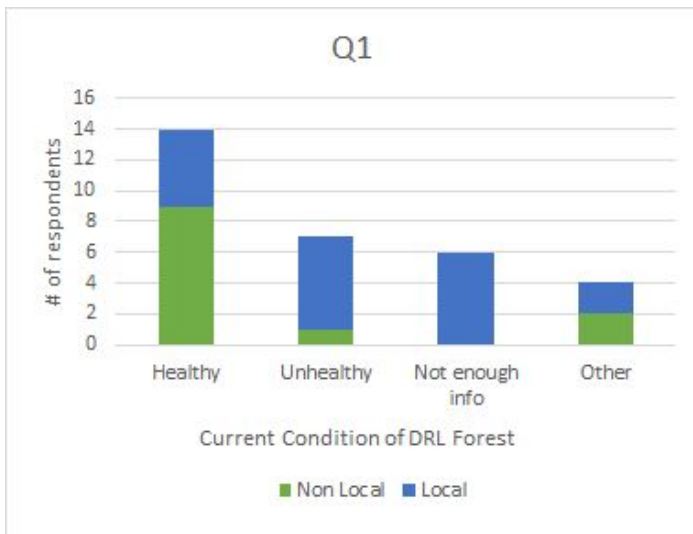


Figure 5: Question One: *In your opinion, what is the current condition of the forest within Dry Lake Hills?* The majority of respondents said that the forest was healthy, however only five of those respondents were Flagstaff residents. Local responses dominated the unhealthy and not enough info responses, although there were less of these responses than healthy.

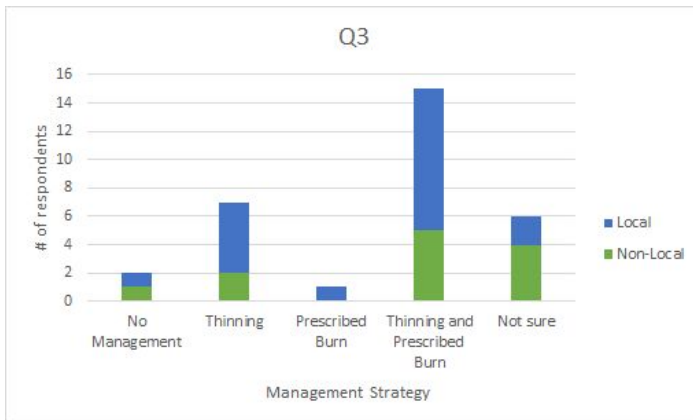


Figure 6: Question Three: *Based on the current condition of the forest within Dry Lake Hills, what do you consider to be the appropriate management strategy to be?* 48% of the respondents thought that thinning and prescribed burn was the appropriate management response, 67% of those respondents being Flagstaff residents.

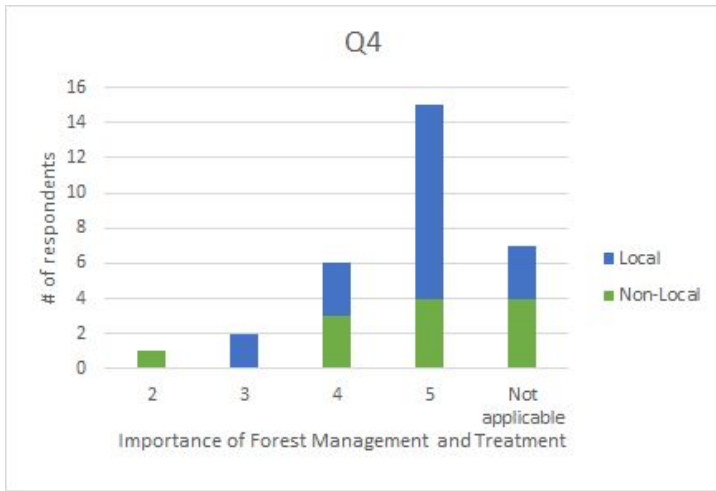


Figure 7: Question Four: *If you felt treatment was needed, how important is forest management and treatment for the Dry Lake Hills area on a scale of 1 to 5, 1 being not important to 5 being very important.* 48% of respondents answered a 5, indicating management and treatment within Dry Lake Hills to be very important. 60% of those respondents were Flagstaff residents.

Wildland Fire and Flooding

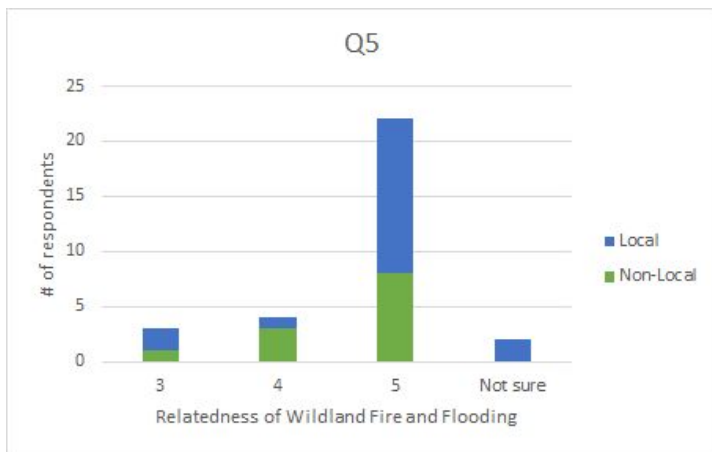


Figure 8: Question 5: *On a scale of 1 to 5, how related do you consider wildland fire and flooding to be, 1 being not related to 5 being extremely related.* 71% of respondents answered a 5 indicating wildland fire and flooding to be extremely related. Of 22 respondents that answered a 5, 64% were Flagstaff residents.

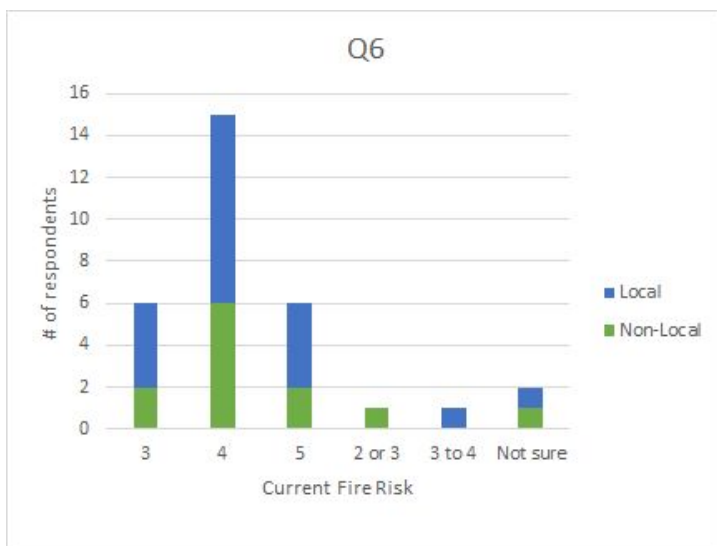
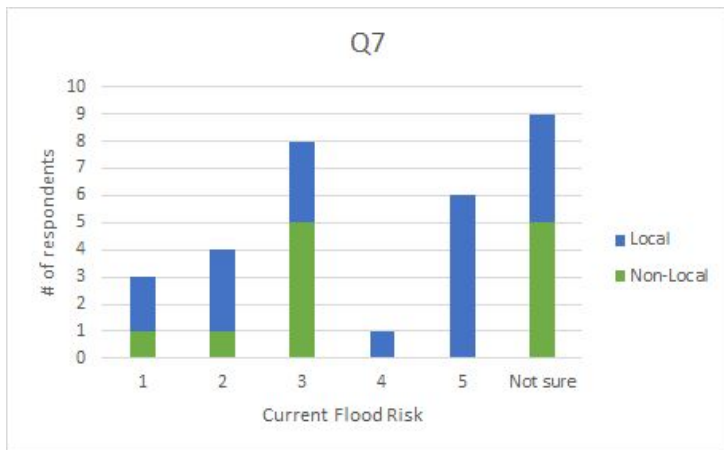


Figure 9: Question Six: *On a scale of 1 to 5, how would you rate the current fire risk to the forests within Dry Lake Hills, 1 being minimal to 5 being severe.* 48% respondents answered a 4, of that 48%, 60% were Flagstaff residents.



In Figure 10: Question Seven: *On a scale of 1 to 5, how would you rate the flood risk from the Dry Lake Hills area, 1 being minimal to 5 being severe.* The most number of respondents answered not sure. The next highest response was a 3, 63% of those respondents being non-local. Only Flagstaff residents answered a 4 or 5.

FWPP Familiarity and Exposure

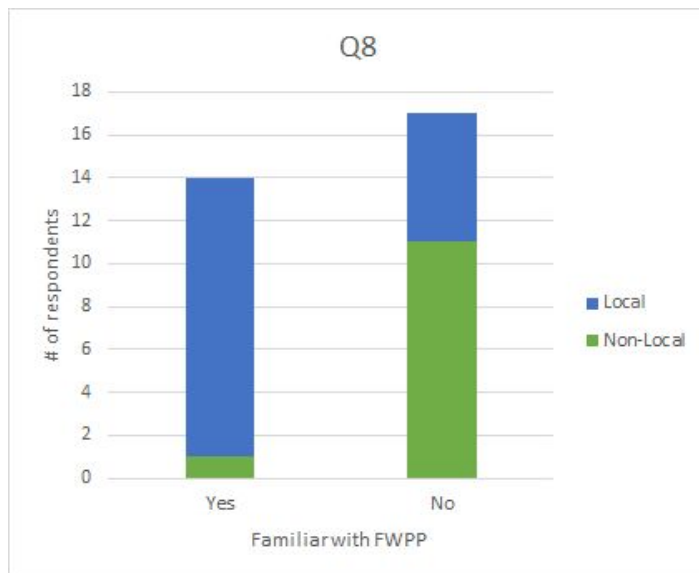


Figure 11: Question Eight: *Are you familiar with the Flagstaff Watershed Protection Project, also referred to as FWPP?* More respondents were not familiar with FWPP. Of the respondents who were familiar, only one respondent was a non-local.

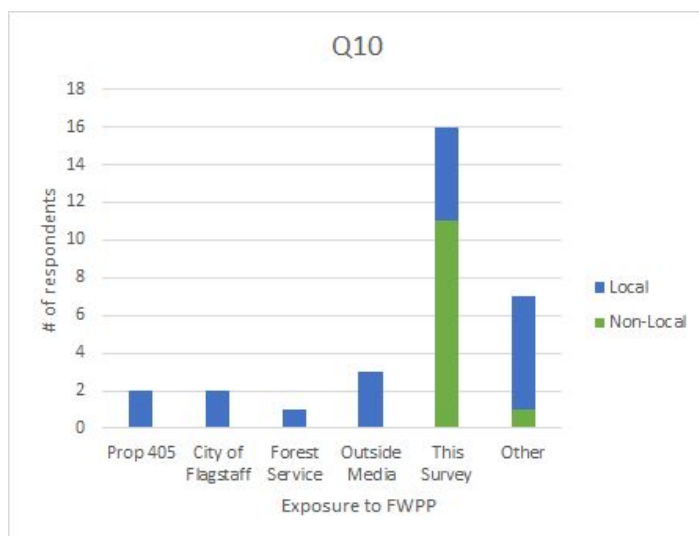
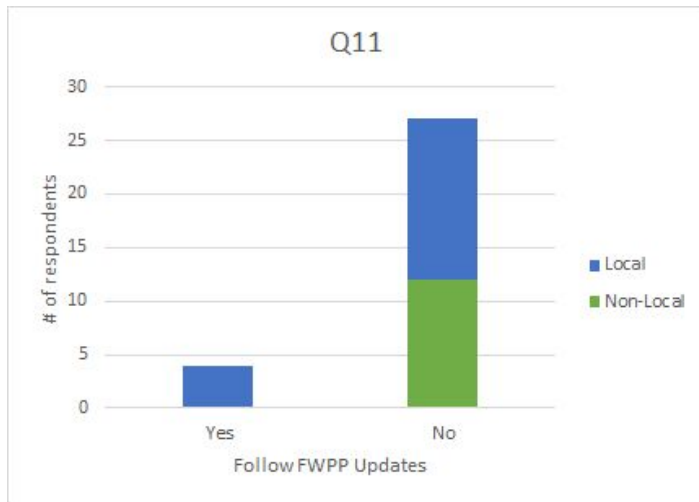


Figure 12: Question Ten: *How did you first hear of FWPP?* First exposure to FWPP for Flagstaff residents was pretty evenly distributed across various sources, the most number of Flagstaff residents had heard of FWPP outside of sources identified within the survey.



In **Figure 13**: Question Eleven: *Do you follow FWPP updates?* 87% of respondents answered no, 48% of those respondents being Flagstaff residents.

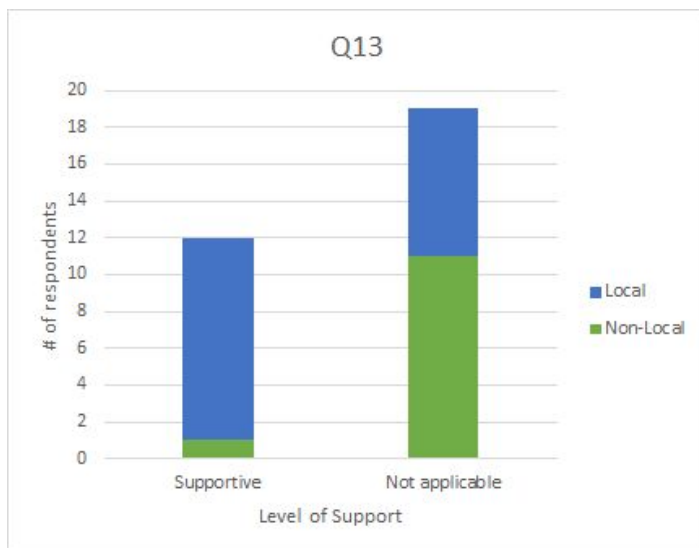


Figure 14: Question 13: *What is your level of support for FWPP?* Most respondents answered not applicable due to a lack of familiarity with FWPP. Of those that were supportive, only one respondent was non-local.

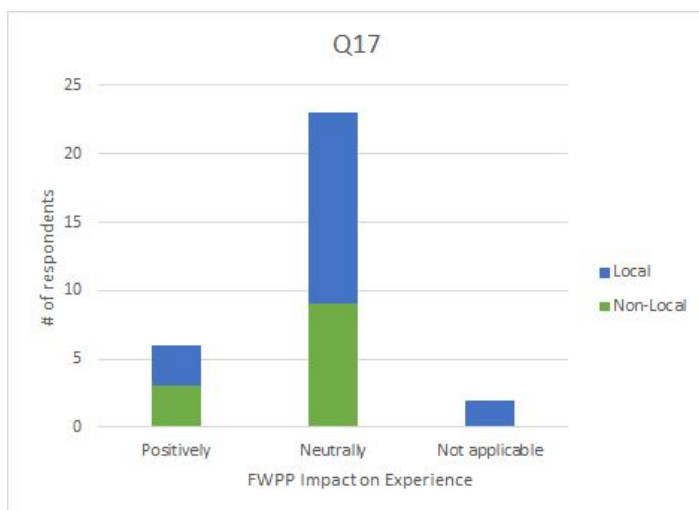
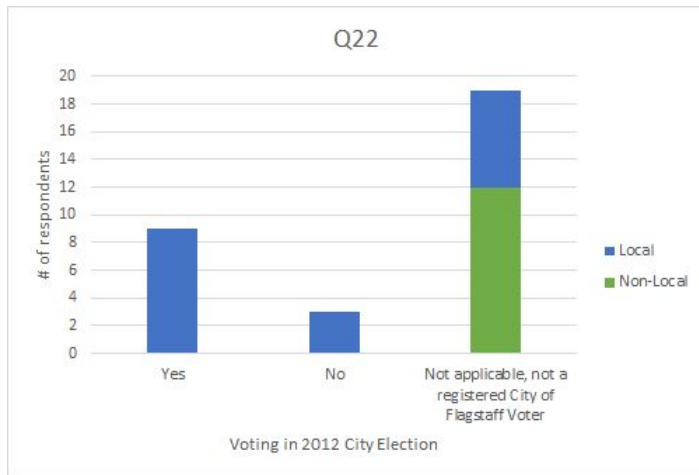
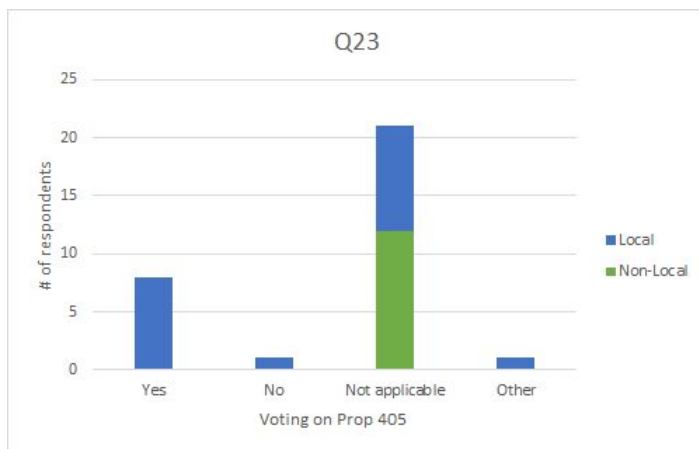


Figure 15: Question Seventeen: *Has your experience in Dry Lake Hills been affected positively, neutrally or negatively due to FWPP?* 74% of respondents' recreational impact had been neutrally affected.



In **Figure 16**: Question Twenty-Two: *Did you vote in the 2012 City of Flagstaff elections which included Prop 405?* 47% of Flagstaff respondents answered yes.



In **Figure 17**: Question Twenty-Three: *If so (in reference to question 22), did you vote yes for Prop 405?* 42% of Flagstaff respondents voted yes for Prop 405.

Responses Categorized by Site

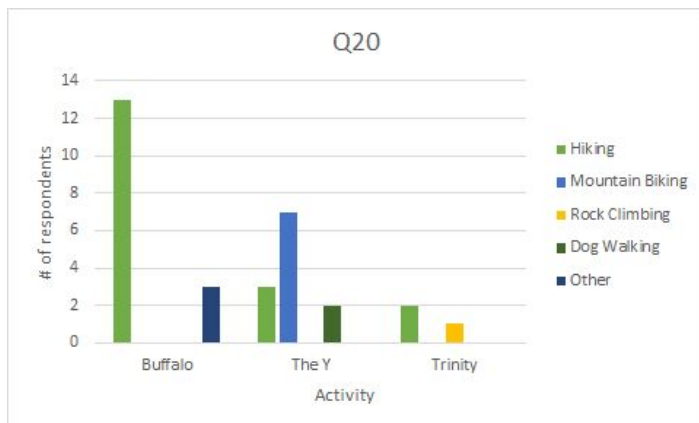


Figure 18: *Recreational activity broken down by site.* Buffalo Park captured the most hikers, while The “Y” captured the most mountain bikers.

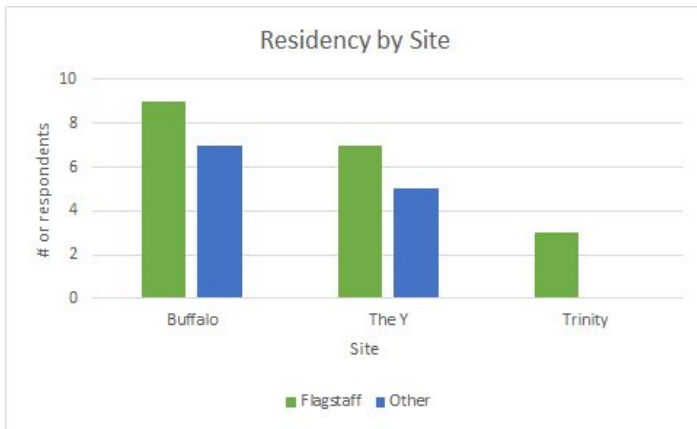


Figure 19: *Residency broken down by site.* Residency was pretty evenly distributed based on site, Trinity Heights was the only survey site that strictly captured Flagstaff residents.

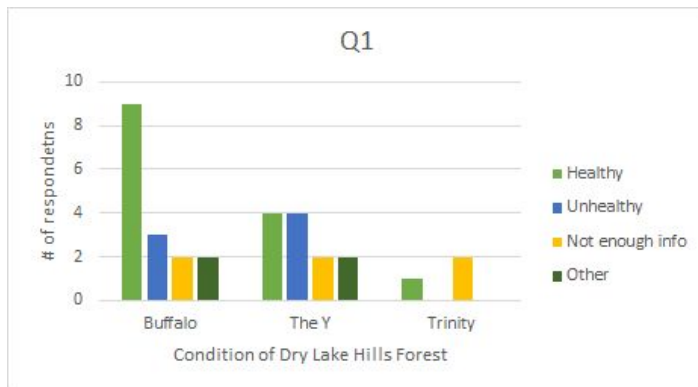


Figure 20: *Question One broken down by site, In your opinion, what is the current condition of the forest within Dry Lake Hills?* Buffalo Park had the most respondents to answer healthy. The “Y” had an equal number of respondents answer healthy and unhealthy.

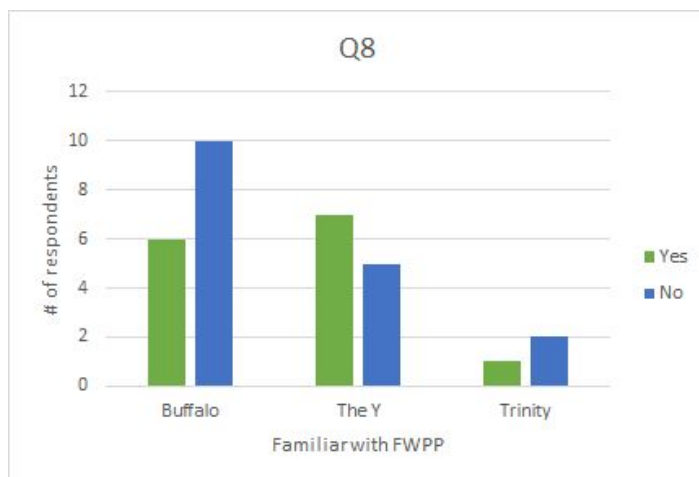


Figure 21: *Question Eight broken down by site, Are you familiar with the Flagstaff Watershed Protection Project, also referred to as FWPP?* The “Y” had the most respondents familiar with FWPP.

Open-ended responses:

Of the three open-ended questions, the results provided enough responses only for the descriptions of forest health. Of those respondents that identified the current condition of Dry Lake Hills to be healthy, I found the following themes:

Respondents associated Dry Lake Hills forest health with more aesthetic variables, encompassing considerations of beauty and the vibrancy of forest color. Survey participants commented on the greenness of the forest in their explanations of why they considered Dry Lake Hills to be healthy. Additional themes that arose in participants associations of health were biodiversity, the acknowledgement of land management, and mortality. Encompassed within the umbrella theme of biodiversity, participants mentioned the quantity of wildlife and the variety of vegetation. Whether or not participants acknowledged biodiversity for aesthetics or functionality remains unclear. Several survey participants mentioned that the presence of land management contributed to the health of Dry Lake Hills. Comments pertaining to land management referenced thinning as an indication of land management contributing to overall forest health. The lack of mortality was additionally mentioned as an indication of health, participants commenting on the lack of dead material and trees within the area.

Themes that arose within answers that identified the current condition of Dry Lake Hills to be unhealthy included: the lack of water and the density of the forest. Participants mentioned that the area appeared to be dry, in several participants responses, the lack of water was in part attributable to forest density. The theme of forest density encompassed comments mentioning the encroachment of trees, the abundance of small diameter trees, and the thickness of forest density. One participant indicated that the forest density in its current state consumes water, stifles the growth of vegetation, and can produce fire.

Discussion

Forest Health and Management

The majority of respondents thought Dry Lake Hills was healthy but that was largely due to the non-local residents surveyed; local resident responses were almost equally distributed between healthy, not healthy and needing more information. Only one non-local respondent thought the area was unhealthy. The majority of respondents thought thinning and prescribed burn was the appropriate management strategy, even though some of those respondents thought Dry Lake Hills was healthy or were uncertain about the

current condition of Dry Lake Hills. One-third of respondents who thought thinning and prescribed burn was the appropriate management strategy for Dry Lake Hills were Flagstaff residents. Almost half of the respondents thought forest management and treatment was extremely important for the area, the majority of those respondents being Flagstaff residents.

Wildland Fire and Flooding

Over half of survey respondents considered wildland fire and flooding to be extremely related. Respondents thought the current fire risk to the Dry Lake Hills area was greater than the current flood risk. The only participants who indicated a risk of 4 or 5 for the current flood risk to Dry Lake Hills were Flagstaff residents. The most number of participants answered “not sure” for assessing the current flood risk though, comprising both Flagstaff and non-local residents.

FWPP Familiarity and Exposure

The majority of survey participants were unfamiliar with FWPP. Of the participants who were familiar, only one was a non-local resident. Most respondents indicated that their first exposure to FWPP was through the survey, one non-local resident indicated that they had exposure outside of the survey. Outside of the survey the highest exposure to FWPP was “other” non specified sources of information. Majority of survey respondents answered not applicable for level of support for FWPP this being attributable to lack of project familiarity. Similarly the majority of respondents answered not applicable when asked to assess the projected success of FWPP and the importance of FWPP for forest health and water supply, both these trends additionally being attributable to lack of familiarity with the project.

General Trends

Place of residency significantly influenced perceptions of health and knowledge related to forest dynamics and restoration treatments. Flagstaff participants were more knowledgeable about the forest dynamics that contributed to the current health condition of Dry Lake Hills, additionally being cognizant of the need for and importance of forest management within the area. Similarly, more Flagstaff participants indicated wildland fire and flooding to be intimately related. While assessment of current fire and flood risk to Dry Lake Hills captured almost the entire range of answers possible, Flagstaff participants were more likely to indicate a higher risk within each of these areas.

Public perceptions of forest health were based on different metrics. For participants who possessed less knowledge or direct experience with forested ecosystems of the Southwest, visual aesthetics defined their

notions and perceptions of health. Flagstaff residents being more familiar with historic and current conditions of Southwestern forests considered factors outside of aesthetics such as stand dynamics and functionality when assessing health.

Participants' possessed less knowledge related to FWPP than initially predicted. While the majority of Flagstaff residents were familiar with FWPP, only a few participants demonstrated the ability to express project objectives. In regards to project impact on recreational experience, the majority of participants indicated that their experience had not been affected either positively or negatively. Neutrally impacted individualized experience could be attributable to the lack of physical signs of disturbance associated with project progress.

Conclusion

Project objectives were met with varying success. In regards to the objective assessing the general public's understanding of forest restoration, participants demonstrated knowledge related to appropriate management strategies and treatments necessitated for Southwestern forested ecosystems in addition to demonstrating an understanding of an explicit connection between wildland fire and flooding. In regards to the objective intended to assess community concerns related to FWPP, no explicit public concerns were expressed. The lack of public concerns related to FWPP was likely attributable to the stage of project enactment and lack of physical signs of disturbance associated with the project. With a lack of individualized contact with the project or impact on recreational experience, participants didn't express a whole lot of commentary. In regards to the objective related to aesthetic landscape preferences and social acceptability of restoration, the lack of physical disturbance associated with the project was not pronounced enough to explore how alteration to forest aesthetics affects acceptability of forest management treatments. In regards to the objectives assessing how recreational involvement affects knowledge, awareness, and support of FWPP/ forest restoration, recreational affiliation proved to have less impact on these factors than initially anticipated. When analyzing the data, no visible trends were discernable that variation of recreational activity affected knowledge, support, and awareness in any significant way. In regards to the objective assessing levels of knowledge related to forest restoration, health, and FWPP and the role of knowledge in influencing public support, responses were not varied enough to explore how factors of knowledge and support are connected. Most participants were supportive of FWPP or answered not applicable due to lack of familiarity with project, but the assessment that support was connected to the possession of knowledge related to forest restoration, health, and project treatment could not be determined.

In summation, the monumental understandings that were gathered from survey results included the connection between residential status and knowledge and the lack of explicit knowledge related to the Flagstaff Watershed Protection Project. Flagstaff survey participants possessed more knowledge about forest restoration and conditions connected to ecosystem health than non-local residents. Perceptions of health invoked considerations related to forest functionality and interactions between biotic and abiotic factors when cognizance of forest restoration principles. Non-local residents, less likely to possess knowledge and extensive experience related to Southwestern forested ecosystem, associate health with more aesthetic considerations such as beauty, vibrancy of forest color, and abundant presence of vegetation. In regards to lack of explicit knowledge about FWPP, though the majority of Flagstaff participants were familiar and supportive of FWPP, ability to articulate project specifics was less pronounced than initially anticipated. This insight potentially sheds light on the disconnection between project objectives and name recognition. Though participants in the community were supportive enough of the project to pass Prop 405 and still demonstrate support they are less familiar with specific project details.

Lessons Learned

The enactment of this research project shed light on numerous desirable modifications to project logistics. If enactment of a similar project was to be carried out in the future it would be helpful to pre-screen potential survey participants for residency status in order to strictly survey local residents. Additional modifications would include more questions aimed at exploring participant knowledge of forest health and restoration principles. The most significant portion of the survey featured questions related to FWPP, since people lack specific familiarity with the project these questions were essentially void. A broader project intends to survey recreationists following active tree removal and slash pile burning in the area to assess if overall trends change with more evidence of active management.

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Numerical Code: Date: Site: The "Y" Trinity Heights Buffalo Park

1) In your opinion, what is the current condition of the forest within Dry Lake Hills?

- a) Healthy
- b) Unhealthy
- c) Not enough information
- d) Other _____

2) Please explain your response to question one:

3) Based on the current condition of the forest within Dry Lake Hills, what do you consider to be the appropriate management strategy?

- a) No management
- b) Thinning
- c) Prescribed burn
- d) Thinning and Prescribed burn
- e) Not sure
- f) Other _____

4) If you felt treatment was needed, how important is forest management and treatment for the Dry Lake Hills area?

Not important 1 2 3 4 5 Very important Not sure Not applicable

5) On a scale of 1 to 5, how related do you consider wildland fire and flooding to be?

Not related 1 2 3 4 5 Extremely related Not sure

6) On a scale of 1 to 5, how would you rate the current fire risk to the forest within Dry Lake Hills?

Minimal 1 2 3 4 5 Severe Not sure

7) On a scale of 1 to 5, how would you rate the flood risk from the Dry Lake Hills area?

Minimal 1 2 3 4 5 Severe Not sure

8) Are you familiar with the Flagstaff Watershed Protection Project, also referred to as FWPP?

- a) Yes
- b) No

9) If yes, what are the intended objectives of FWPP? (Circle objectives indicated)

a) Reduce the risk of wildfire, specifically: _____

* Reduce the potential for crown fire _____

* Reduce the potential for high intensity surface fire _____

* Reduce the likelihood of human-caused ignitions _____

* Increase ability of fire suppression crews to control a wildfire occurring within the project area _____

b) Reduce the risk of post- fire flooding, specifically: _____

* Reduce potential damage to drinking water infrastructure _____

* Reduce potential damage to residential and commercial areas _____

c) Location: Rio de Flag (Dry Lake Hills) / Lake Mary (Mormon Mountain)

10) How did you first hear of FWPP?

- a) Prop 405 (Forest Health and Water Supply Protection Project)
- b) City of Flagstaff
- c) Forest Service
- d) Outside media
- e) This survey
- f) Other _____

11) Do you follow FWPP updates?

- a) Yes
- b) No

12) If you follow FWPP updates, how do you go about obtaining this information?

- a) FWPP website/ Twitter account
- b) City of Flagstaff- website/ mailers
- c) Forest Service- Twitter/ website/ Facebook
- d) News or other media

- e) Other _____
- f) Not applicable

13) What is your level of support for FWPP?

- a) Supportive
- b) Not supportive
- c) Indifferent
- d) Not applicable- not familiar

14) If you are familiar with the objectives of FWPP, how successful do you believe FWPP will be in meeting its intended objectives?

Not successful 1 2 3 4 5 Very successful Not sure Not applicable

15) On a scale of 1 to 5, how important do you feel FWPP is for the health of Flagstaff forests?

Not important 1 2 3 4 5 Very important Not sure Not applicable

16) On a scale of 1 to 5, how important do you feel FWPP is the protection of Flagstaff's water supply?

Not important 1 2 3 4 5 Very important Not sure Not applicable

17) Has your experience in Dry Lake Hills been affected positively, neutrally, or negatively due to FWPP?

- a) Positively (Favorable)
- b) Neutrally (No effect)
- c) Negatively (Adverse)

18) Please explain your response to question 16:

19) Other comments or concerns related to FWPP:

20) What brings you to the Dry Lake Hills areas?

- a) Hiking
- b) Mountain Biking
- c) Wildlife Viewing
- d) Hunting
- e) Rock Climbing
- f) Dog Walking
- g) Horseback Riding
- h) Other _____

21) How often, on average do you recreate in Dry Lake Hills? A) Very Frequent (>1/week)
B) Frequent (1-4/month) C) Occasional (<1/month) D) Rare (1/yr or first visit)

22) Did you vote in the 2012 City of Flagstaff elections which included Prop 405?

- a) Yes
- b) No
- c) Not applicable, not a registered City of Flagstaff voter

23) If so, did you vote yes for Prop 405?

- a) Yes
- b) No
- c) Not Applicable

24) Do you live in Flagstaff and/ or a fire prone community?

- a) Yes
- b) No

If yes, then specify:

25) How many years have you lived in Flagstaff and/or a fire prone community? A) 1-3 yrs
B) 4-7 yrs C) 8-10 yrs D) Over 10 yrs Not applicable

26) Please identify your age group: 18-25 26-35 36-45 46-55
56-65 66 or older

28) With what gender do you identify with?

29) Specify your ethnicity:

30) Level of education: