

# San Juan County, Washington

## Community Wildfire Protection Plan/Wildfire Risk Assessment

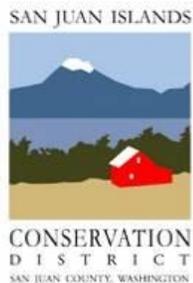


*2010 Satellite Island Fire*

Adopted by the  
San Juan County Council  
August 2012

## Acknowledgements

This Community Wildfire Protection Plan represents the efforts and cooperation of a number of organizations and agencies working together to improve preparedness for wildfire events while reducing factors of risk.



To obtain copies of this plan contact:

**San Juan County Emergency Management**  
PO Box 669  
Friday Harbor, WA 98250  
360-370-7612 [dem@sanjuandem.net](mailto:dem@sanjuandem.net)

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## Foreword

The process of developing a Community Wildfire Protection Plan (CWPP) can help a community clarify and refine its priorities for the protection of life, property, and critical infrastructure in the wildland–urban interface on both public and private land. It also can lead community members through valuable discussions regarding management options and implications for the surrounding land base. Local fire service organizations help define issues that may place the county, communities, and/or individual homes at risk. Through the collaboration process, the CWPP steering committee discusses potential solutions, funding opportunities, and regulatory concerns and documents their resulting recommendations in the CWPP. The CWPP planning process also incorporates an element for public outreach. Public involvement in the development of the document not only facilitates public input and recommendations, but also provides an educational opportunity through interaction of local wildfire specialists and an interested public.

The idea for community-based forest planning and prioritization is neither novel nor new. However, the incentive for communities to engage in comprehensive forest planning and prioritization was given new and unprecedented impetus with the enactment of the Healthy Forests Restoration Act (HFRA) in 2003. This landmark legislation includes the first meaningful statutory incentives for the US Forest Service (USFS) and the Bureau of Land Management (BLM) to give consideration to the priorities of local communities as they develop and implement forest management and hazardous fuel reduction projects. In order for a community to take full advantage of this new opportunity, it must first prepare a Community Wildfire Protection Plan (CWPP).

A countywide CWPP steering committee generally makes project recommendations based on the issue causing the wildfire risk, rather than focusing on individual landowners or organizations. Thus, projects are mapped and evaluated without regard for property boundaries, ownership, or current management. Once the CWPP is approved by the San Juan County Council, the steering committee will begin further refining proposed project boundaries, feasibility, and public outreach as well as seeking funding opportunities.

*The San Juan County Community Wildfire Protection Plan expands on the wildfire chapter of the San Juan County Natural Hazard Mitigation Plan, which is currently being updated. This project was funded by County Chiefs' Association.*

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# Chapter 1

## Overview of this Plan and its Development

In 2011, the Bureau of Land Management contracted with Northwest Management Inc. to conduct an in-depth risk assessment for the hazards of wildland fire. Wildfire events occur almost annually in San Juan County; thus, programs and projects that mitigate the impacts of this hazard is a benefit to the local residents, property, infrastructure, and the economy. In January of 2012, the Bureau of Land Management meet with the newly formed Steering Committee to introduce their plans in developing a wildland fire risk assessment and the opportunity to meld that plan into a Community Wildfire Protection Plan.

This Community Wildfire Protection Plan (CWPP) for San Juan County, Washington, is the result of analyses, professional collaboration, and assessments of wildfire risks and other factors focused on reducing wildfire threats to people, structures, infrastructure, and unique ecosystems in San Juan County. Agencies and organizations that participated in the planning process included:

- San Juan Island Fire & Rescue
- Lopez Island Fire & EMS
- Orcas Island Fire & Rescue
- San Juan County Department of Emergency Management
- San Juan County Land Bank
- San Juan Preservation Trust
- San Juan Islands Conservation District
- Town of Friday Harbor
- San Juan County Firewise Communities USA
- San Juan County Noxious Weed Program
- Washington Department of Natural Resources
- Bureau of Land Management
- National Park Service
- U.S. Fish and Wildlife Service

Northwest Management, Inc. of Moscow, Idaho was selected to assist the steering committee by facilitating meetings, leading the assessments, and authoring the document. Mike Harris, Orcas Island Fire & Rescue, served as the lead for San Juan County. The project manager from Northwest Management, Inc. was Brad Tucker.

## Goals and Guiding Principles

### Planning Philosophy and Goals

The goals of the planning process include integration with the National Fire Plan, the Healthy Forests Restoration Act, and the Disaster Mitigation Act. The plan utilizes the best and most appropriate science from all partners as well as local and regional knowledge about wildfire risks and fire behavior while meeting the needs of local citizens and recognizing the significance wildfire can have to the regional economy.

### Mission Statement

To make San Juan County residents, communities, state agencies, local and federal governments, and businesses less vulnerable to the negative effects of wildland fires through the effective administration of wildfire hazard mitigation grant programs, hazard risk assessments, wise and efficient fuels treatments, and a coordinated approach to mitigation policy through federal, state, regional, and local planning efforts. Our combined prioritization will be the protection of people, structures, infrastructure, and unique ecosystems that contribute to our way of life and the sustainability of the local and regional economy.

### Vision Statement

Institutionalize and promote a countywide wildfire hazard mitigation ethic through leadership, professionalism, and excellence, leading the way to a safe, sustainable San Juan County.

### Goals

- Identify and evaluate hazardous fuel conditions with an emphasis near communities adjacent to forest lands, prioritize areas for hazardous fuel reduction treatments, and recommend the types and methods of treatment to protect the communities.
- Educate communities about the unique challenges of wildfire in the wildland-urban interface
- Improve fire agency awareness of wildland fire threats, vulnerabilities, and mitigation opportunities or options.
- Develop/evaluate regulatory measures such as building codes and road standards specifically targeted to reduce the wildland fire potential and reduce the potential for loss of life and property.
- Determine areas at risk of wildfire and establish/prioritize mitigation projects, without regard to ownership, and recommend both conventional and alternative treatment methods to protect people, homes, infrastructure and natural resources within the WUI throughout San Juan County.
- Improve the ability of the County Fire Districts to provide fire protection for the residents of San Juan County through improved resources and training.

### United States Government Accountability Office (GAO)

Since 1984, wildland fires have burned an average of more than 850 homes each year in the United States and, because more people are moving into fire-prone areas bordering wildlands, the number of homes at risk is likely to grow. The primary responsibility for ensuring that preventative steps are taken to protect homes lies with homeowners. Although losses from fires made up only 2 percent of all insured catastrophic losses from 1983 to 2002, fires can result in billions of dollars in damages.

GAO was asked to assess, among other issues, (1) measures that can help protect structures from wildland fires, (2) factors affecting use of protective measures, and (3) the role technology plays in improving firefighting agencies' ability to communicate during wildland fires.

The two most effective measures for protecting structures from wildland fires are: (1) creating and maintaining a buffer, called defensible space, from 30 to 100 feet wide around a structure, where flammable vegetation and other objects are reduced; and (2) using fire-resistant roofs and vents. In addition to roofs and vents, other technologies – such as fire-resistant windows and building materials, surface treatments, sprinklers, and geographic information systems mapping – can help in protecting structures and communities, but they play a secondary role.

Although protective measures are available, many property owners have not adopted them because of the time or expense involved, competing concerns such as aesthetics or privacy, misperceptions about wildland fire risks, and lack of awareness of their shared responsibility for fire protection. Federal, state, and local governments, as well as other organizations, are attempting to increase property owners' use of protective measures through education, direct monetary assistance, and laws requiring such measures. In addition, some insurance companies have begun to direct property owners in high risk areas to take protective steps<sup>1</sup>.

### **State and Federal CWPP Guidelines**

This Community Wildfire Protection Plan includes compatibility with FEMA requirements for a Hazard Mitigation Plan, while also adhering to the guidelines proposed in the National Fire Plan, and the Healthy Forests Restoration Act (2004). This Community Wildfire Protection Plan has been prepared in compliance with:

- The National Fire Plan: A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (December 2006).
- Healthy Forests Restoration Act (2003).
- The Federal Emergency Management Agency's Region 10 guidelines for a Local Hazard Mitigation Plan as defined in 44 CFR parts 201 and 206, and as related to a fire mitigation plan chapter of a Multi-Hazard Mitigation Plan.
- National Association of State Foresters – guidance on identification and prioritizing of treatments between communities (2003).

The objective of combining these complementary guidelines is to facilitate an integrated wildland fire risk assessment, identify pre-hazard mitigation activities, and prioritize activities and efforts to achieve the protection of people, structures, the environment, and significant infrastructure in San Juan County while facilitating new opportunities for pre-disaster mitigation funding and cooperation.

Additional information detailing the state and federal guidelines used in the development of the San Juan County Community Wildfire Protection Plan is included in Appendix 6.

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<sup>1</sup> United States Government Accountability Office. Technology Assessment – Protecting Structures and Improving Communications during Wildland Fires. Report to Congressional Requesters. GAO-05-380. April 2005.

## **Integration with other Local Planning Documents**

During development of this Community Wildfire Protection Plan, several planning and management documents were reviewed in order to avoid conflicting goals and objectives. Existing programs and policies were reviewed in order to identify those that may weaken or enhance the mitigation objectives outlined in this document. The following sections identify and briefly describe some of the existing San Juan County planning documents and ordinances considered during development of this plan.

### **San Juan County – Town of Friday Harbor Comprehensive Emergency Management Plan**

The (2009) Comprehensive Emergency Management Plan (CEMP) is an all-hazard plan that describes how San Juan County will organize and respond to emergencies and disasters. It is based on, and is compatible with, Federal, State of Washington, and other applicable laws, regulations, plans, and policies, including the National Response Framework and the State of Washington Comprehensive Emergency Management Plan.

### **San Juan County Comprehensive Plan**

The Comprehensive Plan, together with its supporting documents and the ordinance by which it is adopted, is the official policy statement of the County. The Comprehensive Plan is not a detailed, final plan. Rather, it provides a long range framework to guide citizens, County government, and private agencies and service providers in their planning, design and location decisions about growth, land uses, conservation of natural resources, and major capital facility expenditures. The goals and policies in the Comprehensive Plan direct future decisions on land use actions, ordinance amendments, capital expenditures, procedures and programs.

This CWPP will “dove-tail” with the County’s Comprehensive Plan during its development and implementation to ensure that the goals and objectives of each are integrated. This planning effort is intended to be compatible with the goals and objectives of the County’s Comprehensive Plan.

### **San Juan County-Town of Friday Harbor Natural Hazards Mitigation Plan**

The creation of the San Juan County Natural Hazards Mitigation Plan (NHMP) is a step toward a comprehensive assessment of disasters and what can be done to protect local communities and resources. The NHMP, adopted by San Juan County in 2008, contains a detailed section on wildland urban interface fires. Much of the information included in this section was integrated into the CWPP; however, the scope of the CWPP and the identification of specific mitigation strategies is more extensive in the CWPP. It is anticipated that future revisions of the NHMP will be at least partially informed by the CWPP analysis.

## Chapter 2

### Documenting the Planning Process

Documentation of the planning process, including public involvement, is necessary to meet FEMA's DMA 2000 requirements (44CFR§201.4(c)(1) and §201.6(c)(1)). This section includes a description of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how all of the involved agencies participated.

### Description of the Planning Process

The San Juan County Community Wildfire Protection Plan was developed through a collaborative process involving all of the organizations and agencies detailed in Chapter 1 of this document. The planning process included five distinct phases which were in some cases sequential (step 1 then step 2) and in some cases intermixed (step 4 completed throughout the process):

1. **Collection of Data** about the extent and periodicity of the wildfire hazard in and around San Juan County.
2. **Field Observations and Estimations** about risks, location of structures and infrastructure relative to risk areas, access, and potential treatments.
3. **Mapping** of data relevant to pre-wildfire mitigation and treatments, structures, resource values, infrastructure, risk assessments, and related data.
4. **Facilitation of Public Involvement** from the formation of the steering committee to news releases, public meetings, public review of draft documents, and acknowledgement of the final plan by the signatory representatives.
5. **Analysis and Drafting of the Report** to integrate the results of the planning process, provide ample review and integration of committee and public input, and signing of the final document.

### The Planning Team

Leading the planning effort from San Juan County was Mike Harris, Orcas Island Fire & Rescue. Additional partners included local communities, fire districts, federal and state agencies, and local organizations with an interest in the county's fire safety.

The planning philosophy employed in this project included the open and free sharing of information with interested parties. Information from federal, state, and local agencies was integrated into the database of knowledge used in this project. Meetings with the committee were held throughout the planning process to facilitate a sharing of information between participants. When the public meetings were held, many of the committee members were in attendance and shared their support and experiences and their interpretations of the results.

### Multi-Jurisdictional Participation

44 CFR §201.6(a)(3) calls for multi-jurisdictional planning in the development of Hazard Mitigation Plans which impact multiple jurisdictions. In addition to the participation of federal

agencies and other organizations, the following local jurisdictions were actively involved in the development of this Community Wildfire Protection Plan:

- San Juan County
- San Juan Preservation Trust
- SJC Noxious Weed Program
- San Juan Islands Conservation District
- San Juan County Firewise Communities
- San Juan County Department of Emergency Management
- San Juan Island Fire & Rescue
- Orcas Island Fire & Rescue
- Lopez Island Fire and EMS
- San Juan County Land Bank
- National Park Service
- Bureau of Land Management
- Washington Department of Natural Resources
- U.S. Fish and Wildlife Service

These jurisdictions were represented on the steering committee and in public meetings either directly or through their servicing fire department or district. They participated in the development of hazard profiles, risk assessments, and mitigation measures. The steering committee meetings were the primary venue for authenticating the planning record. However, additional input was gathered from each jurisdiction in the following ways:

- Steering committee leadership visits to local group meetings where planning updates were provided and information was exchanged.
- One-on-one visits between the steering committee leadership and representatives of the participating jurisdictions (e.g. meetings with county councilors, city councilors and mayor, fire district commissioners, and community leaders).
- Written correspondence between the steering committee leadership and each jurisdiction updating the participating representatives on the planning process, making requests for information, and facilitating feedback.

Like other areas of Washington and the United States, San Juan County's human resources have many demands placed on them in terms of time and availability. In San Juan County, elected officials (county and town councilors and mayor) do not serve in a full-time capacity; some of them have other employment and serve the community through a convention of public service. Recognizing this and other time constraints, many of the jurisdictions decided to identify a representative to cooperate on the steering committee and then report back to the remainder of their organization on the process and serve as a conduit between the steering committee and the jurisdiction.

## Steering Committee Meetings

The following people participated in steering committee meetings, volunteered time, or responded to elements of the San Juan County Community Wildfire Protection Plan’s preparation.

<b>NAME</b>	<b>ORGANIZATION</b>
• Mike Harris .....	Orcas Fire & Rescue
• Kevin O’Brien.....	Orcas Fire & Rescue
• Valerie Harris.....	Orcas Fire & Rescue
• Patrick Shepler .....	Orcas Fire & Rescue
• Judith Leraas Cook .....	Orcas Fire & Rescue
• Jim Ghiglione.....	Lopez Island Fire & EMS
• Jim Lett.....	Lopez Fire District Commissioner / .....Chair of the Board
• Steve Marler.....	San Juan Island Fire & Rescue
• Brad Creesy.....	San Juan Island Fire & Rescue
• Brud Joslin .....	Shaw Island Fire
• Greg Sutherland .....	San Juan County GIS
• Joby Clark .....	San Juan County GIS
• Richard Lee.....	San Juan County Weed Board
• Judy Jackson .....	San Juan County Noxious Weed Program
• Ron Garner.....	San Juan County Firewise
• Paul Turner.....	San Juan County Fire Marshal
• Dave Halloran .....	San Juan DEM
• Brendan Cowan.....	San Juan DEM
• Mike Wilks.....	Town of Friday Harbor
• Bruce Gregory.....	San Juan Islands Conservation District
• Dana Kinsey.....	San Juan Islands Conservation District
• Tim Clark .....	San Juan County Land Bank
• Eliza Habegger.....	San Juan County Land Bank
• Dean Dougherty .....	San Juan Preservation Trust
• Steven Biggs .....	Washington Department of Natural Resources
• Lakota Burwell.....	Olympic National Park
• Larry Nickey .....	National Park Service
• Todd Rankin.....	National Park Service
• Lorenz Sollmann.....	U.S. Fish and Wildlife Service
• Richard Parrish.....	Bureau of Land Management, Spokane District
• Dennis Strange .....	Bureau of Land Management, Spokane District
• Lauren Maloney .....	OR/WA BLM State Office
• Leanne Mruzik .....	OR/WA BLM State Office

- Brad Tucker .....Northwest Management, Inc.
- Tera King .....Northwest Management, Inc.
- Vaiden Bloch .....Northwest Management, Inc.
- Luke Machtolf.....Northwest Management, Inc.

**Committee Meeting Minutes**

Committee meetings were scheduled and held from January 2012 through June 2012. These meetings served to facilitate the sharing of information and to lay the groundwork for the updated San Juan County CWPP. Northwest Management, Inc. as well as other planning committee leadership attended the meetings to provide the group with regular updates on the progress of the document and gather any additional information needed to complete the Plan.

Steering committee meeting minutes are included in Appendix 2.

**Public Involvement**

Public involvement was made a priority from the inception of the project. There were a number of ways that public involvement was sought and facilitated. In some cases, this led to members of the public providing information and seeking an active role in protecting their own homes and businesses, while in other cases it led to the public becoming more aware of the process without becoming directly involved in the planning.

**News Releases**

Under the auspices of the San Juan County Department of Emergency Management, periodic press releases were submitted to the various print and online news outlets that serve the San Juan Islands. Informative flyers were also distributed around town and to local offices within the communities by the committee members.

<b>Print Media</b>	<b>Online Media</b>	<b>Other Media</b>
<i>San Juan Journal</i> (San Juan Island)	<i>Island Guardian</i>	KWLE 1340
<i>Island Sounder</i> (Orcas Island)	<i>San Juan Islander</i>	Orcas Island Chamber of Commerce
<i>Islands Weekly</i> (Lopez Island)	<i>Friday Harbor Now</i>	Orcas Fire PIO
	<i>Bullwings</i>	San Juan EMS PIO
	<i>San Juan Update</i>	San Juan County PIO
	<i>Orcas Issues</i>	

**Figure 2.1. Sample Press Release.**

**San Juan County Plans to Assess Wildfire Risk**

Working in conjunction with San Juan County, the Bureau of Land Management (BLM) has launched the process of developing a county-level wildland fire risk assessment. Local agencies and organizations in San Juan County have initiated a planning committee to complete the risk assessment as the first step in the ultimate development of a San Juan County Wildfire Protection Plan as part of the National Fire Plan and Healthy Forests

Restoration Act. The San Juan County Wildland Fire Risk Assessment will include risk analyses with predictive models indicating where fires are likely to ignite and how they may impact local communities and the environment.

Northwest Management, Inc. has been retained by the Bureau of Land Management to facilitate meetings, conduct field inspections and interviews, develop vulnerability assessments, and collaborate with the committee to delineate mitigation projects. The planning committee includes representatives from local fire districts, San Juan County, Washington Department of Natural Resources, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, private landowners, and others.

The intention of the project is to conduct an assessment of wildland fire risk in San Juan County and the local communities, then make mitigation recommendations that will not only help prevent wildfire ignitions from occurring, but will also guide decision-makers towards creating a more fire-resistant San Juan County and provide for public wildfire education. Some of the goals of this project are to improve awareness of wildland fire issues locally, identify high fire risk areas and develop strategies to reduce this risk, and improve accessibility of funding assistance to achieve these goals.

The planning committee will be conducting public meetings to discuss preliminary findings and to seek public involvement in the planning process in the spring of 2012. A notice of the dates and locations of these meetings will be posted in local news outlets. For more information on the San Juan County Wildland Fire Risk Assessment or if you're interested in participating on the planning committee, please contact Tera King, Northwest Management, Inc., at 208-883-4488 ext 133 or Richard Parrish, Bureau of Land Management, at 509-536-1226.

## **Public Meetings**

Public meetings were scheduled in several communities during the wildfire risk assessment phase of the planning process to share information on the Plan, obtain input on the details of the wildfire risk assessments, and discuss potential mitigation treatments. Attendees at the public meetings were asked to give their impressions of the accuracy of the information generated and provide their opinions of potential treatments.

The schedule of public meetings in San Juan County included 5 locations; the Shaw Island Community Center, the San Juan Island Fire Station, the Waldron Island Post Office, the Orcas Island Fire Station, and the Lopez Island Fire Station. They were attended by a number of individuals on the committee and from the general public. The public meeting announcement sent to the local newspapers, local citizen participation organizations, county departments, fire district representatives, and distributed by committee members, is included below in Figure 2.2.

Figure 2.2. Public Meeting Flyer.



## San Juan County

### Community Wildfire Protection Plan & Wildfire Risk Assessment

## Public Meetings!

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**Shaw Island** – May 21<sup>st</sup> 5:30 pm at the Community Center  
**Friday Harbor** – May 22<sup>nd</sup> 5:30 pm at 1011 Mullis street  
**Waldron Island** – May 23<sup>rd</sup> 11:00am at the Post Office  
**Orcas Island** – May 23<sup>rd</sup> 5:30 pm at 45 Lavender Lane, Eastsound (**Meet & Greet 4 pm – 5 pm**)  
**Lopez Island** – May 24<sup>th</sup> 5:30 pm at 2228 Fisherman Bay Road

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These public meetings will address the Community Wildfire Protection Plan and Wildfire Risk Assessment being developed for San Juan County. Public input is being sought to better understand the vulnerability of County residents, businesses, and resources to wildfire. The purpose of this plan is to promote awareness of the countywide wildland fire hazard and propose workable solutions to reduce the wildfire risk.

The planning committee is working on:

- Mapping the Wildland Urban Interface in San Juan County.
- Improving public awareness and educating the public about wildfire risk.
- Evaluating strategies for landowners to lessen wildfire potential.
- Addressing areas of inadequate fire protection.
- Recommending risk mitigation projects.



Courtesy of WA DNR

These meetings are open to the public and will include slideshow presentations by wildfire specialists and local personnel working to develop these plans.

Learn about the assessments of wildfire risk and the wildland urban interface of San Juan County. Discuss *YOUR* priorities for how our community can best mitigate these risks.

The planning committee would like to provide the opportunity for meaningful discussions among community members and local, state, and federal government representatives regarding their priorities for local fire protection and land management.

For more information on the Community Wildfire Protection Plan and the Wildfire Risk Assessment, contact your local Fire Department or Brad Tucker with Northwest Management, Inc. at (208) 883-4488 ext. 123

Figure 2.3. Local News Article.

# When fires rage, there is a plan

By CALI BAGBY

Islands Sounder Reporter

MAY 30, 2012 · UPDATED 10:26 AM

The fire rages, enveloping green trees in orange and red bursts of flames and turns the black sky into a smoky copper. And as the minutes go by, the fire grows stronger and faster. For islanders concerned about their homes and forest, there is now a document that can help.

For the last four years the San Juan Fire Chiefs' Association has been working with the [Bureau of Land Management](#) to create the Wildland Fire Risk Assessment so that [San Juan County](#) can better understand wildfire vulnerability and resources.

According to Richard Parrish, assistant fire management officer at the BLM Spokane District, the assessment is the "meat and potatoes," but another document called the Community Wildfire Prevention Plan is what will be of interest to islanders, as it focuses more on the community.

The plan, prepared by Northwest Management Inc. combines information from the assessment, the San Juan Fire Chiefs' Association and the community to promote awareness of wildland fire hazard and reduce risk.

"One thing it does is to tell us as first responders what we can do to mitigate fire risks," said Fire Chief Kevin O'Brien.

Tera King of [Northwest Management Inc.](#), is hoping to have the plan finalized by mid-July before firefighting season begins.

King said it's important for people to know the plan does not contain regulations or requirements.

"It's more of a tool to use for finding information and to use as a leverage to seek funding," she said.

The plan has projects ranging anywhere from better defense from fire in a private home to protecting wildlands from home fires to helping the Garry Oak fire ecosystem on Turtleback Mountain.

Some areas of vital interest on Orcas are Mt. Constitution, the vegetation around Rosario and various historic sites.

"If something is not in the plan it doesn't mean you can't do anything, it just means these are areas of concern," Parrish said.

The plan focuses on mitigation of wildfire rather than prevention and offers site specific remedies, according to King, which could be as little as clearing brush away from a driveway to as extensive as brush clearing pruning and vegetation removal, but not as drastic as cutting down a tree.

A series of meetings on various San Juan Islands this month were held to gain feedback from the community about what should be included in the plan. "The meetings were all about the community input, which is vitally important to the document," O'Brien said. For more information, go to [www.orcasfire.org](http://www.orcasfire.org).

## **Documented Review Process**

Review and comment on this plan has been provided through a number of avenues for the committee members as well as the members of the general public.

During regularly scheduled committee meetings in the late winter and spring of 2012, the committee met to discuss findings, review mapping and analysis, and provide written comments on draft sections of the document. During the public meetings, attendees observed map analyses and photographic collections, discussed general findings from the community assessments, and made recommendations on potential project areas.

The first draft of the document was prepared after the public meetings and presented to the committee in June for a full committee review. The committee was given two months to provide comments to the plan.

## **Public Comment Period**

A public comment period was conducted from June 20th thru July 6th, 2012 to allow members of the general public an opportunity to view the full draft plan and submit comments and any other input to the committee for consideration. A press release was submitted to the local media outlets announcing the comment period, the location of Plan for review, and instructions on how to submit comments. Hardcopy drafts were printed and made available at the public libraries on Orcas, San Juan, Lopez Island, and online at <http://www.sjcfiremarshal.org/pageHome>. Each hardcopy was accompanied by a letter of instruction for submitting comments to the steering committee. A list of comments that were not incorporated into the plan can be found in Appendix 2. Each public comment is followed by a brief explanation, given by the committee, as to why that comment was not incorporated into the document.

**Figure 2.4. Press Release #3 – Public Comment Period.**

San Juan County Press Release  
June 13<sup>th</sup>, 2012

**Draft Community Wildfire Protection Plan – Public Comment Period**

**Friday Harbor, WA** – San Juan County is seeking public input on its draft Community Wildfire Protection Plan (CWPP), which will be released to the public on June 20<sup>th</sup>, 2012.

The draft plan is available for viewing at public libraries located on San Juan Island, Orcas Island, and Lopez Island or online at <http://www.sicfiremarshal.org/pageHome>. Public comments may be submitted until 5 p.m. on July 6<sup>th</sup>, 2012. The San Juan County CWPP will help San Juan County:

- Reduce wildfire risk for San Juan County residents, landowners, businesses, communities, local governments, and state and federal agencies;
- Identify high fire risk areas and develop strategies to reduce risk;
- Improve awareness of wildland fire issues locally;
- Provide opportunities for discussions among community members and agencies regarding priorities for fire protection and natural resource management;
- Maintain appropriate wildfire response capabilities; and
- Improve access to funding to achieve wildfire mitigation goals.

The draft CWPP recommends various actions be taken by fire districts, property owners, local government and others, but does not impose regulations on private properties. The CWPP Planning Committee – comprising representatives from local fire districts, Washington Department of Natural Resources, Bureau of Land Management, private land managers, various San Juan County departments, and others – is coordinating the effort.

Comments can be submitted to the attention of Brad Tucker, Northwest Management, Inc., PO Box 9748, Moscow, Idaho 83843 or [tucker@nmi2.com](mailto:tucker@nmi2.com). For more information on the Community Wildfire Protection Plan project, contact Mike Harris, CWPP Planning Committee Chair at 360-376-2331.

### **Continued Public Involvement**

San Juan County is dedicated to involving the public directly in review and updates of the Community Wildfire Protection Plan and Wildfire Risk Assessment. The San Juan County Council, working through the CWPP steering committee, are responsible for review and update of the Plan as recommended in chapter 6 of this document.

The public will have the opportunity to provide feedback annually on the anniversary of the adoption of this plan, at an open meeting of the steering committee. Copies of the Plan will be catalogued and kept at all of the appropriate agencies in the county. The Plan also includes the address and phone number of San Juan County Emergency Management, who is responsible for keeping track of public comments on the Plan.

A public meeting will also be held as part of each annual evaluation or when deemed necessary by the steering committee. The meetings will provide the public a forum for which they can express its concerns, opinions, or ideas about the Plan. The County Department of Emergency Management will be responsible for using county resources to publicize the annual public meetings and maintain public involvement through the webpage and various print and online media outlets.

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## Chapter 3

### San Juan County Characteristics

San Juan County was established October 31, 1873, with its county seat at Friday Harbor (the county's only incorporated town), after the peaceful settlement obtained following the Pig War.<sup>2</sup>

Prior to becoming a county, Hudson's Bay Company laid claim to San Juan Island where they built a salmon curing station in 1850 and began a sheep farm a few years later.

Friday Harbor got its name from a native Hawaiian Shepherd (Joseph Poalie Friday), who worked for the Hudson's Bay Company's Cowlitz sheep farm and later moved to the harbor now bearing his name.<sup>3</sup>

Sailing ships, and later, the steamships of the Puget Sound Mosquito Fleet, visited the harbor on a regular basis hauling passengers, mail and freight. Freight from the island would include apples, pears, cherries, strawberries, peas, cream, eggs, chickens, grain, salmon, and lime. All were produced on or around San Juan Island. The Great Depression, World War II, the pea weevil, and competition from Eastern Washington growers brought about the decline of traditional island industries, diminishing Friday Harbor's export trade. The 1960s brought new industries - tourism, retirement, real estate, and construction. Today, Friday Harbor is again busy and prosperous.

### Description

*The following section has been summarized from the San Juan County-Town of Friday Harbor Natural Hazards Mitigation Plan (draft).*<sup>4</sup>

The islands are situated in the Salish Sea amidst the windy straits north of Puget Sound and between the Straits of Juan de Fuca and the Gulf of Georgia. Rosario Strait separates the islands from Washington mainland to the east and northeast. To the west and northwest of San Juan County, lie Vancouver Island and the Canadian mainland, separated from San Juan County by 43 miles of international boundary, Haro Strait, and the Strait of Georgia. South of San Juan County is Island County and the Olympic Peninsula.

The San Juan Islands are the exposed tops of a submerged range of mountains. Depending on how high the tide is, there are between 130 and 740 islands, of which 172 are named and roughly 15 are occupied by year-round residents. The largest islands are Orcas, with 56.9 sq. miles; San Juan, with 55.3 sq. miles; and Lopez with 29.5 sq. miles. Other inhabited islands include Shaw, with 7.7 sq. miles; Waldron, 5; Decatur, 4; Stuart, 3; and Henry with 1.6 sq. miles.

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<sup>2</sup> [http://www.historylink.org/index.cfm?DisplayPage=output.cfm&File\\_Id=5380](http://www.historylink.org/index.cfm?DisplayPage=output.cfm&File_Id=5380). Accessed May, 2012

<sup>3</sup> <http://www.byd2.com/history/>. Accessed May, 2012

<sup>4</sup> San Juan County-Town of Friday Harbor Natural Hazards Mitigation Plan (draft). <http://www.sanjuandem.net/About/PDFs/HazardMitigationPlan.pdf>. Accessed May, 2012.

## Geography and Climate

*The following section has been summarized from the San Juan County-Town of Friday Harbor Natural Hazards Mitigation Plan (draft).<sup>5</sup>*

The San Juan archipelago topography is varied. Islands may rise abruptly out of the water, revealing a steep and rugged terrain, or have gently rolling terrain carved by glaciers fifteen thousand years ago. The cumulative length of tidelands is roughly 370 miles, and varies widely from open sandy beaches to treacherous vertical cliffs.

Due to its location and geography, San Juan County enjoys a milder climate than in neighboring counties in the Puget Sound. The islands lie in the “rain shadow” created by the Vancouver Island Range and the Olympic Mountains. Most storms in Washington move from over the warm moist Pacific Ocean and are directed eastward by the jet stream, where they end up colliding with the coastal mountains. The moisture-laden air is forced to rise, resulting in a cooling effect that triggers massive cloud formation and increased precipitation for the western coastal mountains of the mainland. The moisture is essentially squeezed out of the air before it gets to the San Juan Islands, giving them a “banana belt” reputation.

The islands see about 250 days of sun annually, with typical late summer coastal fogs clearing by the afternoon. Summer high temperatures range between 60 and 75 degrees. The record high temperature was 92 degrees, in 1941.

Rainfall varies widely on the islands but generally averages less than 30 inches per year. The driest areas are at the southern end of the county, where cacti even grow. The wettest portion of the county is Mt. Constitution, on Orcas, and the northwest end of San Juan Island.

Winter storms frequently bring sustained winds of 40-50 miles per hour, which are capable of causing significant damage. An occasional “nor’easter” will bring bitterly cold winds upwards of 100 miles per hour. Temperatures can, and have, reached single digits or colder. Generally, the islands experience about 30 days of temperatures right around the freezing mark per winter. San Juan County does average around 7 inches of short-lived snowfall each year.

## Population and Demographics

The 2010 Census established the San Juan County population at 15,769, which is up from 14,077 in 2000. Table 3.1 shows historical changes in population in San Juan County.

	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>
San Juan County	3,856	7,838	10,035	14,077	15,769

Since 1970, San Juan County has been the fastest growing area in the state. In the 1990’s the county’s population grew by more than 40%. In 2005, the Washington Office of Financial Management and the State Ferry system released projections that predicted the county’s population would increase 71% between 2011 and 2030.

<sup>5</sup> San Juan County-Town of Friday Harbor Natural Hazards Mitigation Plan (draft). <http://www.sanjuandem.net/About/PDFs/HazardMitigationPlan.pdf>. Accessed May, 2012.

Of the county’s residents, about 14% (2,040) live in Friday Harbor on San Juan Island. The majority of the remaining residents (12,760) are concentrated in unincorporated parts of San Juan, Orcas, Lopez, and Shaw Islands.

The 2010 Census reported that ethnicity in San Juan County is comprised of 93% white, 0.7% American Indian, 0.3% African American, 1.1% Asian, and 5.4% Hispanic or Latino. Approximately 49% of residents are male. There are 9,372 occupied housing units (70.4% of available housing units) in San Juan County.<sup>6</sup>

### Land Ownership

The majority of ownership within San Juan County appears to be private. It is assumed however, that County and town/village ownerships are represented under the privately owned category. Federal ownerships account for less than 4% of the land base. Nearly 8% of San Juan County is State owned land. The rural nature of San Juan County is viewed as a top priority by the citizens that reside on these islands and the county has developed plans considering such priorities.

Entity	Acres	Percent of Total Area
Private	100,503	90%
State Parks	6,964	6%
National Park Service	1,733	2%
State	1,512	1%
Bureau of Land Management	902	<1%
U.S. Fish and Wildlife Service	398	<1%
State Fish and Wildlife	137	<1%
Federal	24	<1%
<b>Total</b>	<b>112,173</b>	<b>100%</b>

The data used to develop this table was provided by the 2010 BLM database. Local government property (i.e. County) is likely under the Private ownership category. There may be more accurate information but this table shows general trends, which is sufficient for the purpose of this plan.

### Development Trends

*This section was summarized from the San Juan County Economic Almanac.*

By the 1960’s, much of the traditional economy of farming, fishing and seafaring had dwindled. The economy continued to struggle through the 1960’s as the region south of the islands boomed as a result of gains by companies like the Boeing Commercial Airplane Company and the John Fluke Manufacturing Company.

The islands began to take on a new role in the region through the efforts of a small group of businesspeople, who worked to market the county as a tourism and retirement destination to the newly prosperous Seattle area. The seeds of their efforts in the early 60’s, created a boom that lasted over 40 years.

<sup>6</sup> US Census Bureau. State & County QuickFacts. Available online at <http://quickfacts.census.gov/qfd/states/53/53055.html>. Accessed May 2012.

The recent national economic downturn has been felt in San Juan County, as real estate sales and construction projects decline. Tourism has better weathered the storm. While our unemployment percentage is currently double its usual number, it is still half that of most of the rest of the nation.

As the community explores infrastructure improvements in the areas of broadband and transportation, newer forms of business will become possible in San Juan County. Telecommuting, which is currently done by a select few, may soon become common if the efforts to improve broadband infrastructure are realized.<sup>7</sup>

## Natural Resources

San Juan County is a diverse ecosystem with a complex array of vegetation, wildlife, and fisheries that have developed with, and adapted to fire as a natural/man-induced disturbance process. Nearly a century of wildland fire suppression coupled with past land-use practices (primarily timber harvesting, agriculture, and mining) has altered plant community succession and has resulted in dramatic shifts in the fire regimes and species composition. As a result, some forests in San Juan County have become more susceptible to large-scale, high-intensity fires posing a threat to life, property, and natural resources including wildlife and plant populations. High-intensity, stand-replacing fires have the potential to seriously damage soils, native vegetation, and fish and wildlife populations. In addition, an increase in the number of large, high-intensity fires throughout the nation’s forest and rangelands has resulted in significant safety risks to firefighters and higher costs for fire suppression.

### Biota

**Fish and Wildlife** – Due to the general isolation of the San Juan Islands, some animal species are not found on all of the islands. For example, some islands have certain rodent species that are not present on other islands. Deer are found on most of the islands, but again not all islands have deer. The marine environment around the San Juan Islands is rich in diversity and plays a big role in the economy of the region.

**Vegetation** – Early explorers described the landscape of the San Juan Islands and southern Vancouver Island as predominated by oak woodlands, grasslands, and mature fir and cedar forests. Shrubs were less common than they are today, as were stands of smaller fir and pines. In the past, low-intensity fires would burn through the grasslands, killing shrubs and small trees, but allowing the mature native trees (western red cedar, red alder, Garry oak, maple, and madrone) to survive.<sup>8</sup> By the early 1900s, due to human intervention, the intervals between fires had increased. As a result, the natural plant communities began to shift from open grassland and hardwood forest to primarily fast-growing firs and pines, slow-growing cedars and dense shrubbery.<sup>9</sup>

**Table 3.3. Vegetative Cover Types in San Juan County.**

Land Cover	Acres	Percent of Total Area
Conifer	62,078	55%

<sup>7</sup> San Juan County Economic Almanac.2011.

<sup>8</sup> Prehistoric Cultural Resources of San Juan County, WA, Gary C. Wessen.

<sup>9</sup> Are the San Juan Islands at Risk for Wildfire?, Bill McLaughlin, The Islands’ Sounder, March 21, 2001.

**Table 3.3. Vegetative Cover Types in San Juan County.**

Land Cover	Acres	Percent of Total Area
Agriculture	13,200	12%
Hardwood	12,667	11%
Developed	11,850	11%
Grassland	4,660	4%
Exotic Herbaceous	2,946	3%
Non-Vegetated	2,809	3%
Riparian	1,807	2%
Conifer-Hardwood	237	<1%
Shrubland	168	<1%
Sparsely Vegetated	4	<1%
<b>Total</b>	<b>112,426</b>	<b>100%</b>

Vegetation in San Juan County is a mix of forestland, riparian, grassland, and agricultural ecosystems. An evaluation of satellite imagery of the region provides some insight to the composition of the vegetation of the area. The most represented vegetated cover type is conifer followed by agriculture then developed areas.

### Hydrology

The following section was taken from the San Juan County – Town of Friday Harbor Natural Hazards Mitigation Plan. Water is a precious commodity in San Juan County. The annual precipitation is relatively low, underground aquifers are limited, and surface reservoirs are in short supply. Much of the county relies on groundwater wells for residential and commercial needs. Lakes on San Juan, Orcas, and Blakely islands augment groundwater aquifers, providing potable water to roughly 40% of the population living in Friday Harbor and the other island villages. Several residential developments rely on saltwater-desalinization systems; more systems may be necessary to accommodate future residential development. In years with ample precipitation, a small number of seasonal streams run, and scattered natural and man-made ponds fill—each playing a critical role in providing agricultural water, storm water catchment, and aquifer recharge<sup>10</sup>.

### Air Quality

The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides.<sup>11</sup>

The Clean Air Act, passed in 1963 and amended in 1977, is the primary legal authority of the U.S. Environmental Protection Agency. The Clean Air Act provides the principal framework for national, state, and local efforts to protect air quality. Under the Clean Air Act, the Organization for Air Quality Protection Standards (OAQPS) is responsible for setting the NAAQS standards for pollutants which are considered harmful to people and the environment. OAQPS is also responsible for ensuring these air quality standards are met, or attained (in cooperation with state,

<sup>10</sup> San Juan County-Town of Friday Harbor Natural Hazards Mitigation Plan. 2012. – Draft.

<sup>11</sup> USDA-Forest Service (United States Department of Agriculture, Forest Service). 2000. Incorporating Air Quality Effects of Wildland Fire Management into Forest Plan Revisions – A Desk Guide. April 2000. – Draft.

Tribal, and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories, and other sources.<sup>12</sup>

Smoke emissions from fires potentially affect an area and the airsheds that surround it. Climatic conditions affecting air quality in Washington are governed by a combination of factors. Large-scale influences include latitude, altitude, prevailing hemispheric wind patterns, and mountain barriers. At a smaller scale, topography and vegetation cover also affect air movement patterns. Locally adverse conditions can result from occasional wildland fires in the summer and fall, and prescribed fire and agricultural burning in the spring and fall.

Due principally to local wind patterns, air quality in San Juan County is generally good to excellent, rarely falling below Washington Department of Ecology pollution standards.

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<sup>12</sup> Louks, B. 2001. Air Quality PM 10 Air Quality Monitoring Point Source Emissions; Point site locations of DEQ/EPA Air monitoring locations with Monitoring type and Pollutant. Idaho Department of Environmental Quality. Feb. 2001. As GIS Data set. Boise, Idaho.

## Chapter 4

### Risk and Preparedness Assessments

#### Wildland Fire Characteristics

An informed discussion of fire mitigation is not complete until basic concepts that govern fire behavior are understood. In the broadest sense, wildland fire behavior describes how fires burn; the manner in which fuels ignite, how flames develop and how fire spreads across the landscape. The three major physical components that determine fire behavior are the fuels supporting the fire, the topography in which the fire is burning, and the weather and atmospheric conditions during a fire event. At the landscape level, both topography and weather are beyond our control. We are powerless to control winds, temperature, relative humidity, atmospheric instability, slope, aspect, elevation, and landforms. It is beyond our control to alter these conditions, and thus impossible to alter fire behavior through their manipulation. When we attempt to alter how fires burn, we are left with manipulating the third component of the fire environment; fuels which support the fire. By altering fuel loading and fuel continuity across the landscape, we have the best opportunity to control or affect how fires burn.

A brief description of each of the fire environment elements follows in order to illustrate their effect on fire behavior.

#### Weather

Weather conditions contribute significantly to determining fire behavior. Wind, moisture, temperature, and relative humidity ultimately determine the rates at which fuels dry and vegetation cures, and whether fuel conditions become dry enough to sustain an ignition<sup>13</sup>. Once conditions are capable of sustaining a fire, atmospheric stability and wind speed and direction can have a significant effect on fire behavior. Winds fan fires with oxygen, increasing the rate at which fire spreads across the landscape. Weather is the most unpredictable component governing fire behavior, constantly changing in time and across the landscape.

#### Topography

Fires burning in similar fuel types, will burn differently under varying topographic conditions. Topography alters heat transfer and localized weather conditions, which in turn influences vegetative growth and resulting fuels. Changes in slope and aspect can have significant influences on how fires burn. Generally speaking, north slopes tend to be cooler, wetter, more productive sites. This can lead to heavy fuel accumulations, with high fuel moistures, later curing of fuels, and lower rates of spread. In contrast, south and west slopes tend to receive more direct sun, and thus have the highest temperatures, lowest soil and fuel moistures, and lightest fuels. The combination of light fuels and dry sites leads to fires that typically display the highest rates of spread. These slopes also tend to be on the windward side of mountains. Thus, these slopes tend to be “available to burn” a greater portion of the year.

Slope also plays a significant role in fire spread, by allowing preheating of fuels upslope of the burning fire. As slope increases, rate of spread and flame lengths tend to increase. Therefore,

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<sup>13</sup>NOAA website <http://www.nws.noaa.gov/om/wfire.shtml>. Accessed on July 30, 2012.

we can expect the fastest rates of spread on steep, warm south and west slopes with fuels that are exposed to the wind.<sup>14</sup>

## **Fuels**

Fuel is any material that can ignite and burn. Fuels describe any organic material, dead or alive, found in the fire environment. Grasses, brush, branches, logs, logging slash, forest floor litter, conifer needles, and buildings are all examples. The physical properties and characteristics of fuels govern how fires burn. Fuel loading, size and shape, moisture content, and continuity and arrangement all have an effect on fire behavior. Generally speaking, the smaller and finer the fuels, the faster the potential rate of fire spread. Small fuels such as grass, needle litter and other fuels less than a quarter inch in diameter are most responsible for fire spread. In fact, “fine” fuels, with high surface to volume ratios, are considered the primary carriers of surface fire. This is apparent to anyone who has ever witnessed the speed at which grass fires burn. As fuel size increases, the rate of spread tends to decrease due to a decrease in the surface to volume ratio. Fires in large fuels generally burn at a slower rate, but release much more energy and burn with much greater intensity. This increased energy release, or intensity, makes these fires more difficult to control. Thus, it is much easier to control a fire burning in grass than to control a fire burning in timber.<sup>15</sup>

When burning under a forest canopy, the increased intensities can lead to torching (single trees becoming completely involved) and potential development of crown fires. That is, they release much more energy. Fuels are found in combinations of types, amounts, sizes, shapes, and arrangements. It is the unique combination of these factors, along with the topography and weather, which determines how fires will burn.

The study of fire behavior recognizes the dramatic and often-unexpected effect small changes in any single component have on how fires burn. It is impossible to speak in specific terms when predicting how a fire will burn under any given set of conditions. However, through countless observations and repeated research, some of the principles that govern fire behavior have been identified and are recognized.

## **Wildfire Hazards**

In the 1930s, wildfires consumed an average of 40 to 50 million acres per year in the contiguous United States, according to US Forest Service estimates. By the 1970s, the average acreage burned had been reduced to about 5 million acres per year. Over this time period, fire suppression efforts were dramatically increased and firefighting tactics and equipment became more sophisticated and effective. For the 11 western states, the average acreage burned per year since 1970 has remained relatively constant at about 3.5 million acres per year.

The severity of a fire season can usually be determined in the spring by how much precipitation is received, which in turn determines how much fine fuel growth there is and how long it takes this growth to dry. These factors, combined with annual wind events can drastically increase the chance a fire start will grow and resist suppression activities. Furthermore, recreational activities are typically occurring throughout the months of July, August, and September. Occasionally,

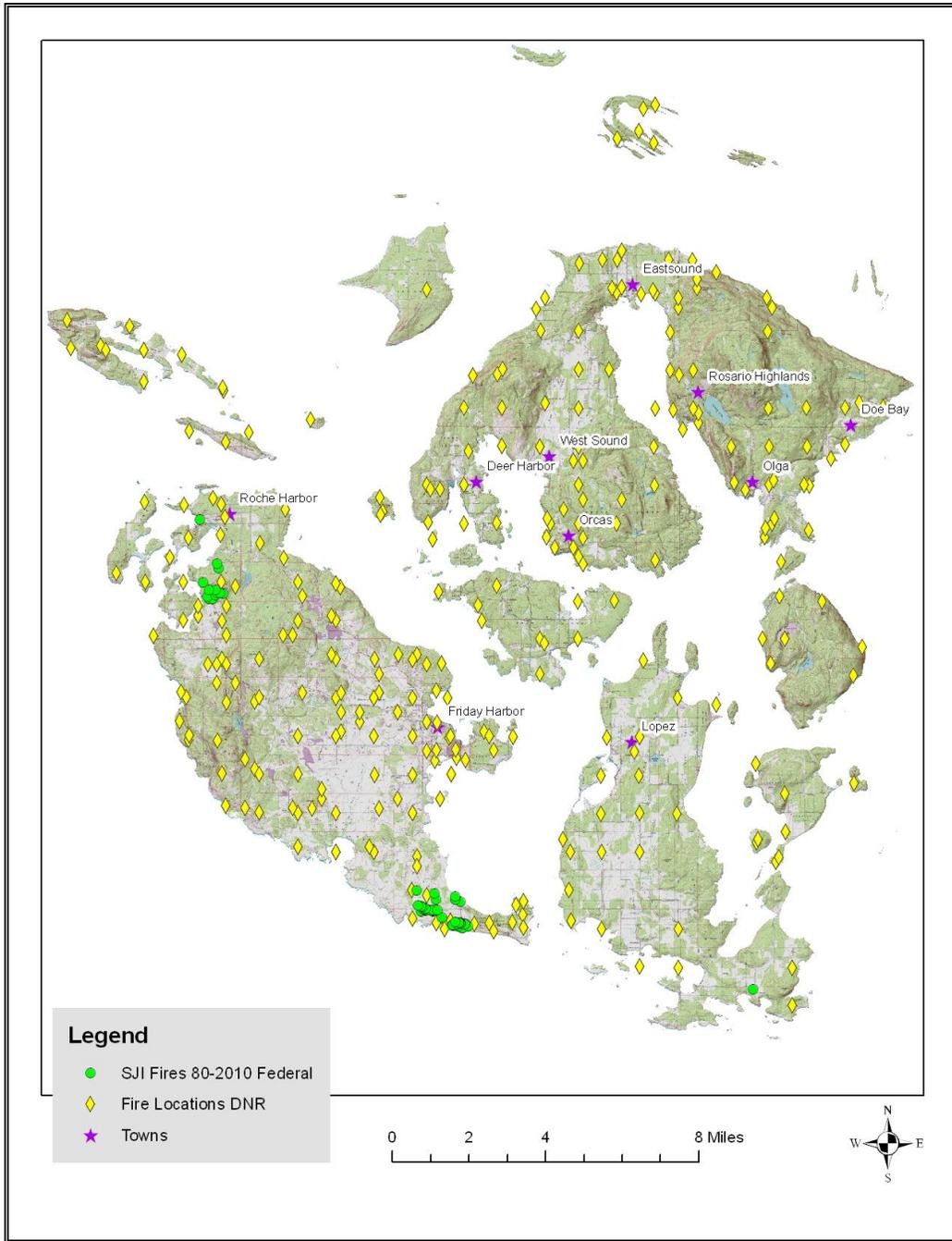
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<sup>14</sup> Auburn University website [https://fp.auburn.edu/fire/topos\\_effect.htm](https://fp.auburn.edu/fire/topos_effect.htm). Accessed on July 30,2012.

<sup>15</sup> Gorte, R. 2009. Congressional Research Service, Wildfire Fuels and Fuel Reduction.

these types of human activities cause an ignition that could spread into populated areas and timberlands.

**Figure 4.1. Ignition History in San Juan County from 1980-2008.**



This map shows both state and federally reported fires. The federal fires (indicated by green dots) appear to be located primarily on National Park Service property and are likely planned ignitions.

### **Fire History**

Fire was once an integral function within the majority of ecosystems in Washington. The seasonal cycling of fire across most landscapes was as regular as the July, August and September

lightning storms plying across western Washington. Depending on the plant community composition, structural configuration, and buildup of plant biomass, fire resulted from ignitions with varying intensities and extent across the landscape. Shorter return intervals between fire events often resulted in less dramatic changes in plant composition.<sup>16</sup> These fires burned from 1 to 47 years apart, with most at 5- to 20-year intervals.<sup>17</sup> With infrequent return intervals, plant communities tended to burn more severely and be replaced by vegetation different in composition, structure, and age.<sup>18</sup> Native plant communities in this region developed under the influence of fire, and adaptations to fire are evident at the species, community, and ecosystem levels.

Fire history data (from fire scars and charcoal deposits) suggest fire, or lack thereof, has played an important role in shaping the vegetation throughout San Juan County. Native American inhabitants of San Juan County used fire to enhance the natural propagation of native plants important for food, such as camas bulbs. According to one study, the mean individual-tree fire return interval was 18.4 years from 1700-1879 (pre Euro-American settlement) and 103.8 years (post Euro-American settlement).<sup>19</sup> On San Juan Island, the need for wood to fuel the kilns used by the Roche Harbor Lime and Cement Company resulted in dramatic harvest of native forests. By the early 1900's, the natural vegetation was rapidly changing from open grassland and hardwood forest (madrona, Garry oak, and maple) to Douglas fir.<sup>20</sup>

#### Orcas Island - September 18<sup>th</sup>, 2008

The Island Sounder reported two fires on Orcas Island on September 18<sup>th</sup>, 2008. Due to high temperatures and dry conditions, a brush fire occurred as a result of a mower hitting a rock in the Crow Valley area. Initial attack efforts by Orcas Island Fire and Rescue contained the fire to about a half an acre. On the same day, a second wildfire was reported off of Dolphin Bay Road. Again, successful initial attack operations suppressed the fire before significant damages could occur. Both events threatened nearby structures.

#### West Sound, Orcas Island - June 15<sup>th</sup>, 2009

A property owner was burning a brush pile when it got out of control around 3pm. The fire took five hours to contain and burned three and a half acres of both public and private lands. The fire came to within 300 feet of one home. Although the burn pile had a valid permit, prohibited materials contributed to the fire's spread in conjunction with a lack of water supply<sup>21</sup>.

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<sup>16</sup> Johnson, C.G. 1998. Vegetation Response after Wildfires in National Forests of Northeastern Oregon. 128 pp.

<sup>17</sup> Barrett, J.W. 1979. Silviculture of ponderosa pine in the Pacific Northwest: the state of our knowledge. USDA Forest Service, General Technical Report PNW-97. Pacific Northwest Forest and Range Experiment Station, Portland, OR. 106 p.

<sup>18</sup> Johnson, C.G.; Clausnitzer, R.R.; Mehringer, P.J.; Oliver, C.D. 1994. Biotic and Abiotic Processes of Eastside Ecosystems: the Effects of Management on Plant and Community Ecology, and on Stand and Landscape Vegetation Dynamics. Gen. Tech. Report PNW-GTR-322. USDA-Forest Service. PNW Research Station. Portland, Oregon. 722pp.

<sup>19</sup> Sprenger, C. B.; Dunwiddie, P. W. 2011. Fire History of a Douglas-Fir-Oregon White Oak Woodland, Waldron Island, Washington. Northwest Science, 85(2):108-119.

<sup>20</sup> Natural Hazards Mitigation Plan. June/July 2008. San Juan County-Town of Friday Harbor Department of Emergency Management.

<sup>21</sup> ISLANDSOUNDER.COM. <http://www.islandssounder.com/news/47660027.html>. Accessed May, 2012.

## Satellite Island Fire - July 28<sup>th</sup>, 2010

It took 16 firefighters through the night to bring this wildfire under control. Between 4 and 12 acres were consumed by the fire. The cause was unknown at the time the article was written. The island is uninhabited so no homes were threatened by the blaze<sup>22</sup>.

### Wildfire Ignition Profile

Detailed records of wildfire ignitions and extents from the Washington Department of Natural Resources (DNR) and Bureau of Land Management (BLM) have been analyzed. In interpreting these data, it is important to keep in mind that the information represents only the lands protected by the agency specified and may not include all fires in areas covered only by local fire departments or other agencies.

The DNR (1970-2011) and BLM (1981-2009) database of wildfire ignitions used in this analysis includes ignition and extent data within their jurisdictions. During this period, the agencies recorded an average of 13 wildfire ignitions per year resulting in an average total burn area of 30 acres per year. According to this dataset, the vast majority of fires occurring in San Juan County are human caused; however, naturally ignited/unknown caused fires do occur.

The highest number of ignitions in San Juan County was witnessed in 1973 with 52 separate ignitions. However, the greatest number of acres burned in a single year occurred in 2003 with over 468 acres being burned, of which 463 acres were recorded by the National Park Service.

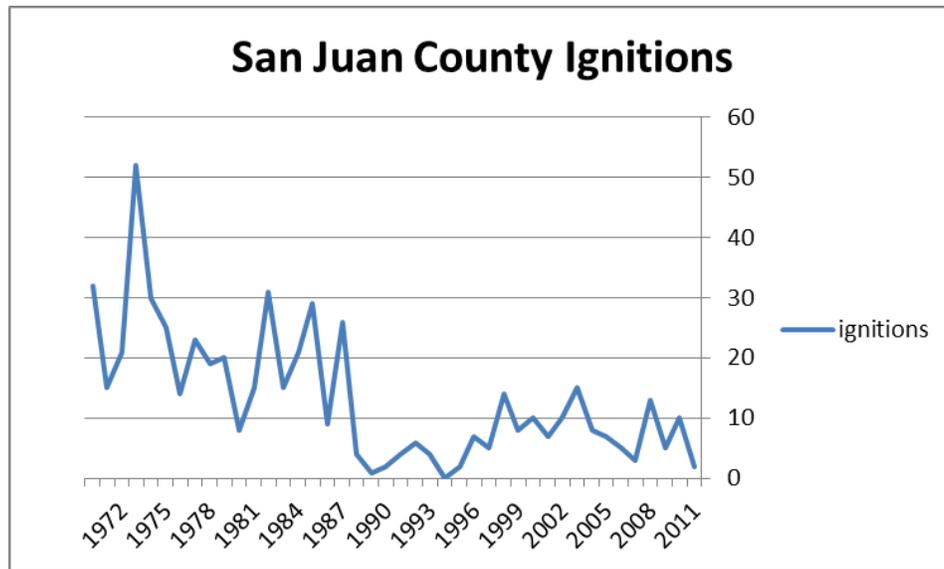
When analyzed by decade from 1970-2010, the data shows that the total number of ignitions ranges from 5 to 25 ignitions per decade and the average number of acres burned per decade jumps around as well, from 3 acres to 58 acres. The data suggests that weather, specifically droughts, may play a major role in the amount of acres burned annually in San Juan County.

General Cause	Number of Ignitions	Percent of Total Ignitions	Acres Burned	Percent of Total Acres
Human-Caused	435	88%	421	74%
Natural Ignition	11	2%	27	5%
Unknown	47	10%	122	21%
<b>Total</b>	<b>493</b>	<b>100%</b>	<b>570</b>	<b>100%</b>

Based on the agencies' combined datasets specific to San Juan County, there is a downward trend in the number of ignitions/year since 1970, and generally less than 50 acres burned/year. There are however, occasionally spikes in the total acres burned in any given year and could be a result of prescribed burning. It should be noted that if given the proper weather conditions, San Juan County could experience extreme wildfire activity.

<sup>22</sup> SanJuanJournal.com. <http://www.sanjuanjournal.com/news/99460014.html>. Accessed June, 2012.

Figure 4.2. Summary of San Juan County Ignitions from 1970 to 2011.



The data reviewed above provides a general picture regarding the level of wildland-urban interface fire risk within San Juan County. There are several reasons why the fire risk may be even higher than suggested above, especially in developing wildland-urban interface areas.

- 1) Large fires may occur infrequently, but statistically they will occur. One large fire could significantly change the statistics. In other words, 40 years of historical data may be too short to capture large, infrequent wildland fire events.
- 2) The level of fire hazard depends profoundly on weather patterns. A several year drought period would substantially increase the probability of large wildland fires in San Juan County. For smaller vegetation areas, with grass, brush and small trees, a much shorter drought period of a few months or less would substantially increase the fire hazard.
- 3) The level of fire hazard in wildland-urban interface areas is likely significantly higher than for wildland areas as a whole due to the greater risk to life and property. The probability of fires starting in interface areas is much higher than in wildland areas because of the higher population density and increased activities. Many fires in the wildland urban interface are not recorded in agency datasets because the local fire department responded and successfully suppressed the ignition without mutual aid assistance from the state or federal agencies.

### Wildfire Extent Profile

Across the west, wildfires have been increasing in extent and cost of control. Data summaries for 2000 through 2011 are provided and demonstrate the variability of the frequency and extent of wildfires nationally.

**Table 4.2. National Fire Season Summaries.**

Statistical Highlights	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Number of Fires	84,079	88,458	85,943	77,534	66,753	96,385	85,705	78,979	78,792	71,971	74,126
10-year Average ending with indicated year	106,400	103,112	101,575	100,466	89,859	87,788	80,125	79,918	78,549	76,521	80,465
Acres Burned (million acres)	3.6	6.9	4.9	6.8	8.7	9.9	9.3	5.3	5.9	3.4	8.7
10-year Average ending with indicated year (million acres)	4.1	4.2	4.7	4.9	6.1	6.5	7.0	6.9	6.9	6.5	7.0
Structures Burned	731	2,381	5,781	1,095	--	--	--	--	--	--	--
Estimated Cost of Fire Suppression (Federal agencies only)	\$917 million	\$ 1.6 billion	\$1.3 billion	\$890 million	\$876 million	--	--	--	--	--	--

The National Interagency Fire Center maintains records of fire costs, extent, and related data for the entire nation. Tables 4.2 and 4.3 summarize some of the relevant wildland fire data for the nation and some trends that are likely to continue into the future unless targeted fire mitigation efforts are implemented and maintained. According to these data, the total number of fires is trending downward while the total number of acres burned is trending upward. Since 2000 there has been a significant increase in the number of acres burned.<sup>23</sup>

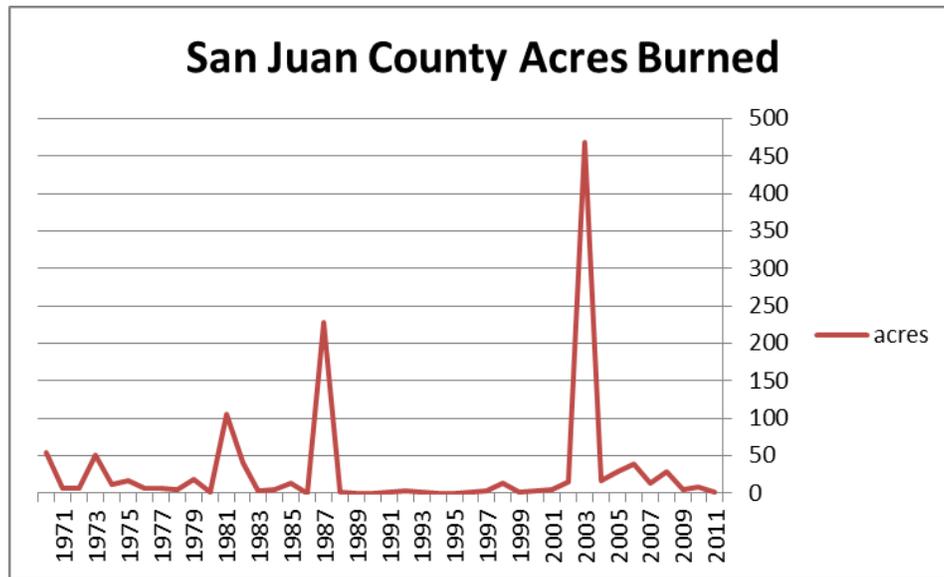
**Table 4.3. Total Fires and Acres 1980 - 2010 Nationally.**

Year	Fires	Acres	Year	Fires	Acres
2011	74,126	8,711,367	1995	130,019	2,315,730
2010	71,971	3,422,724	1994	114,049	4,724,014
2009	78,792	5,921,786	1993	97,031	2,310,420
2008	68,594	4,723,810	1992	103,830	2,457,665
2007	85,822	9,321,326	1991	116,953	2,237,714
2006	96,385	9,873,745	1990	122,763	5,452,874
2005	66,753	8,689,389	1989	121,714	3,261,732
2004	77,534	6,790,692	1988	154,573	7,398,889
2003	85,943	4,918,088	1987	143,877	4,152,575
2002	88,458	6,937,584	1986	139,980	3,308,133
2001	84,079	3,555,138	1985	133,840	4,434,748
2000	122,827	8,422,237	1984	118,636	2,266,134
1999	93,702	5,661,976	1983	161,649	5,080,553
1998	81,043	2,329,709	1982	174,755	2,382,036
1997	89,517	3,672,616	1981	249,370	4,814,206
1996	115,025	6,701,390	1980	234,892	5,260,825

These statistics are based on end-of-year reports compiled by all wildland fire agencies after each fire season. The agencies include: Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service, Forest Service, and all state agencies.

<sup>23</sup> National Interagency Fire Center. 2008. Available online at <http://www.nifc.gov/>.

Figure 4.3. Summary of San Juan County Acres Burned 1970-2011.



The fire suppression agencies in San Juan County respond to numerous wildland fires each year, but few of those fires grow to a significant size. According to national statistics, only 2% of all wildland fires escape initial attack. However, that 2% accounts for the majority of fire suppression expenditures and threatens lives, properties, and natural resources. These large fires are characterized by a size and complexity that require special management organizations drawing suppression resources from across the nation. These fires create unique challenges to local communities by their quick development and the scale of their footprint.

San Juan County has experienced low impact wildland fires that have not burned structures or infrastructure within their wildland urban interface. However, based on field assessments by experts, the fuels for a potentially catastrophic fire are present, and given an extremely dry summer it is not unimaginable to believe that significant fires could happen in San Juan County. It is important that regional planners as well as local residents understand that in order to more effectively prepare for potential wildfire events.

### Wildfire Hazard Assessment

San Juan County was analyzed using a variety of models, managed on a Geographic Information System (GIS) system. Physical features of the region including roads, streams, soils, elevation, and remotely sensed images were represented by data layers. Field visits were conducted by specialists from Northwest Management, Inc. and others. Discussions with area residents and local fire suppression professionals augmented field visits and provided insights into forest health issues and treatment options. This information was analyzed and combined to develop an objective assessment of wildland fire risk in the region.

### Historic Fire Regime

Historical variability in fire regime is a conservative indicator of ecosystem sustainability, and thus, understanding the natural role of fire in ecosystems is necessary for proper fire management. Fire is one of the dominant processes in terrestrial systems that constrain vegetation patterns, habitats, and ultimately, species composition. Land managers need to understand historical fire regimes, the fire return interval (frequency) and fire severity prior to

settlement by Euro-Americans, to be able to define ecologically appropriate goals and objectives for an area. Moreover, managers need spatially explicit knowledge of how historical fire regimes vary across the landscape.

“Natural” fires in San Juan County would have been disproportionately caused by Native Americans. Aboriginal peoples intentionally set fires throughout the region (Puget Sound, southern Vancouver Island, Gulf and San Juan Islands) for the purposes of controlling tree expansion and for the cultivation of select plants. When we describe “natural” in the Range of Natural Variability we are including indigenous peoples as natural disturbance agents and contributors to perceptions of what is “natural”.

A primary goal in ecological restoration is often to return an ecosystem to a previously existing condition that no longer is present at the site, under the assumption that the site’s current condition is somehow degraded or less desirable than the previous condition and needs improvement. A report from the Washington Natural Heritage Program identified a number of forest associations on Patos as containing regionally and globally significant stands with old growth characteristics. Based on evidence from adjacent islands, however, the hypothesis is that Patos Island was once sparsely vegetated and maintained that way for centuries by Native Americans. The range of reference conditions resulting from frequent Native American burning would be the target ecosystem condition.<sup>24</sup>

Land managers in San Juan County must determine if the past, Native American influenced condition on the islands was necessarily healthier, had a higher level of integrity, and was more sustainable than the current condition. In other words, is “restoration” an appropriate course of action? After a prolonged absence, if fire is reintroduced to these ecosystems the result could be damaging. Fuel loads on most of the islands today are quite high and most of the islands are inhabited by people, homes, and infrastructure. The ecosystem was adapted to fire in the past, but is no longer adapted today, especially in light of the human component.

In the absence of intensive Native American burning, a condition has developed where fire could/should not be reintroduced without some significant alteration of the current ecosystem structure. This would also require a significant assessment of social acceptance and financial contribution.

Many ecological assessments are enhanced by the characterization of the historical range of variability which helps managers understand: (1) how the driving ecosystem processes vary from site to site; (2) how these processes affected ecosystems in the past; and (3) how these processes might affect the ecosystems of today and the future. Historical fire regimes are a critical component for characterizing the historical range of variability in fire-adapted ecosystems. Furthermore, understanding ecosystem departures provides the necessary context for managing sustainable ecosystems. Land managers need to understand how ecosystem processes and functions have changed prior to developing strategies to maintain or restore sustainable systems. In addition, the concept of departure is a key factor for assessing risks to ecosystem components. For example, the departure from historical fire regimes may serve as a useful proxy for the potential of severe fire effects from an ecological perspective.

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<sup>24</sup> Gray, R.W. *What to Do With Competing Versions of Historic Fidelity: the Case of Patos Island, Washington.*

<b>Table 4.4. Historic Fire Regimes in San Juan County.</b>			
<b>Historic Fire Regime</b>	<b>Description</b>	<b>Acres</b>	<b>Percent of Total</b>
Fire Regime Group I	<= 35 Year Fire Return Interval, Low and Mixed Severity	0	0
Fire Regime Group II	<= 35 Year Fire Return Interval, Replacement Severity	0	0
Fire Regime Group III	35 - 200 Year Fire Return Interval, Low and Mixed Severity	46,355	41%
Fire Regime Group IV	35 - 200 Year Fire Return Interval, Replacement Severity	13,440	12%
Fire Regime Group V	> 200 Year Fire Return Interval, Any Severity	30,242	27%
Water	Water	1,008	<1%
Barren	Barren	515	<1%
Indeterminate Fire Regime Characteristics	Indeterminate Fire Regime Characteristics	20,873	19%
	<b>Total</b>	<b>112,433</b>	<b>100%</b>

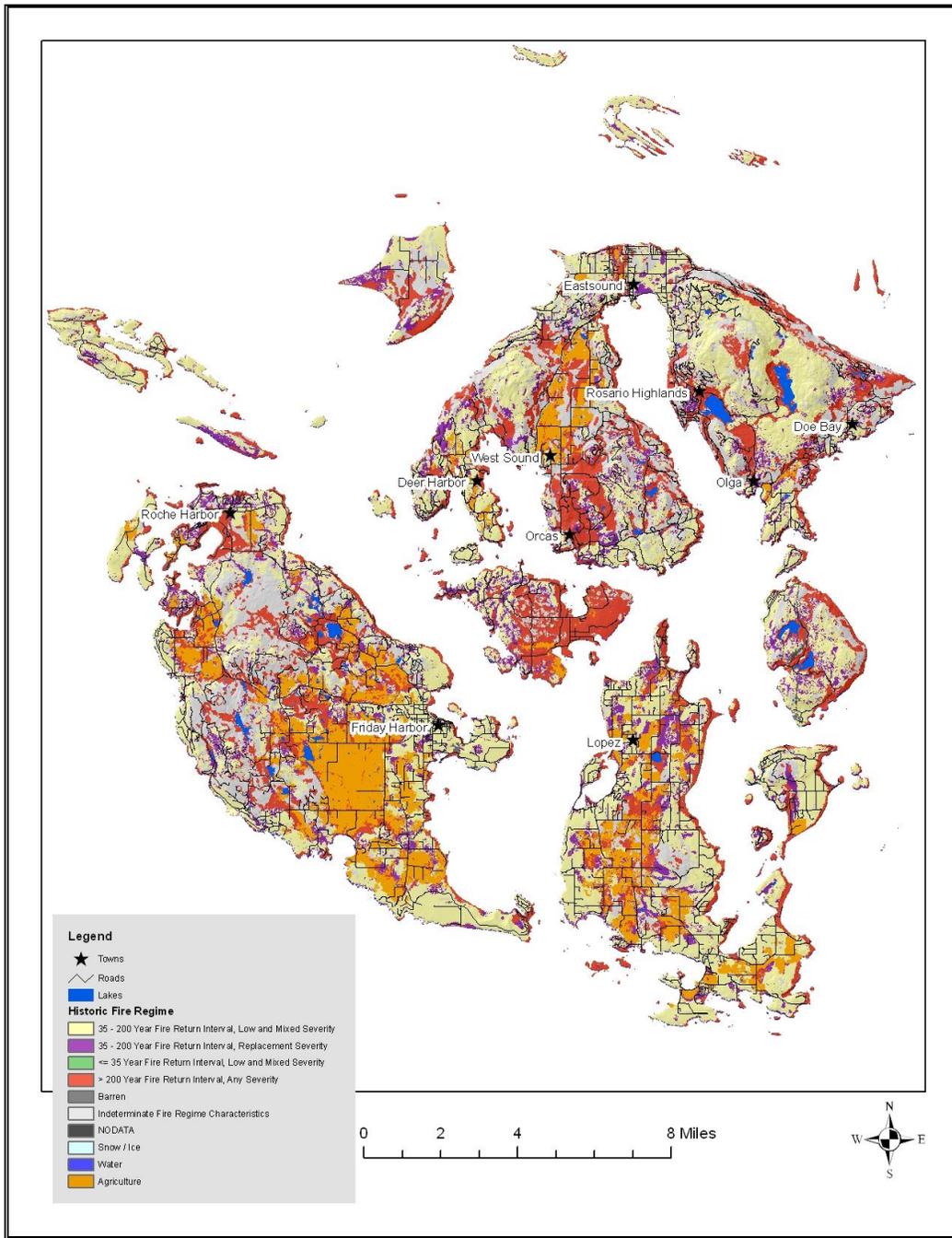
This model only uses the current vegetation types to determine the historic fire regime. Native Americans reportedly burned throughout the county on a regular basis.<sup>25</sup> The vegetation types were much different pre Euro-American settlement than they are today. It is largely unknown what the vegetation on the islands was like before anthropogenic influence. The Historic Fire Regime model suggests that fires in San Juan County historically burned with low to mixed severity on a longer return interval. The longer time between fires allows fuel to build-up, which can burn very intensely when conditions are dry. For this reason, it may be reasonable to assume that even a majority of the areas on the islands that have been categorized as having a 200 plus year return interval with mixed severity fires, could likely be stand replacing fires with the current accumulation of fuels. There is also a large percentage of acres that are ‘Indeterminate’, which may be a result poor data or lack of ground truthing for specific map signatures.

Additional explanation of how the historic fire regime data were derived is included in Appendix 3.

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<sup>25</sup> Murphy, M. and R. L. Barsh. “Origin and Visibility of island Garry Oak communities: Case studies from Waldron and Samish Island, WA.” Lopez, WA. 2006. Pp 8-10.

**Figure 4.4. Historic Fire Regime for San Juan County.**



### Fire Regime Condition Class

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning.<sup>26, 27</sup> Coarse scale definitions for historic fire regimes have been developed by Hardy et al<sup>28</sup> and Schmidt et al<sup>29</sup> and interpreted for fire and fuels management by Hann and Bunnell.

<sup>26</sup> Agee, J. K. Fire Ecology of the Pacific Northwest forests. Oregon: Island Press. 1993.

A fire regime condition class (FRCC) is a classification of the amount of departure from the historic regime.<sup>30</sup> The three classes are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime.<sup>31,32</sup> The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.

An analysis of Fire Regime Condition Classes in San Juan County shows that the majority land in the county has a moderate departure (75%) from its historic fire regime and associated vegetation and fuel characteristics. Approximately 10% has a low departure and less than 1% is considered highly departed.

<b>Fire Regime Condition Class</b>	<b>Description</b>	<b>Acres</b>	<b>Percent of Total</b>
Fire Regime Condition Class I	Low Vegetation Departure	11,068	10%
Fire Regime Condition Class II	Moderate Vegetation Departure	84,055	75%
Fire Regime Condition Class III	High Vegetation Departure	661	<1%
Water	Water	1,008	<1%
Urban	Urban	1,818	2%
Barren	Barren	515	<1%
Agriculture	Agriculture	13,308	12%
	<b>Total</b>	<b>112,433</b>	<b>100%</b>

The current Fire Regime Condition Class model shows that much of San Juan County is considered to be moderately departed. A majority of the islands are dominated by various pine and fir species with an understory consisting of oceanspray (*Holodiscus discolor*), salal (*Gaultheria shallon*), and many other shrub species. The Douglas fir / Garry oak savannahs have been reduced to small pockets and conservation management efforts have been put into practice on Federal and private lands. These lands historically were renewed by burning by local tribes who desired the Camas bulbs harvested from these areas. Forest structure consists of a dense canopy with high amounts of shrub species on the forest floor. The current structure and density of the forest in many areas makes it susceptible to health issues from competition, insects, and

<sup>27</sup> Brown, J. K. "Fire regimes and their relevance to ecosystem management." *Proceedings of Society of American Foresters National Convention*. Society of American Foresters. Washington, D.C. 1995. Pp 171-178.

<sup>28</sup> Hardy, C. C., et al. "Spatial data for national fire planning and fuel management." *International Journal of Wildland Fire*. 2001. Pp 353-372.

<sup>29</sup> Schmidt, K. M., et al. "Development of coarse scale spatial data for wildland fire and fuel management." General Technical Report, RMRS-GTR-87. U.S. Department of Agriculture, Forest Service. Rocky Mountain Research Station. Fort Collins, Colorado. 2002.

<sup>30</sup> Hann, W. J. and D. L. Bunnell. "Fire and land management planning and implementation across multiple scales." *International Journal of Wildland Fire*. 2001. Pp 389-403.

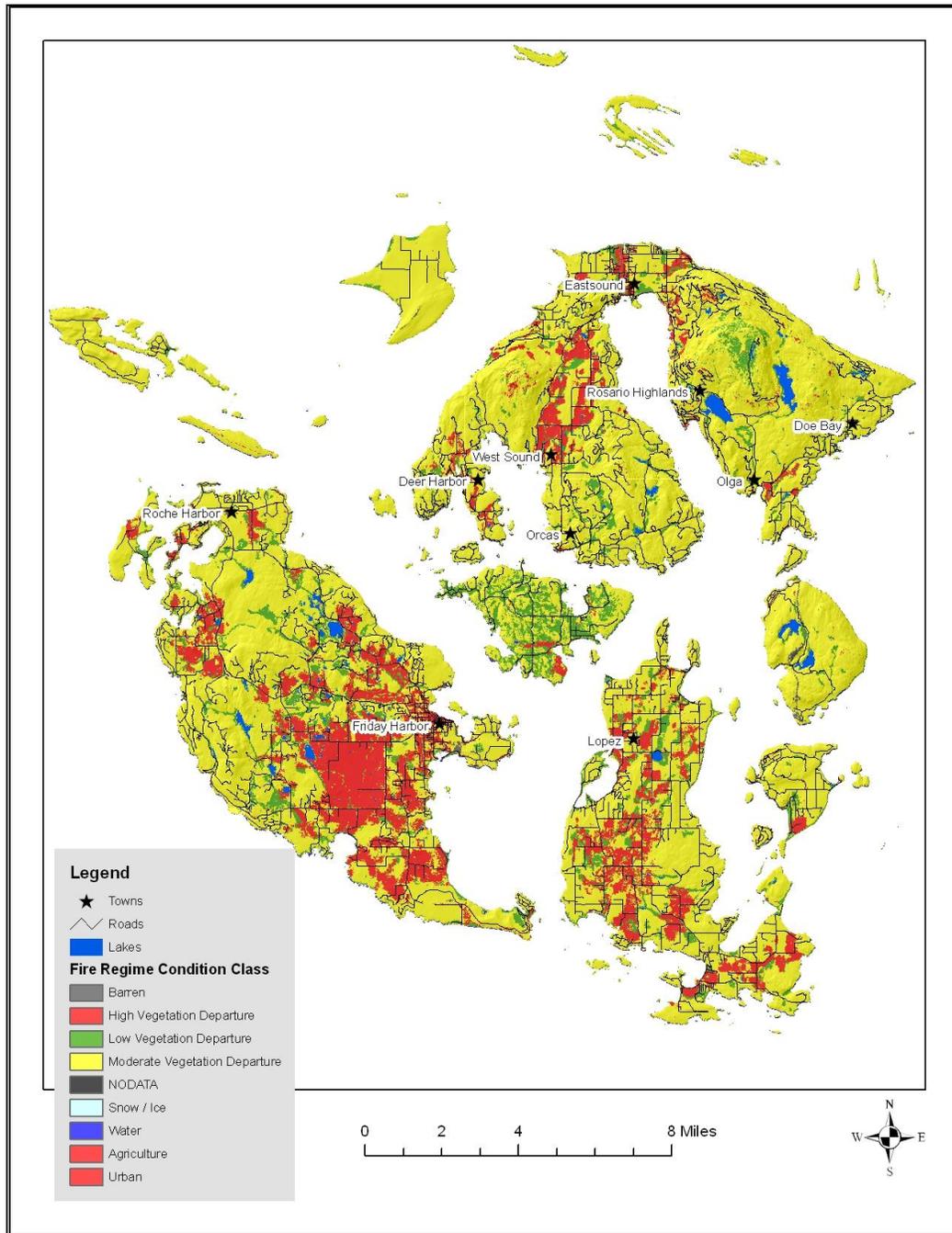
<sup>31</sup> Hardy, C. C., et al. "Spatial data for national fire planning and fuel management." *International Journal of Wildland Fire*. 2001. Pp 353-372.

<sup>32</sup> Schmidt, K. M., et al. "Development of coarse scale spatial data for wildland fire and fuel management." General Technical Report, RMRS-GTR-87. U.S. Department of Agriculture, Forest Service. Rocky Mountain Research Station. Fort Collins, Colorado. 2002.

disease. The current fire severity model suggests that a higher severity fire than historical norms would be expected in this area.

A map depicting Fire Regime Condition Class as well as a more in-depth explanation of FRCC is presented in Appendices 3.

**Figure 4.5. Fire Regime Condition Class Map for San Juan County.**



### San Juan County's Wildland-Urban Interface

The wildland-urban interface (WUI) has gained attention through efforts targeted at wildfire mitigation; however, this analysis technique is also useful when considering other hazards

because the concept looks at where people and structures are concentrated in any particular region.

A key component in meeting the underlying need for protection of people and structures is the protection and treatment of hazards in the wildland-urban interface. The wildland-urban interface refers to areas where wildland vegetation meets urban developments or where forest fuels meet urban fuels such as houses. The WUI encompasses not only the interface (areas immediately adjacent to urban development), but also the surrounding vegetation and topography. Reducing the hazard in the wildland-urban interface requires the efforts of federal, state, and local agencies and private individuals.<sup>33</sup> “The role of [most] federal agencies in the wildland-urban interface includes wildland firefighting, hazard fuels reduction, cooperative prevention and education, and technical experience. Structural fire protection [during a wildfire] in the wildland-urban interface is [largely] the responsibility of Tribal, state, and local governments”.<sup>34</sup> The role of the federal agencies in San Juan County is and will be much more limited. Property owners share a responsibility to protect their residences and businesses and minimize danger by creating defensible areas around them and taking other measures to minimize the risks to their structures.<sup>35</sup> With treatment, a wildland-urban interface can provide firefighters a defensible area from which to suppress wildland fires or defend communities against other hazard risks. In addition, a wildland-urban interface that is properly treated will be less likely to sustain a crown fire that enters or originates within it.<sup>36</sup>

By reducing hazardous fuel loads, ladder fuels, and tree densities, and creating new and reinforcing existing defensible space, landowners can protect the wildland-urban interface, the biological resources of the management area, and adjacent property owners by:

- Minimizing the potential of high-severity ground or crown fires entering or leaving the area;
- Reducing the potential for firebrands (embers carried by the wind in front of the wildfire) impacting the WUI. Research indicates that flying sparks and embers (firebrands) from a crown fire can ignite additional wildfires as far as 1¼ miles away during periods of extreme fire weather and fire behavior;<sup>37</sup>
- Improving defensible space in the immediate areas for suppression efforts in the event of wildland fire.

Three wildland-urban interface conditions have been identified (Federal Register 66(3), January 4, 2001) for use in wildfire control efforts. These include the Interface Condition, Intermix Condition, and Occluded Condition. Descriptions of each are as follows:

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<sup>33</sup> Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

<sup>34</sup> USFS. 2001. United States Department of Agriculture, Forest Service. Wildland Urban Interface. Web page. Date accessed: 25 September 2001. Accessed at: <http://www.fs.fed.us/r3/sfe/fire/urbanint.html>

<sup>35</sup> USFS. 2001. United States Department of Agriculture, Forest Service. Wildland Urban Interface. Web page. Date accessed: 25 September 2001. Accessed at: <http://www.fs.fed.us/r3/sfe/fire/urbanint.html>

<sup>36</sup> Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

<sup>37</sup> McCoy, L. K., et all. Cerro Grand Fire Behavior Narrative. 2001.

- **Interface Condition** – a situation where structures abut wildland fuels. There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences. The development density for an interface condition is usually 3+ structures per acre;
- **Intermix Condition** – a situation where structures are scattered throughout a wildland area. There is no clear line of demarcation; the wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres; and
- **Occluded Condition** – a situation, normally within a city, where structures abut an island of wildland fuels (park or open space). There is a clear line of demarcation between the structures and the wildland fuels along roads and fences. The development density for an occluded condition is usually similar to that found in the interface condition and the occluded area is usually less than 1,000 acres in size.

In addition to these classifications detailed in the Federal Register, San Juan County has included four additional classifications to augment these categories:

- **Rural Condition** – a situation where the scattered small clusters of structures (ranches, farms, resorts, or summer cabins) are exposed to wildland fuels. There may be miles between these clusters.
- **High Density Urban Areas** – those areas generally identified by the population density consistent with the location of incorporated cities, however, the boundary is not necessarily set by the location of city boundaries or urban growth boundaries; it is set by very high population densities (more than 7-10 structures per acre).
- **Non-WUI Condition** – a situation where the above definitions do not apply because of a lack of structures in an area or the absence of critical infrastructure. This classification is not considered part of the wildland urban interface.

In summary, the designation of areas by the San Juan County steering committee includes:

- Interface Condition: WUI
- Intermix Condition: WUI
- Occluded Condition: WUI
- Rural Condition: WUI
- High Density Urban Areas: WUI
- Non-WUI Condition: Not WUI, but present in San Juan County

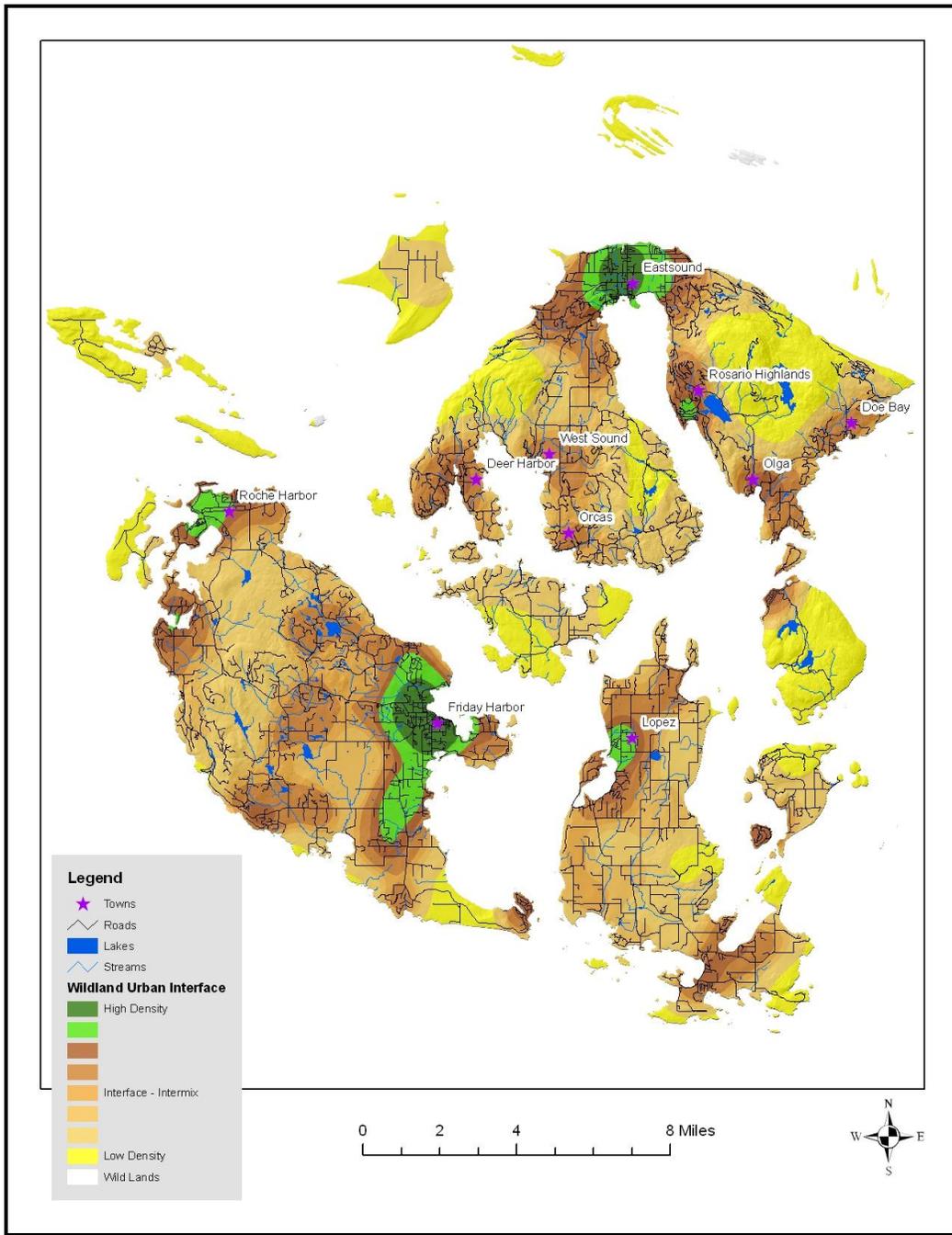
San Juan County's wildland urban interface (WUI) is mostly based on population density. Relative population density across the county was estimated using a GIS based kernel density population model that uses object locations to produce, through statistical analysis, concentric rings or areas of consistent density. To graphically identify relative population density across the county, structure locations are used as an estimate of population density. Aerial photography was used to identify structure locations in 2005. This existing structure layer was updated in 2011 using 2009 NAIP imagery and San Juan County's cadastral data. The resulting output identified the extent and level of population density throughout the county.

By evaluating structure density in this way, WUI areas can be identified on maps by using mathematical formulae and population density indexes. The resulting population density indexes create concentric circles showing high density areas, interface, and intermix condition WUI, as well as rural condition WUI (as defined above). This portion of the analysis allows us to “see” where the highest concentrations of structures are located in reference to relatively high risk landscapes, limiting infrastructure, and other points of concern.

The WUI, as defined here, is unbiased and consistent and most importantly – it addresses all of the county, not just federally identified communities at risk. It is a planning tool showing where homes and businesses are located and the density of those structures leading to identified WUI categories. It can be determined again in the future, using the same criteria, to show how the WUI has changed in response to increasing population densities. It uses a repeatable and reliable analysis process that is unbiased.

The Healthy Forests Restoration Act makes a clear designation that the location of the WUI is at the determination of the county or reservation when a formal and adopted Community Wildfire Protection Plan is in place. It further states that the federal agencies are obligated to use this WUI designation for all Healthy Forests Restoration Act purposes. The San Juan County Community Wildfire Protection Plan steering committee evaluated a variety of different approaches to determining the WUI for the county and selected this approach and has adopted it for these purposes. In addition to a formal WUI map for use with the federal agencies, it is hoped that it will serve as a planning tool for the county, state and federal agencies, and local fire districts.

**Figure 4.6. Wildland Urban Interface in San Juan County, Washington.**



### Potential WUI Treatments

The definition and mapping of the WUI is the creation of a planning tool to identify where structures, people, and infrastructure are located in reference to each other. This analysis tool does not include a component of fuels risk. There are a number of reasons to map and analyze these two components separately (population density vs. fire risk analysis). Primary among these reasons is the fact that population growth often occurs independent from changes in fire risk, fuel loading, and infrastructure development. Thus, making the definition of the WUI dependent on all of them would eliminate populated places with a perceived low level of fire risk

today, which may in a year become an area at high risk due to forest health issues or other concerns.

By examining these two tools separately, the planner is able to evaluate these layers of information to see where the combination of population density overlays areas of high current relative fire risk and then take mitigative actions to reduce the fuels, improve readiness, directly address factors of structural ignitability, improve initial attack success, mitigate resistance to control factors, or (more often) a combination of many approaches.

It should not be assumed that just because an area is identified as being within the WUI, that it will therefore receive treatments because of this identification alone. Nor should it be implicit that all WUI treatments will be the application of the same prescription. Instead, each location targeted for treatments must be evaluated on its own merits: factors of structural ignitability, access, resistance to control, population density, resources and capabilities of firefighting personnel, and other site specific factors.

It should also not be assumed that WUI designation on national or state forest lands automatically equates to a treatment area. The Forest Service, Bureau of Land Management, and Washington Department of Natural Resources are still obligated to manage lands under their control according to the standards and guides listed in their respective forest plans (or other management plans). The adopted forest plan has legal precedence over the WUI designation until such a time as the forest plan is revised to reflect updated priorities.

Most treatments may begin with a home evaluation, and the implicit factors of structural ignitability (roofing, siding, deck materials) and vegetation within the treatment area of the structure. However, treatments in the low population areas of rural lands (mapped as yellow) may look closely at access (two ways in and out) and communications through means other than land-based telephones. On the other hand, a subdivision with densely packed homes (mapped as brown – interface areas) surrounded by forests and dense underbrush, may receive more time and effort implementing fuels treatments beyond the immediate home site to reduce the probability of a crown fire entering the subdivision.

## **Relative Threat Level Mapping**

San Juan County recognizes that certain regions of the County have unique risk factors that increase their vulnerability to wildland fire. In an effort to demonstrate these risk factors, the steering committee developed a threat level model analyzing various risk factors on a scale relative to San Juan County specifically.

### **Risk Categories**

Based on analysis of the various modeling tools, existing historical information, and local knowledge, a preliminary assessment of potentially high wildfire risk areas was completed. This assessment prioritized areas that may be at higher risk due to non-native or high fire risk vegetation, fire history profile, high risk fuel models, and/or limited suppression capabilities. This assessment also considered areas that had a high population or other valuable assets requiring protection from the impacts of wildland fires.

#### *Non-native or High Fire Risk Vegetation*

Fuel type, or vegetation, plays an important role in determining wildland fire danger. All fuel types can and will burn under the right conditions; however, some fuel types pose more danger than others due to the intensity at which they burn, the horizontal and vertical continuity of

burnable material, and firefighters' ability to modify the fuel complex in front of an approaching wildfire. While rangeland or grass fires often spread rapidly, they burn quickly and at a lower intensity than forest fires. Additionally, local farmers and firefighters can often construct fuel breaks with dozers and other equipment relatively quickly. These tactics are not as effective in forested areas or on steep terrain.

Vegetation types that lead to increased wildfire intensity or severity were given a higher threat level rating.

### High Ignition Potential

The primary ignition source in San Juan County is people. Human caused ignitions are generally a result of debris burning or recreation activities. Most of the fires that have occurred on the interior of the larger islands are likely a result of debris burning. Unattended campfires, fireworks, and other recreational activities probably occur along the shorelines and on some of the more remote islands. An influx of visitors to the islands occurs during the drier summer months, which adds to the ignition potential.

Areas considered to have a higher potential for fire ignitions such as recreational hotspots were given a higher threat level rating.

### High Risk Fire Behavior

Due to the heavy fuel loads in places, many of the islands could experience extreme wildfire behavior characteristics that result in very intense, stand replacing severity fires. On the other hand, much of the agriculture/grassland area will likely experience rapid rates of spread, particularly under the influence of wind.

One of the factors contributing to potentially dangerous fire behavior is the preheating of fuels on steep slopes ahead of the actual flame front. Typically, fires spread very rapidly uphill, particularly in grass fuel types. Hot gases rise in front of the fire along the slope face preheating the upslope vegetation and moving a grass fire up to four times faster with flames twice as long as a fire on level ground. This preheating of fuels, or radiant heat, is capable of igniting combustible materials from distances of 100 feet or more.<sup>38</sup>

Another characteristic of extreme fire behavior is the formation of crown fires, which has a dramatic effect on suppression capabilities and ultimately the severity of the fire. Crown fires are defined as fires that advance through canopy fuels more or less independently of surface fires. Crown fires are extremely dangerous, very difficult to fight, and often require the use of indirect suppression methods. Crown fires are generally grouped into three broad classes: dependent, active, and independent based on the degree of dependence on the surface fire. Dependent crown fires are initiated and maintained by the heat produced by the consumption of surface fuels and may consume individual tree crowns or small clumps of trees. They do not spread from crown to crown except for adjacent trees in a clump. An active crown fire runs through both the surface and aerial strata at the same time, while an independent crown fire burns through crowns independent of the surface fire. While dependent crown fires are a significant concern in some forested areas of San Juan County, active and independent crown fires are uncommon primarily due to the patchy nature of the forest fuel types and structure.

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<sup>38</sup> "Wildfires and Schools". 2008. National Clearinghouse for Educational Facilities. National Institute of Building Sciences. Available online at <http://www.ncef.org/pubs/wildfires.pdf>.

General exceptions to this pattern might occur in fires with extreme fire behavior caused by low moisture levels, erratic winds, or high fuel loadings. Ideal conditions for the development of crown fires include dry fuel, low humidity with high temperatures, heavy accumulations of dead and downed litter, conifer regeneration and other ladder fuels, steep slopes, strong winds, unstable atmosphere, and a continuous cover of coniferous trees.<sup>39</sup>

Areas with a high potential for extreme fire behavior based on Fire Behavior Analysis Tool modeling and local knowledge were given a higher threat level rating. Based on local knowledge, the grass fuel model was given a higher intensity level than it normally would receive. Fires burning in this fuel type can spread rapidly. Grass fires can generally be controlled relatively easy assuming that response time is quick, which is difficult on many of the islands.

### Suppression Capabilities

Fire protection on each island in San Juan County is essentially the responsibility of the local fire district. The four larger islands (San Juan, Orcas, Lopez, and Shaw) have active fire districts with resources available for fire suppression. However, each island is limited to the resources at hand until help from other islands or state or federal agencies can arrive.

The outer islands in San Juan County fall under Washington DNR fire protection responsibility. The Washington DNR has a cooperative agreement with San Juan Fire District to provide initial attack on outer islands. The response time from the District's station at Friday Harbor can be an hour or longer due to the logistical challenge of mobilizing both crews and equipment across the water.

### Population Centers and Developing Areas

Due to the increased human activity within and surrounding San Juan County communities, these areas are inherently at a higher risk of ignitions.

The perimeter and outskirts of population centers and known developing areas were given a higher threat level rating.

### High Protection Value

There are several areas in San Juan County that constitute protection due to their high conservation value such as tribal and other culturally or historically significant sites, recreational areas, and critical infrastructure. Watersheds were included in this risk category due to the limited supply of this natural resource within the county. Communication towers and State Parks are other examples of "High Protection Value" assets that were ranked with a higher threat level.

### Field Assessments

Based on the preliminary review of the risk categories, high risk areas were identified and mapped. Field assessment of these areas was conducted in April and included guided tours of each of the four larger islands as well as tours of several of the outer islands in combination with interviews with local residents in identified high risk areas. Fire control and mitigation specialists conducted thorough field assessment to evaluate the accuracy of the models and other data, assess the extent of risk and hazardous fuels, and develop specific hazardous fuels

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<sup>39</sup> Forest Encyclopedia Network. 2011. USDA Forest Service Southern Research Station and Southern Regional Extension Forestry. Available online at <http://www.forestencyclopedia.net/p/p481>.

treatment project plans. Additionally, experts from the local fire districts, the Bureau of Land Management, and San Juan County were consulted in order to address specific areas of concern and document local wildfire suppression operational tactics.

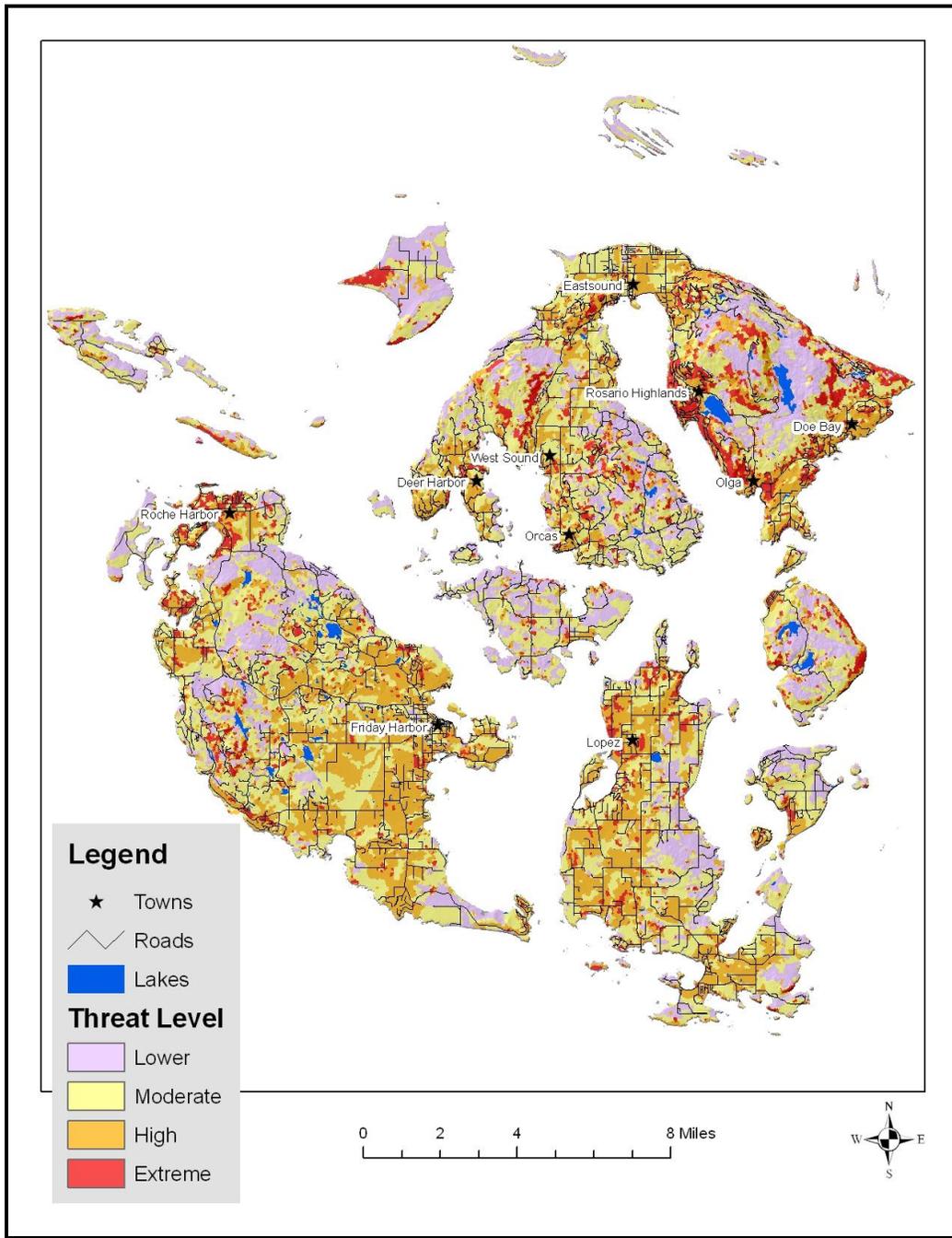
### **Determination of Relative Threat Level**

Following the field assessments, the steering committee began development of the Relative Threat Level model. Risk categories included in the final analysis were slope, aspect, gorse occurrence, precipitation, fuel models, rate of spread, fire intensity, population density, and critical infrastructure. The various categories, or layers, were ranked by the committee based on their significance pertaining to causal factors of high wildland fire risk conditions or protection significance. The ranked layers were then analyzed in a geographical information system to produce a cumulative effects map based on the ranking. Following is a brief explanation of the various categories used in the analysis and the general ranking scheme used for each.

- Environmental Factors – slope, aspect and precipitation all can have an enormous impact on the intensity of a wildfire. Therefore, areas with steep slopes, dry aspects, or lesser amounts of precipitation, relative to San Juan County, were given higher threat rankings.
- Vegetation Cover Types – certain vegetation types are known to carry and produce more intense fires than other fuel types. For San Juan County, shrub and grass fuel models were given the highest ranking followed by lower density forest types (shrub understory), closed canopy forest types, short grass, and agricultural fuel models. Known gorse infestations on Orcas Island were also ranked as having a higher risk vegetation type.
- Fire Behavior – areas identified by fire behavior modeling as having high rate of spread potential or high fire intensity were given a higher threat level ranking.
- Populated Areas – these areas were ranked higher due to the presence of human populations, structures, and infrastructure requiring protection from fire.
- Critical Infrastructure – areas or assets that cannot be replaced or afford special wildfire protection such as critical infrastructure, cultural or historic sites, and recreational areas were given a higher ranking.

Each data layer was developed, ranked, and converted to a raster format using ArcGIS 9.3. The data layers were then analyzed in ArcGIS using the Spatial Analyst extension to calculate the cumulative effects of the various threats. This process sums the ranked overlaid values geographically to produce the final map layer. The ranked values were then color coded to show areas of highest threat (red) to lowest threat (green) relative to San Juan County.

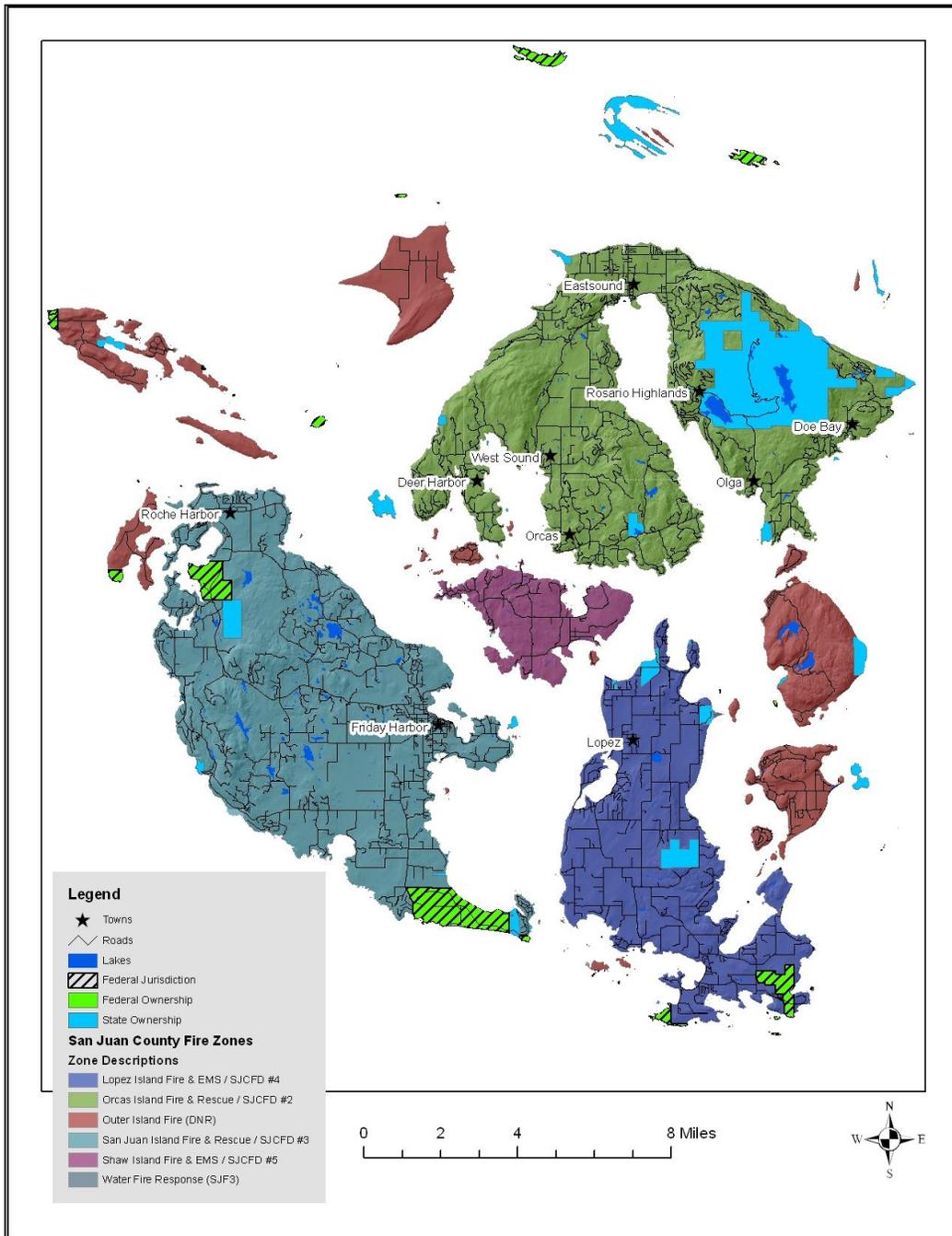
Figure 4.7. San Juan County Relative Threat Level Map.



## Overview of Fire Protection System

San Juan, Lopez, Shaw, and Orcas Island each have a local fire protection district covering both structural and wildland fire response on their respective island. The Washington DNR is responsible for wildland fire protection outside of fire district jurisdictions (i.e. outer islands). Due to the lack of DNR resources in San Juan County, the DNR maintains an agreement with San Juan Fire and Rescue to provide initial attack for the first 12 hours of the operational period.

**Figure 4.8. Wildfire Protection Responsibility Map.**



**\*\*NOTE: Washington DNR does not respond to structure fires.\*\***

## **Local Fire Department and District Summaries**

The firefighting resources and capabilities information provided in this section is a summary of information provided by the fire chiefs or representatives of the wildland firefighting agencies listed. Each organization completed a survey with written responses. Their answers to a variety of questions are summarized here. These synopses indicate their perceptions and information summaries.

Appendix 5 contains contact information and a complete available resource list for each of the following fire service organizations.

### **Waldron Island Fire Brigade**

**District Summary:** The citizens on Waldron Island do not have a fire protection district on their island. Waldron falls under the Washington DNR, which has a cooperative agreement with San Juan Island Fire & Rescue and Orcas Island Fire & Rescue. The anticipated long response times have prompted the development of an informal island fire brigade, and to acquire an old military style truck carrying a 1200 gallon water tank to which a high capacity pump and fire hose were added. With the aid of community funding and support, the Waldron Island Fire Brigade was able to commission the building of 3 smaller water wagons or trailers, each with 200 gallon capacity, mounted high pressure pump and 100+ feet of fire hose. These trailers are strategically placed around the island during the drier months, to allow anyone to hook-up and take them to wherever they are needed. These efforts notwithstanding, islanders are under no illusion that this equipment is sufficient to defeat a significant fire. Rather, they hope that it will help the brigade to control and delay the spread of any wildland fire until external help can reach the island.



## **Orcas Island Fire & Rescue / San Juan County Fire District #2**

**District Summary:** San Juan County Fire Protection District #2 provides emergency medical services, advanced life support (ALS), fire prevention and suppression, and public education services.

The District's response area is all of Orcas Island, which is approximately 55 square miles and categorized as rural. The topography of the island is the most diverse of the San Juan Islands; with elevations from sea level to 2,400 feet.

The District serves a permanent population of about 5,000 people with a summer population of 12,000. Because of its remoteness, the District has equipped and staffed itself to stand alone on emergency responses. There are seven stations across the “horseshoe” shaped island. The Eastsound Station, which is located in the center of the island, is staffed 24/7 by a Paramedic with additional overnight accommodations for volunteers. Orcas Island Fire and Rescue is run predominantly by volunteers.

**Issues of Concern:** Steep terrain is found throughout most areas of the island resulting in access and fire spread problems. The combination of topography and climate variances, results in a wide variety of fuels across the island. Receiving outside assistance is limited to boat or aircraft therefore; it is not a rapid response. As population and construction increase, keeping current with public education, preparedness, and water supply throughout the island is an ever-growing concern.

Due to the topography and the communications infrastructure on Orcas Island, two-way radio and cell phone communications are limited. Areas of Orcas Island can rise from Sea Level (Puget Sound) to 2,400' (Mount Constitution) within two miles with many high ridges and deep valleys. Consequently, there are large areas of the island that are shadowed by the terrain where radio and cell phone communications do not function. The antenna tower is located at the high point of Mt. Constitution at 2400'. This communication facility not only houses Sheriff, Fire & EMS communications, it serves Public Works, DEM and many other government and private radio and TV facilities. Orcas Island Fire & Rescue currently uses Bendix King Radios as well as supplying all volunteers with Motorola HT 1000 radios. The district does encounter challenges with radio communications when topography interferes with “line of sight” or “tower to tower” connections.

Open burning regulations are uniform throughout San Juan County. “Recreational” fires that are two-feet in diameter or less are allowed year-round without the need to obtain a permit, unless the state or county bans burning. “Residential” fires can be up to ten-feet in diameter, and require a \$15 permit that is available from any fire district as well as online from the County Fire Marshal's Web site. “Commercial” permits are issued only after an on-site inspection. The current fee is \$225. Residential permits are issued each year beginning on October 1<sup>st</sup>, with all permits expiring the following June 30<sup>th</sup>. Commercial permits expire thirty days after they are issued.

Major response issues include lack of water hydrants and water, along with narrow, steep roads and driveways. Access is a challenge for both EMS and fire.

As with all fire districts within San Juan County, when fire conditions require multiple resources to be deployed into forested areas to protect homes and people from fire, mutual aid resources are logistically difficult to obtain, with very long lead times between request and arrival.

**Cooperative Agreements:** Orcas Island Fire and Rescue is a party to the County-wide Mutual Aid Agreement and participates in the Statewide Fire Mobilization Plan.



### **San Juan Island Fire & Rescue / San Juan County Fire District #3**

**District Summary:** San Juan County Fire District #3 comprises San Juan, Brown and Pearl Islands. Through a contract with the State’s Department of Natural resources (DNR) the fire district also provides wildland fire protection to the County’s “outer” islands.

The Fire District operates under the name of “San Juan Island Fire Rescue” and is staffed predominantly by volunteer firefighters. There are seven fire stations located on San Juan Island and one station on Brown Island. The fire district operates a variety of land-based vehicles and one small fire boat.

There are typically approximately 200 calls for service per year within the fire district. While few of them are for wildland fires, the fuel model and intermix of wildland and structures represents a significant potential hazard during the dry season each year.

**Issues of Concern:** Individual and small subdivision developments continue to increase the number of occupied structures in forested areas. These buildings represent an incremental increase upon the demand for services from the fire district, and pose an increased risk to the safety of the residents and fire suppression forces when fire conditions require resources to be deployed in to forested areas to protect homes and people from fire.

The topography and infrastructure of San Juan County create numerous areas where radio communication between the 9-1-1 Center and emergency responders is difficult or impossible. Commercial cell phone service is not available in many areas, making it difficult for those without access to a “land line” telephone to report a fire. In addition, there are no mass media outlets located within San Juan County, so the dissemination of emergency messages to the public (such as evacuation routes or “shelter in place” instructions) is very difficult.

Open burning regulations are uniform throughout San Juan County. “Recreational” fires that are two-feet in diameter or less are allowed year-round without the need to obtain a permit. “Residential” fires can be up to ten-feet in diameter, and require a \$15 permit that is available from any fire district as well as online from the County Fire Marshal’s Web site. “Commercial” permits are issued only after an onsite inspection. The current fee is \$225. Residential permits are issued each year beginning on October 1<sup>st</sup>, with all permits expiring the following June 30<sup>th</sup>. Commercial permits expire thirty days after they are issued.

As a volunteer-staffed fire service, the community’s demographics impact the ability to recruit and retain firefighters. As the population ages, willing and able volunteers become an increasingly scarce resource.

As with all fire districts within San Juan County, when fire conditions require multiple resources to be deployed into forested areas to protect homes and people from fire, mutual aid resources are logistically difficult to obtain, with very long lead times between request and arrival.

**Cooperative Agreements:** San Juan Island Fire Rescue is DNR’s contracted “first responder” for wildland fire suppression for all lands in San Juan County that are not within an organized fire protection district. The agency is also a party to the County-wide Mutual Aid Agreement and participates in the Statewide Fire Mobilization Plan.



#### **Lopez Island Fire & EMS / San Juan County Fire District #4**

**District Summary:** Lopez Island Fire & EMS protects an area of 27 square miles, comprised of farmland, forest and a small residential/commercial hub, Lopez Island Village at the North end of

Fisherman Bay.

The District is a rural area with significant WUI concerns. Lopez Island Fire & Rescue provides fire and emergency medical services to a year round population of 2,000 that during the spring and summer increases to 3,500 individuals. District personnel consists of two full time paramedic firefighters, one part time fire chief, one part time administrative assistant, 17 Volunteer Emergency Medical Technicians and 40 Volunteer Firefighters.

The District's aid and firefighting fleet consist of 2 ambulances, 2 paramedic cars, 1 command vehicle, 1 brushfire apparatus with 250 gallon water tank and pump, 4 class A pumpers, 1 class A pumper/tender, 1 tender and 1 rescue with 250 gallon CAFS pump.

**Issues of Concern:** More residential units are built within the WUI every year, this places a large strain on the Fire District to continue providing adequate fire protection for those homes under its current staff and equipment limitations.

As with all fire districts within San Juan County, when fire conditions require multiple resources to be deployed into forested areas to protect homes and people from fire, mutual aid resources are logistically difficult to obtain, with very long lead times between request and arrival.

The District is working to solve communication issues regarding; VHF radio frequencies, and cellular frequencies on Lopez Island that are blocked by terrain. There are large areas on Lopez Island where communications between the public, emergency dispatch, and emergency responders is neither seamless nor timely.

Current regulations are adequate and the burn permit process and outdoor burning season on Lopez Island is effective for controlling debris disposal and land clearing fires.

The District is faced with a large potential for WUI fires as there is significant accumulations of fuels in the wooded areas of the island. A large percentage of the access roads are too narrow for Fire District apparatus and private drives are not well marked making it difficult for firefighter to locate homes. Fire District apparatus access will create a barrier to residents trying Flee using these roads in the event of a wildfire.

**Cooperative Agreements:** The District has formal mutual aid agreements with other County emergency service providers.



## **Shaw Island Fire & EMS / San Juan County Fire District #5**

**Fire Department Summary:** San Juan County Fire District #5 protects Shaw Island. The fire district provides EMS response and structural and wildland fire protection to the island. The agency is comprised of volunteer firefighters and Emergency Medical Technicians (some cross trained for both functions).

There are three fire stations located on Shaw Island. The fire district operates a variety of fire vehicles and an ambulance. The vehicles are surplus rigs from other agencies, generally nearing the end of their useful service lifespans.

There are approximately 25 calls for service per year within the fire district. While few of them are for wildland fires, the fuel model and intermix of wildland and structures represents a significant potential hazard during the dry season each year.

**Issues of Concern:** There are approximately 250 residents on Shaw Island. While the limited number of residents results in some relatively large areas of land throughout the fire district where structure protection concerns are minimal, there are legitimate wildland/urban interface and intermix areas. The small population also poses a continuing challenge to recruit and train sufficient fire suppression forces.

As with all fire districts within San Juan County, when fire conditions require multiple resources to be deployed into forested areas to protect homes and people from fire, mutual aid resources are logistically difficult to obtain, with very long lead times between request and arrival.

The topography and infrastructure of San Juan County create numerous areas where radio communication between the 9-1-1 Center and emergency responders is difficult or impossible. Commercial cell phone service is not available in many areas, making it difficult for those without access to a “land line” telephone to report a fire. In addition, there are no mass media outlets located within San Juan County, so the dissemination of emergency messages to the public (such as evacuation routes or “shelter in place” instructions) is very difficult.

Open burning regulations are uniform throughout San Juan County. “Recreational” fires that are two-feet in diameter or less are allowed year-round without the need to obtain a permit. “Residential” fires can be up to ten-feet in diameter, and require a \$15 permit that is available from any fire district as well as online from the County Fire Marshal’s Web site. “Commercial” permits are issued only after an onsite inspection. The current fee is \$225. Residential permits are issued each year beginning on October 1<sup>st</sup>, with all permits expiring the following June 30<sup>th</sup>. Commercial permits expire thirty days after they are issued.

As a volunteer-staffed fire service, the community’s demographics impact the ability to recruit and retain firefighters. As the population ages, willing and able volunteers become an increasingly scarce resource.

**Cooperative Agreements:** Shaw Island is a party to the San Juan County Mutual Aid Plan.



## **Washington Department of Natural Resources**

**District Summary:** The Washington Department of Natural Resources (DNR) is the largest on-call fire department in the State with 1,200 permanent and temporary employees that fight fire on more than 12 million acres of private and state-owned forest lands. The DNR's fire protection and safety equipment requirements help local fire districts respond to wildfires. The DNR also works with the National Weather Service to provide the fire weather forecasts and fire precaution levels that firefighters, landowners, forest industry rely on.

The Washington DNR does not have resources directly assigned to San Juan County. The DNR's Northwest Region has 8-10 Type 5 and 6 initial attack engines staffed and available during the fire season in addition to air resources. These resources as well as others statewide are available to San Juan County as they are available.

**Cooperative Agreements in San Juan County:** San Juan Island Fire Rescue and Orcas Island Fire & Rescue are the DNR's contracted "first responders" for wildland fire suppression for all lands in San Juan County that are not within an organized fire protection district.

**\*\*NOTE: Washington DNR does not respond to structure fires.\*\***



## **National Park Service**

**District Summary:** The San Juan Island National Historic Park (SAJH) wildland fire management program is supported by fire management personnel based at Olympic National Park (OLYM) in Port Angeles, Washington. Fire management projects related to hazard fuels reduction, ecosystem restoration, and habitat improvement are planned and conducted by OLYM personnel with periodic assistance from San Juan County Fire District #3. Treatment methods include the use of mechanical equipment and prescribed fire. Mechanical fuel reduction treatments are generally located along roadways and along boundaries to reduce the potential for human caused fires and provide a buffer along the park boundaries. Prescribed fire is used to reduce fuel accumulations as well as restoring Garry oak woodlands, enhancing prairie ecosystems, and maintaining healthy mixed conifer forests. All fire activities are included in the approved 2005 Fire Management Plan and follow all federal wildland fire management policies and guidelines. The fire plan is currently under revision to include areas of park expansion.

Resource availability for response to unplanned fires at SAJH varies annually due to funding levels and qualifications of SAJH personnel. Typically, there are one or two SAJH employees that maintain wildland fire qualifications. Additional resources including wildland fire engines and incident commanders are available from OLYM. San Juan County Fire District #3 provides the primary initial response to unplanned fires in the park.

**Cooperative Agreements:** There is an agreement between the United State Department of Interior, National Park Service, San Juan Island National Historical Park and National Park Service, Olympic National Park and San Juan County Fire District No. 3 for wildfire fire response and prescribed fire assistance.



## **U.S. Fish and Wildlife Service, San Juan Islands National Wildlife Refuge**

**District Summary:** The Service owns 83 islands, rocks, and reefs within the San Juan archipelago. All the islands are designated wilderness and closed to the public with the exception of Matia and Turn Islands. Matia is also designated as a wilderness island except for the 5 acre campground area. Turn Island also has camping and this activity is managed, under an agreement, by the Washington State Parks and Recreation Department. No open fires are allowed on either island.

Both of these islands have trees with fire scares on them, but the Service has no actual fire history. Many of the islands are vegetated by forest, shrub, and grassland. Trespass issues, including illegal camping and/or campfires, and for Turn Island the close proximity to a large inhabited island provide the greatest risk for wildfires to Service lands.

The Service has an agreement with the Washington Department of Natural Resources for wildfire response. At the refuge complex main office, one red carded firefighter is stationed with the following qualifications: FFT1, ENGB, FALLER B, and RXB3. At this station there are no firefighting equipment resource other than handtools.

**Cooperative Agreements:** Wildland fire protection on U.S. Fish and Wildlife Service ownerships is provided by the Washington Department of Natural Resources.



## **Bureau of Land Management**

**Spokane District Mission Statement:** The mission of the Spokane District is to share our unique capability and interest in sustaining the full diversity of natural and cultural landscapes across Washington State and invite their discovery and use. This includes protecting the natural resources, such as water for fish and wildlife; preserving environmental and cultural values on

the lands they manage; providing for multiple uses, that include some commercial activities; and enhancing opportunities for safe and enjoyable outdoor recreation. The Spokane District also assesses energy and mineral resources and works to ensure that their development is in the best interest of the public. Another major responsibility is to ensure consideration of Tribal interests and administration the Department of Interior's trust responsibilities for American Indian Reservation communities.

**District Summary:** Up through the 1970's, BLM's policy was to divest ownership of all federal public (BLM) lands in the state of Washington. But in 1980, at the height of the Sage Brush Rebellion (a social movement to give control over federal lands to the states and local authorities), Washington voted to have the public lands remain under federal ownership and management. In the 1980 general election, the state put a measure on the ballot asking voters if the state constitution should "be amended to provide that the state no longer disclaim all rights to unappropriated federal public lands." Approximately 60% of the people and the majority in every county voted no, signaling to BLM that there was strong support for continued federal management of the public lands in the state.

In response to this vote, the Director of BLM approved a proposal by the District to begin a process of consolidating the scattered BLM lands around the state. Today the Spokane District BLM manages over 900 acres in San Juan County for multiple uses, providing wildfire protection, suppression, support, and training for the BLM managed lands and other federal/state/county agencies.

The Spokane District Fire Management Program currently consists of two type six wildland engines (300 gallons) with two full time Engine Captains, four engine crew members, one ten person hand crew, one Fuels Technician, Seasonal Dispatcher, Assistant Fire Management Officer (AFMO), and a Fire Management Officer (FMO). The hand crew and one engine is stationed in Spokane at the District office and the other in Wenatchee at the field office. There are approximately 16 other specialist (staff) from across the district that assist the Fire Management Program in wildland and/or prescribed fire efforts. With the District's scattered ownership pattern, the engines are usually on scene after initial attack forces have arrived. Our engines and personnel are available for off District and out of state fire assignments that aide in support, training, and experience. The Spokane District BLM has a cooperative agreement with the Washington Department of Natural Resources, who in turn has an agreement with San Juan Island Fire & Rescue and Orcas Island Fire & Rescue, to provide initial attack on BLM managed lands.

## **Fire Protection Issues**

The following sections provide a brief overview of the many difficult issues currently challenging San Juan County in providing wildland fire safety to citizens. These issues were discussed at length both during the committee process and at several of the public meetings. In most cases, the committee has developed action items (Chapter 6) that are intended to begin the process of effectively mitigating these issues.

### **Address Signage**

The ability to quickly locate a physical address is critical in providing services in any type of emergency response. Accurate road address and address signage is fundamental to ensuring the safety and security San Juan County residents. Currently, there are numerous areas throughout the county lacking road signs, address markers, or both. Signage throughout the county needs to be updated in order to assure visibility and quick location by emergency responders.

### **Garry Oak and Native Prairie Restoration**

Prior to Euro-American settlement of the San Juan Islands, prairie and Garry oak savannah habitats were much more common than they are today. These habitats were likely maintained by Native American burning practices as well as naturally ignited (lightning) wildfires and were probably subject to relatively frequent, low-intensity fire regimes. The vast majority of these habitats has been lost or greatly altered due to nineteenth and twentieth century settlement and development. The remaining Garry oak and prairie ecosystems are transitioning to forest in the absence of active management. Prairies and Garry oak savannahs are recognized as some of the most imperiled habitats in the state; thus, their protection and restoration is identified as a top priority in the 2007 Washington Natural Heritage Plan.<sup>40</sup>

Various public land agencies, private organizations, and private landowners have begun the process of restoring Garry oak and grassland habitats by removing encroaching conifers and other woody species. The National Park Service is working to restore native prairie at American Camp and Garry oak woodland at English Camp on San Juan Island using various techniques, including prescribed burning. At Cady Mountain on San Juan Island, a consortium of private individuals and The San Juan County Land Bank are cooperatively restoring Garry oak savannah. The San Juan County Land Bank is similarly working on Garry oak savannah restoration at the Turtleback Mountain Preserve on Orcas Island. The Nature Conservancy maintains and restores native prairie on Yellow Island with regular prescribed burning and has also worked to restore Garry oak woodland at Point Disney on Waldron Island. Many other native prairie and oak sites would benefit from active land management, including Iceberg Point and Point Colville on Lopez Island and Kellett Bluff on Henry Island. The greatest threats typically include conifer (usually Douglas-fir) encroachment and heavy browsing of young oaks by deer. Conifer removal from these habitats must be done with particular care as the understory often supports associated rare and unusual species.

In most cases, Garry oaks and prairies are found on the steep, south-facing slopes of San Juan County's "mountains" and coastal areas. Many of these areas are also high-risk for wildfire. If

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<sup>40</sup> State of Washington. 2007. Natural Heritage Plan. Washington Department of Natural Resources. Available online at [http://www1.dnr.wa.gov/nhp/refdesk/plan/plan07\\_1.pdf](http://www1.dnr.wa.gov/nhp/refdesk/plan/plan07_1.pdf). Accessed June 2012.

designed with both goals in mind, fuels reduction and thinning projects in some areas could both reduce wildfire risk and benefit some of the State's rarest habitats.

### **Coordination with State and Federal Agencies**

There is currently little to no communication between local fire departments and the federal agencies. This presents a problem when there is confusion on who has initial attack responsibilities on federal lands and what restrictions are imposed by the jurisdictional agency responsible for fire protection.

### **Urban and Suburban Growth**

One challenge San Juan County faces is the large number of houses in the urban/rural fringe. Since the 1970s, a segment of Washington's growing population has expanded further into traditional forest or resource lands. The "interface" between urban and suburban areas and the resource lands created by this expansion has produced a significant increase in threats to life and property from fires and has pushed existing fire protection systems beyond original or current design or capability. San Juan County has a significant number of Firewise Communities. However, there are many property owners within the interface that are not aware of the problems and threats they face. Furthermore, human activities increase the incidence of fire ignition and potential damage.

*It is one of the goals of the San Juan County CWPP to help educate the public on the ramifications of living in the wildland-urban interface, including their responsibilities as landowners to reduce the fire risk on their property and to provide safe access to their property for all emergency personnel and equipment. Homeowners building in a high fire risk area must understand how to make their properties more fire resistant using proven firesafe construction and landscaping techniques and they must have a realistic understanding of the capability of local fire service organizations to defend their property.*

### **Rural Fire Protection**

People moving from mainland urban areas to the San Juan Islands, frequently have high expectations for structural fire protection services. Often, new residents do not realize that the services provided are not the same as in an urban area. The diversity and amount of equipment and the number of personnel can be substantially limited in rural areas. Fire protection may rely more on the landowner's personal initiative to take measures to protect his or her property. Furthermore, subdivisions on steep slopes and the greater number of homes exceeding 3,000 square feet are also factors challenging fire service organizations. In the future, public education and awareness may play a greater role in rural or interface areas. Great improvements in fire protection techniques are being made to adapt to large, rapidly spreading fires that threaten large numbers of homes in interface areas.

### **Debris Burning**

Local burning of yard debris is highly regulated in San Juan County. Permit burns in San Juan County are based on DNR cycle, while burn bans are a locally based decision determined by fuel moistures (see Fire District Summaries for more information on burning). Some people still burn outside of the designated time frame, and escaped debris fires impose a very high fire risk to neighboring properties and residents. It is likely that regulating this type of burning will always be a challenge for local authorities and fire departments; however, improved public

education regarding the county’s burning regulations and permit system as well as potential risk factors would be beneficial.

### **Pre-planning in High Risk Areas**

Although conducting home, community, and road defensible space projects is a very effective way to reduce the fire risk to communities in San Juan County, recommended projects cannot all occur immediately and many will take several years to complete. Thus, developing pre-planning guidelines specifying which and how local fire agencies and departments will respond to specific areas is very beneficial. These response plans should include assessments of the structures, topography, fuels, available evacuation routes, available resources, response times, communications, water resource availability, and any other factors specific to an area. All of these plans should be available to the local fire departments as well as dispatch personnel.

### **Invasive Species**

Fire behavior and fire regimes have been altered due to the proliferation of gorse, Scotch broom, and other invasive species. Gorse invades disturbed open sites and will dominate the area. The volatility of this plant creates an extreme fire hazard. The ability of gorse, Scotch broom, and other invasives to displace native vegetation and dominate an area can often increase the fire hazards beyond normal.

### **Fire Protection on Outer Islands**

The smaller islands fall under the wildland fire protection of the San Juan County District #3 through a contract with the Washington DNR. Due to the logistical constraints of sending crews and equipment to the outer islands, the response time for initial attack from San Juan Island can be an hour or more. Most outer island residents are aware that they are more or less on their own, at least initially. It is imperative that the residents on these islands mitigate the effects of wildfire as much as they can through management of high risk vegetation, wildland fire training, and maintenance of basic fire suppression equipment. San Juan County supports researching the options available to improve the fire services in these areas, which may involve a well-organized public education campaign to ensure all residents are aware of the wildfire risk and understand the ramifications of living on the more remote islands.

### **Public Wildfire Awareness**

As the potential fire risk in the wildland-urban interface continues to increase, it is clear that fire service organizations cannot be solely responsible for protection of lives, structures, infrastructure, ecosystems, and all of the intrinsic values that go along with living in rural areas. Public awareness of the wildland fire risks as well as homeowner accountability for the risk on their own property is paramount to protection of all the resources in the wildland-urban interface.

*The continued development of mechanisms and partnerships to increase public awareness regarding wildfire risks and promoting “do it yourself” mitigation actions is a primary goal of the CWPP steering committee as well as many of the individual organizations participating on the committee.*

## Current Wildfire Mitigation Activities

Many of the county's fire departments and agencies are actively working on public education and homeowner responsibility by visiting neighborhoods and schools to explain fire hazards to citizens. Often, they hand deliver informative brochures and encourage homeowners to have their driveways clearly marked with their addresses to ensure more rapid and accurate response to calls and better access. The San Juan County Firewise Communities program is also being utilized to help fire response organizations communicate fire hazards to the public.

### Firewise

“Over the past century, America’s population has nearly tripled, with much of the growth flowing into traditionally natural areas. These serene, beautiful settings are attracting more residents every year. This trend has created an extremely complex landscape that has come to be known as the wildland/ urban interface: a set of conditions under which a wildland fire reaches beyond trees, brush, and other natural fuels to ignite homes and their immediate surroundings. Consequently, in nearly all areas of the country, the wildland/urban interface can provide conditions favorable for the spread of wildfires and ongoing threats to homes and people. Many individuals move into these picturesque landscapes with urban expectations. They may not recognize wildfire hazards or might assume that the fire department will be able to save their home if a wildfire ignites. However, when an extreme wildfire spreads, it can simultaneously expose dozens — sometimes hundreds — of homes to potential ignition. In cases such as this, firefighters do not have the resources to defend every home. Homeowners who take proactive steps to reduce their homes’ vulnerability have a far greater chance of having their homes withstand a wildfire. The nation’s federal and state land management agencies and local fire departments have joined together to empower homeowners with the knowledge and tools to protect their homes through the National Firewise Communities Program. Firewise Communities is designed to encourage local solutions for wildfire safety by involving firefighters, homeowners, community leaders, planners, developers, and others in efforts to design, build, and maintain homes and properties that are safely compatible with the natural environment. The best Firewise approach involves a series of practical steps that help individuals and community groups work together to protect themselves and their properties from the hazard of wildfire. Using at least one element of a Firewise program and adding other elements over time will reduce a homeowner’s and a community’s vulnerability to fire in the wildland/urban interface. Wildland fires are a natural process. Making your home compatible with nature can help save your home and, ultimately, your entire community during a wildfire.”<sup>41</sup>

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<sup>41</sup><http://www.firewise.org/Information/Who-is-this-or/Homeowners/~media/Firewise/Files/Pdfs/Booklets%20and%20Brochures/BrochureCommunitiesCompatibleNature.pdf>. Accessed June, 2012.

## **Firewise Communities**

San Juan County has had an active and expanding Firewise Communities USA program including a Program Lead and local representatives on the four larger islands since 2004. As of 2012, there are 39 recognized Firewise Communities in San Juan County.

### *San Juan Island Firewise Communities*

1. Alaska Place
2. Boyce Road
3. Brown Island
4. Bullfrog/Hanna
5. Byron Road
6. Cape San Juan
7. Carefree Lane
8. Cattle Point
9. Foxhall
10. Gull Cove
11. Hannah Heights
12. High Haro
13. Hillcrest
14. Hillview Terrace I
15. Hillview Terrace II
16. Hillview Terrace III
17. Leeward Way
18. Misty Isle
19. Mitchel Point
20. Mt. Dallas
21. North Forty
22. North Star Lane
23. Primrose Lane
24. Roche Harbor
25. San Juan Drive
26. South Cady Mountain
27. Spruce Area
28. Sugarloaf Mountain
29. Sunday Drive
30. Three Meadows
31. Timber Lane
32. University Heights
33. Westside Story
34. Wold Road South
35. Yacht Haven

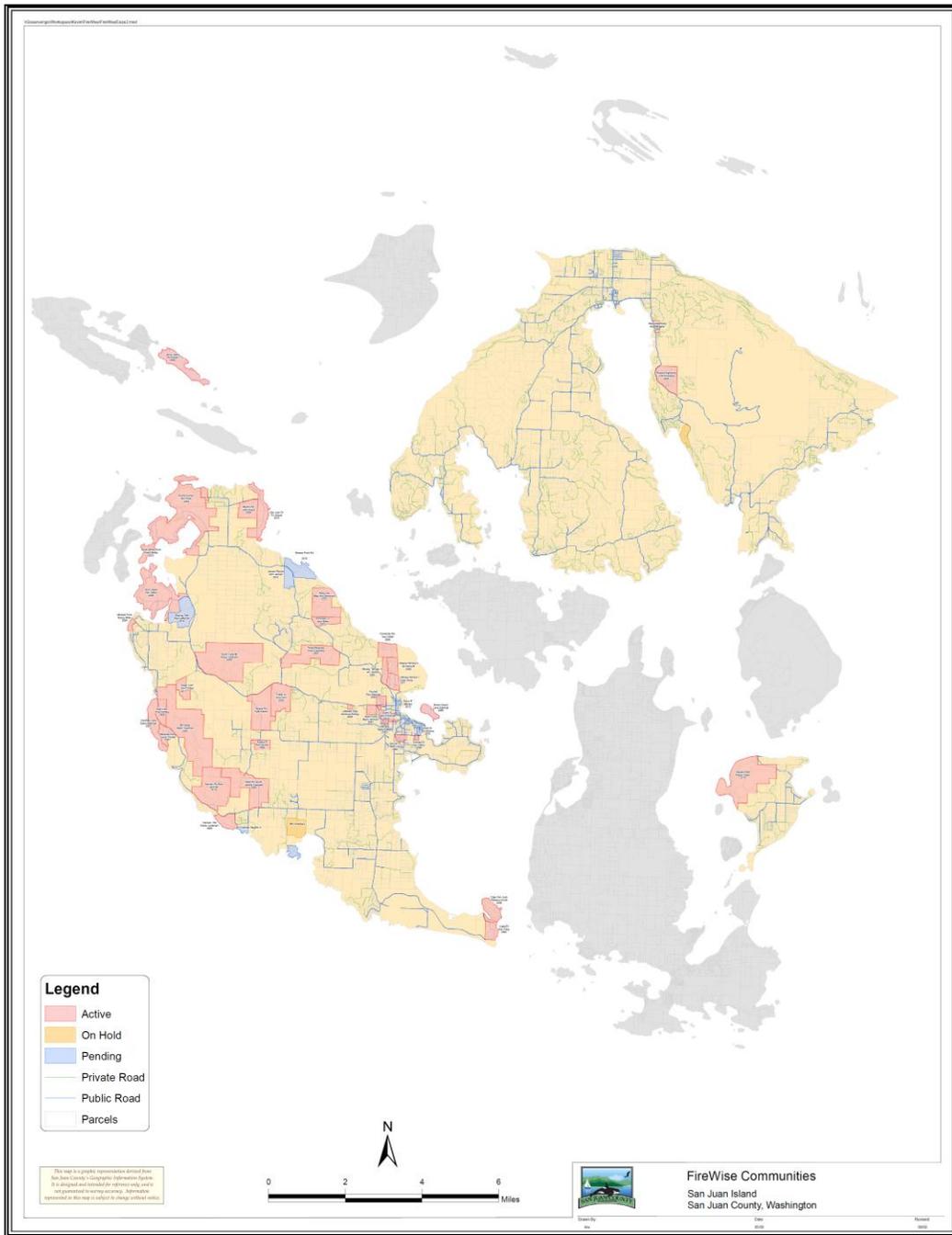
### *Orcas Island Firewise Communities*

1. Orcas Highlands
2. Westview Woods

### *Outer Island Firewise Communities*

1. Decatur Northwest
2. Johns Island

**Figure 4.9. San Juan County Firewise Communities**



## Chapter 5

### Community Fire Risk Assessments

The majority of homes and structures within and surrounding San Juan County communities are along a spectrum from low to moderate to high risk of loss to wildland fire. Individual characteristics of each community and structure dictate the risk factors. The prevalence of tree and shrub fuels pose a moderate to high threat to homes surrounded by these fuels as fire typically spreads quickly through the grasses and burns at relatively high intensities in the brush and forest fuels, especially where declining forest health is a factor. Many homes are at low risk as a result of the management of fuels in the area immediately surrounding the structures and access routes. There are a number of individual homes that have a much higher risk to wildland fire loss largely due to the use of highly ignitable materials in home construction or the lack of defensible space surrounding the home. Home defensibility practices can dramatically increase the probability of home survivability. The amount of fuel modification necessary will depend on the specific attributes of the site. Considering the high spread rates possible in these fuel types, homes need to be protected prior to fire ignitions as there is little time to defend a home in advance of an active fire.

### Island Communities

Much of the landscape in San Juan County was regularly burned by Native Americans pre Euro-American settlement. Research has suggested that at least portions of some islands were burned as often as every seven years (Sprenger and Dunwiddie, 2011) to enhance Camas and for driving game. There are a variety of theories as to why the Native Americans burned so frequently, but regardless of the reason, it is assumed that fire played a significant role in controlling fuel buildup while promoting desirable vegetative species across the islands.

Many of the forests on the islands were cut down for fueling the Lime Kilns and for agriculture during the early 1900s. Fire was also seen as a destructive force in San Juan County and across the country. Active fire suppression efforts through the mid to late 1900s have allowed fuels to build up, which creates an extreme fire risk.

San Juan County is one of the leading counties, not only in the state, but in the country for the number of Firewise communities participating in this program.

### Lopez Island

Lopez Island is the third largest island in San Juan County and covers approximately 30 square miles. Lopez Village, located on Fisherman Bay on the west side of the Island, is the only significant population center. Nearly all of the commercial activity occurs at or near Lopez Village; however, there are scattered businesses throughout the Island. Other population clusters include Port Stanley, Richardson, and Mackaye Harbor. Tourism is the primary industry, but there are also a number of small farms and marinas that contribute to the local economy.

#### *Fuels Assessment*

Lopez is generally flatter than most of the other major islands with Chadwick Hill on the south end and Lopez Hill near the center offering the only significant topography. A large portion of the interior of the Island is dominated by scattered agricultural fields and natural grasslands.

These areas are generally managed through livestock grazing or crop production and are not a significant wildfire risk.

Lopez Island is approximately 10 miles long from the northern tip of Upright Head to Iowa Rock on the southern end of the Island, but only about 4-5 miles wide in most places. The southern end of the Island receives significantly less precipitation than the north end due to the rain shadow cast by the Olympic Mountains to the south. On average, the south end of Lopez Island receives approximately 19 inches of precipitation annually compared to approximately 28 inches on the north end of the Island. This difference has a significant impact on the vegetation type and fuel structures.

Douglas-fir is the primary overstory species in the forested areas. However, on drier sites, particularly south and west facing slopes, understory vegetation consists of mostly oceanspray, baldhip rose, and Douglas-fir and grand fir regeneration. In some of these areas, vegetation management or limited soil availability has resulted in a grass understory condition. Lodgepole pine, madrone, and grand fir make up minor components of the overstory on dry sites. Due to the ladder fuels in the understory as well as the typically dry condition, these forest types would likely carry a rapidly moving fire that could develop into a crown fire, particularly under the influence of wind. Examples of this forest and fuel type include the south aspect of Lopez Hill, much of the Chadwick Hill area, and the Iceberg Point area. A mosaic of low, mixed, and high severity would be anticipated depending on specific site and weather conditions.

On the wetter sites, including the majority of the north end of the Island as well as on most north facing slopes, Douglas-fir was still the primary overstory species; however, western red cedar and grand fir are also common. The understory vegetation in these areas was somewhat dependent on the degree of canopy closure. In areas where sunlight still penetrated the understory, vegetation was prolific and consisted primarily of salal, oceanspray, Douglas maple, red alder, swordfern, salmonberry, stinging nettle, and numerous other shrubs. Upright Head and the Odlin Park area are examples of this forest type. In areas where full canopy closure has occurred, very little understory vegetation was present, but there is typically an abundance of large diameter, dead and down material on the forest floor. Humphrey Head is an example of this type of forest condition.

Prior to white settlement (before 1860), native peoples burned Lopez Island in the vicinity of Iceberg Point and Point Colville on an average at least every 11-12 years. From 1860 to 1914, the fire interval rose to about 23 years, and since then, only one small fire has been recorded in each area. Due to fire exclusion, coniferous trees and non-native vegetation has invaded many historical grasslands. Portions of these grasslands may be suited for restoration to historical vegetative structures.<sup>42</sup>

### *Infrastructure*

The main north/south transportation routes are Center Road and Fisherman Bay Road, which both traverse the majority of the length of the Island. There are numerous east-west routes including Mud Bay Road, Aleck Bay Road, Islandale Road, Lopez Sound Road, School Road, and Cross Road. The majority of the Island is easily accessed by County-maintained roads; however, private residences are typically located on short private driveways or shared driveways.

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<sup>42</sup> Spurbeck, Donald W. and David S. Keenum. July 2003. *Fire History Analysis from Fire Scars Collected at Iceberg Point and Point Colville on Lopez Island, Washington*. Pacific Northwest Research Station, Okanogan and Wenatchee National Forests.

Private roads are often well surfaced, but lack adequate clearance for fire or medical apparatus. Many of the private roads were not constructed with accessibility for larger vehicles; thus, very few have turnouts or turnaround areas that would allow for safe ingress or egress in the event of a fire.

Communication via cell phones and radios is available on Lopez Island; however, there are several areas with none or very limited coverage.

### *Community Assessment*

Lopez Island has a low to moderate risk of experiencing wildland fire. There are very few occurrences of natural ignitions, but the risk of a human caused fire is relatively high due to the intense recreational use in some areas. Even a small fire would have a significant impact on the local population. The scattered nature of the residences throughout the Island as well as the severely limited access into many of them would impede suppression capabilities. Particularly in homes along the shoreline, narrow, poorly-designed, and overgrown driveways prevent firefighters from responding directly to home sites in the event of a wildfire. Furthermore, the majority of homes on Lopez Island are part-time residences and remain empty for the majority of the year.

Additionally, very few homes in forested areas have created a defensible space. Trees and other vegetation typically surround and are often in contact with structures; thus, the risk of a structural fire causing a wildland fire is very high.

Although not likely an inclusive list, due to a combination of the fuel type, access issues, and the lack of defensible space, several housing clusters or developments were identified as having particularly high wildfire risk. These included Humphrey Head, Dusty Road, residences in the Mud Bay and Hunter Bay areas, Skid Road, and residences in the Lopez Sound area. Additionally, the Land Bank properties at Lopez Hill and Upright Head as well as land owned by the Bureau of Land Management near Chadwick Hill and Iceberg Point have significant risk of fire ignition due to their recreational use.

Structural and wildland fire protection is provided by San Juan County Fire District #4, which maintains 4 stations on Lopez Island. Fire District #4 has established mutual aid agreements with the other San Juan County Fire Districts as well as the Washington Department of Natural Resources; however, it is unlikely that these resources would be available in time to assist with initial attack.

### *Potential Mitigation Activities*

The vegetation in close proximity to structures significantly increases the wildfire risk in many areas throughout Lopez Island. Increased awareness of wildland fire risk within communities and the creation of defensible space would help reduce the potential impact of wildfire. Additionally, access improvements including turnouts and adequate turnaround areas at homes would significantly increase Fire District #4's ability to respond as well as firefighter safety in general.

Homeowner education and participation in programs such as Firewise Communities USA would improve the defensibility of individual structures and communities. Additionally, prevention of poorly designed access in new developments would help alleviate the creation of future fire risk issues.

Forest management activities such as thinning and prescribed burning would likely help reduce fuel build ups in undeveloped and recreational areas. Efforts to increase the resiliency of the forest to wildfire will help reduce the potential impact to nearby communities by reducing the likelihood of a stand replacing event.

## **Orcas Island**

Orcas Island is the largest island in San Juan County with a land area of about 57 square miles. Eastsound is the largest population center on Orcas Island, but other villages include Orcas (the ferry landing area), Deer Harbor, Rosario, Olga, and Doe Bay. The topography as well as climate and fuel type is highly variable throughout the Island. Tourism is the primary industry; however, there are a number of small farms and natural resource-based manufacturing firms contributing to the local economy as well.

### *Fuels Assessment*

The fuel types as well as structure and complexity of fuels is highly variable. The vast majority of Orcas Island is forested; however, there is a significant amount of agricultural fields and natural grasslands in the Crow Valley area. The east side of the Island receives significantly more precipitation (approximately 28 inches annually) than the west side of the Island due to the rain shadow effects of Vancouver Island to the west and the Olympic Mountains to the south. Additionally, at 2,409 feet, Mount Constitution also has an effect on local weather patterns.

Douglas-fir is the primary overstory species in forested areas. On drier sites, particularly south and west facing slopes, understory vegetation consists of mostly oceanspray and Douglas-fir and grand fir regeneration. In some of these areas, vegetation management or limited soil availability has resulted in a grass understory condition. Lodgepole pine, madrone, and grand fir make up minor components of the overstory on dry sites. Madrone is more abundant at low elevations near the coastline. Due to the ladder fuels in the understory as well as the typically dry condition, these forest types would likely carry a rapidly moving fire that could develop into a crown fire, particularly under the influence of wind. Examples of this forest and fuel type include much of the Turtleback Mountain area, Deer Harbor, and west facing slopes of the Mount Woolard and Buck Mountain areas. A mosaic of low, mixed, and high severity fires would be anticipated depending on specific site and weather conditions.

Dry, south aspects on Turtleback Mountain have a prominent contingent of Garry oak woodlands and native grassland. Oak woodland and savanna ecosystems' historic fire regime typically consisted of relatively low-intensity fires on a short fire return interval (5-25 years). With changes in land use, the fire return interval has been dramatically increased, which allows coniferous trees, such as Douglas-fir, to establish and overtop the oak trees that were once dominant. Under natural conditions fire in this fuel type would have burned at low to moderate intensity; however, the additional fuel build-up will result in an increased fire intensity.

Wetter sites on the east end of the Island consist of highly productive Douglas-fir as the primary overstory species; however, western red cedar, grand fir, lodgepole pine, and western hemlock are also common. The understory vegetation in these areas was somewhat dependent on the degree of canopy closure. In areas where sunlight still penetrated the understory, vegetation was prolific and consisted primarily of salal, oceanspray, maple, red alder, swordfern, salmonberry, stinging nettle, and numerous other shrubs. Examples of this forest type include the Rosario/Vusario area, Kahboo Hill, and Doe Bay. In areas where full canopy closure has

occurred, very little understory vegetation was present. The communications site on Mount Constitution is an example of this type of forest condition.

Moran State Park is located on the east end of Orcas Island and includes over 5,000 acres of publicly accessible forestland. The forest type in this area transitions from a moist site Douglas-fir dominated uneven aged stand at low to mid elevations to a closed canopy condition at higher elevations. The higher elevation forests are dense with very little understory, but a large dead and down material fuel component. Fires in this fuel type would be stand replacing and likely result in damage to soil properties; however, these forests have a very long fire return interval.

### *Infrastructure*

San Juan County's primary communications facility is located on Mount Constitution within Moran State Park. The area immediately surrounding the tower site has been cleared of vegetation; however, due to the steep topography and dense forest type, this site would likely be threatened in the event of a wildfire. Aerial fire suppression tactics is likely the only form of protection that would be possible due to the topography and limited road access.

Access routes on Orcas Island are limited to a handful of travel corridors including Olga Road, Orcas Road, Deer Harbor Road, Dolphin Bay Road, and Point Lawrence Road. Nearly all secondary access roads intersect these primary routes. Private residences are typically located on short private driveways or shared driveways. Private roads are often well surfaced, but lack adequate clearance for fire or medical apparatus. Many of the private roads were not constructed with accessibility for larger vehicles; thus, very few have turnouts or turnaround areas that would allow for safe ingress or egress in the event of a fire.

Communication via cell phones and radios is available on Orcas Island; however, there are several areas with no or very limited coverage.

### *Community Assessment*

Orcas Island has a low to moderate risk of experiencing wildland fire. There are very few occurrences of natural ignitions, but the risk of a human caused fire is relatively high due to the intense recreational use in some areas. Even a small fire would have a significant impact on the local population. The scattered nature of the residences throughout the Island as well as the severely limited access into many of them would impede suppression capabilities. Particularly in homes along the shoreline or on steep slopes, narrow, poorly-designed, and overgrown driveways prevent firefighters from responding directly to home sites in the event of a wildfire. Furthermore, many of the homes on Orcas Island are part-time residences; thus, they are empty for the majority of the year.

Additionally, very few homes in forested areas have an established defensible space. Trees and other vegetation typically surround and are often in contact with structures; thus, the risk of a structural fire causing a wildland fire is very high.

Although not likely an inclusive list, due to a combination of the fuel type, access issues, and the lack of defensible space, several housing clusters or developments were identified as having particularly high wildfire risk. These included Rosario, Vusario, Highlands, Marina Heights, Kahboo Hill, Mount Entrance, Rustic Homestead, and Buck Mountain. Additionally, the Land Bank property at Turtleback Mountain and Moran State Park have significant risk of fire ignition due to their recreational use.

Structural and wildland fire protection is provided by San Juan County Fire District #2 (Orcas Fire and Rescue), which maintains 7 stations on Orcas Island. Fire District #2 has established mutual aid agreements with the other San Juan County Fire Districts as well as the Washington Department of Natural Resources; however, it is unlikely that these resources would be available in time to assist with initial attack operations.

#### *Potential Mitigation Activities*

Vegetation in close proximity to structures significantly increases the wildfire risk in many areas throughout Orcas Island. Increased awareness of wildland fire risk within communities and the creation of defensible space would help reduce the potential impact of wildfire. Additionally, access improvements including turnouts and adequate turnaround areas at homes would significantly increase Fire District #2's ability to respond as well as firefighter safety in general.

Homeowner wildfire education and participation in programs such as Firewise Communities USA would improve the defensibility of individual structures and communities. Additionally, prevention of poorly designed access in new developments would help alleviate the creation of future fire risk issues.

Forest management activities such as thinning, prescribed burning, oak woodlands restoration would likely help reduce fuel build ups in undeveloped and recreational areas. Efforts that increase the forest's resiliency to wildfire will help reduce the potential impact to nearby communities by reducing the likelihood of a stand replacing event.

#### *Shaw Island*

Shaw Island lies in the center of San Juan County and the San Juan Archipelago; it is the smallest of the four islands served by the Washington State Ferry system. With a land mass of 7.7 square miles, Shaw Island is very rural with a small year round population of 240 persons that only slightly increases during the summer tourist season. Most of the island is privately owned. The only visitor amenities are the Shaw Island Historical Museum, Washington State Ferry dock and small general store and Shaw Island County Park, which provides limited camping on a first come first serve basis.

The University of Washington owns approximately 866 acres of gifted property located in large separate areas on the island. Most noted are Cedar Rock Reserve, and Fred and Marilyn Ellis Biological Preserve. Cedar Rock Reserve on the south side of the island is a biological preserve maintained for biodiversity, education and research. This preserve is accessible by road and has administrative facilities and care taker housing. Road improvement and extension or linking of the current road system through the preserve would facilitate access for firefighting equipment and escape in a wild fire situation. Fuels treatment within the preserve is also needed to reduce areas of heavy fuels and minimize the chance of wildfire occurrence. The other University of Washington property of significant size is the Fred and Marilyn Ellis Biological Preserve, located on a peninsula on the southwest side of the island. This property is a scientific preserve conveyed to the University of Washington with the conditions that the property forever remains untouched for the purpose of teaching and research in the biological and related sciences. This property can only be accessed by foot or boat.

The Island's topography is primarily gently sloping and rolling with areas of rocky outcropping. The shoreline is undulating craggy basalt rock with many small coves and deep bays. Shaw Island is covered with a second growth dry forest ecosystem mixed with small patches of open pastures and cleared farmland. Forested areas contain a lush overstory of Douglas fir, grand fir,

western red cedar, and shore pine mixed with isolated occurrences of Pacific madrone. Near the shoreline, the understory vegetation includes salal and oceanspray on the deep soil areas and grass and sedge on shallow rocky soils. Away from the shore, the forest vegetation is primarily dense shrub and salal with few areas of grass in the understory except in disturbed areas. Throughout the forest ecosystem, dead and down woody material is common on the forest floor in addition to low lying shrubs and forbs.

### *Infrastructure*

Access through Shaw Island is made possible by way of approximately 12 miles of two lane paved road, and 3 miles of gravel road. The roads travel through the interior of the island providing very little access to the shore and many of these roads abruptly dead-end near the shore or at other private roads. Vegetation is very dense along the roadways, especially the roads accessing rural residential areas. Access into individual homes is often limited for large firefighting equipment, due to narrow winding driveways and dense roadside vegetation.

### *Fuels Assessment*

Although Shaw Island is heavily timbered and has a high accumulation of wildland fuels, it is felt that a fire would have to be very well driven by high winds to cause serious damage. The lush understory vegetation is relatively green retaining high fuel moistures. In the grass areas, fires burn well but generally will go out as soon as it reaches the tree line due to the high fuel moistures and relative humidity maintained in the forested areas.

### *Fire Protection Services*

Shaw Island is within the San Juan County Fire Protection District #5. This is an all-volunteer fire department with 2 primary rural fire stations that house fire trucks and firefighting equipment. One fire house is located at the Shaw Island Community Center at the intersection of Blind Bay Road and Squaw Bay Road. The other is at the cross roads of Ben Nevis Loop and Neck Point Road. The department currently has 21 volunteer fire fighters and averages 15 calls per year.

### *Community Assessment*

Residence on the island are widely scattered across the landscape in large secluded acreages, however a few smaller closely grouped subdivisions are present. The Copperhill Road area is an area of higher density rural residence that is built in a forested area on narrow winding roads. Access to this area, and these houses would be very difficult in a wildfire situation due to the narrow road and driveways, heavy encroaching forest fuels, and limited water for suppression. Neck Point Community, located on the west side of the island is an area of several scattered residence on a peninsula all accessed by one narrow paved access road, Neck Point Road. In a wildfire situation, access and escape from this area would be compromised by the heavy fuels present along Neck Point Road. Residences throughout the island live in close proximity to forests and wildland fuels.

### *Potential Mitigation Activities*

Potential project areas on Shaw Island include home defensible space treatment and roadside fuels treatment in the Copperhill Road area. Roadside fuels treatment and access improvement into the Neck Point area, and access road extension and improvement along with fuels treatment in the University of Washington Cedar Rock Preserve.

## **San Juan Island**

San Juan Island is the second largest island in the county with a land base of over 55 square miles and the largest in population. Friday Harbor, located on the east side of the island is the County Seat and the only incorporated town on the island. Friday Harbor is the major commercial center of the islands and provides a number of tourist attractions. There are numerous seasonal homes on the island but also a large contingent of year-round residents as well. Roche Harbor is located on the northwest side of San Juan Island and offers an extremely sheltered harbor.

The highest point on the island is Mt. Dallas at 1,080 feet and Cady Mountain comes in at just under 900 feet. Much of the island topography is relatively gentle with exception to the steep slopes of Mt. Dallas and Cady Mountain. Much of the eastern half of the island has been converted to agriculture.

### *Fuels Assessment*

San Juan Island has generally gentle topography with the exception of Mt. Dallas and Cady Mountain. The eastern half of the island consists largely of agriculture. The western half of the island is where a majority of the forest and steeper terrain are located. The island experiences what is known as a 'rain-shadow' effect from the Vancouver Island mountains and Olympic Peninsula mountains. San Juan Island is approximately 15 miles long from Roche Harbor to Cattle Point and 7 miles wide at its widest point.

Much of the forested portions of the island are dominated by Douglas fir with Lodgepole pine/Shore pine, Grand fir and Madrone making up the remainder of the overstory. In areas where the canopy is dense there is minor understory growth, resulting in a fuel type that is primarily needle litter and coarse woody debris. Where there are openings in the canopy, sunlight penetrates to the forest floor allowing species such as; salal, oceanspray and even the seedlings of the various tree species to grow in the understory. The dense forest canopy and thick understory on San Juan, has resulted in a presumably unnatural buildup of fuels due to fire suppression activities. Forest health is a variable on the island with some pockets of diseased and insect-infested trees scattered across the landscape. These pockets of dead and dying trees increase the risk of wildfire but do not dominate the risk assessment. A wildfire in these forested areas would be uncommon however, given drought conditions, these fuel types could burn with moderate to high intensity.

There is a significant percentage of grassland on San Juan Island. Grass tends to dry out faster during the dry months than forest litter and is considered a flashy fuel. The nature of flashy fuels is that they burn rapidly but at a lower intensity than forest litter. The concern with flashy fuels is response time, because they are easily controlled as long as response time is quick. A longer response time may allow the fire to spread into areas near homes or into the timber where it is harder to control. Fires that burn through this fuel type can be very intense and spread rapidly.

### *Infrastructure*

Friday Harbor serves as the major port of the island and is used by the Washington State Ferry to transport visitors from the mainland. The Roche Harbor road travels northwest out of Friday Harbor and ends in Roche Harbor. There are a few main roads that access the rest of the island including: West Valley road, Beaverton Valley road, Douglas road, Bailer Hill road, and West Side road. There are numerous side roads that access private residence. There are a couple of airports/airstrips on the island and numerous marinas dotting the shoreline.

### *Fire Protection Services*

San Juan Island Fire Rescue operates a fairly substantial Fire Department with eight fire stations and is primarily staffed with volunteer firefighters. This district utilizes a variety of land based vehicles and one small fire boat.

Individual homes and subdivisions continue to increase and expand into forested areas. This expansion places a heavy burden on the fire district due to ingress/egress and addressing issues.

### *Community Assessment*

The roads that access most of the homes on San Juan Island are narrow and winding with few offering a secondary egress option for residents and firefighters. Many residents refuse to use highly visible address signs to identify their property which makes it difficult for firefighters to locate homes.

There are numerous homeowners and communities that do participate in the Firewise program to provide defensible space around their homes.

### *Potential Mitigation Activities*

Continue homeowner education programs to advise homeowners/builders about ‘firesafe’ landscaping and home construction materials. Given the rural nature of this community and observations made while visiting with local residents, it is obvious that many living here are very aware of the need for fuels mitigation. Builders should be encouraged to provide alternative or secondary routes out of communities to prevent homeowners from becoming trapped.

Hazardous fuels reduction around San Juan Island’s public infrastructure (i.e. watersheds, communication sites, etc.) should be implemented to limit losses in the event of a wildfire.

Purchase firefighting apparatus (both land and marine based) to provide adequate fire suppression resources for the expanding communities.

## **Waldron**

Waldron is a medium sized island at nearly 5 square miles with approximately 80-100 homes. Some of the homeowners are seasonal residents, but the majority of Waldron residents live on the island year-round. The residents of Waldron are largely self-sufficient out of necessity. There is no ferry service, and access to the island is limited to private boat, water taxi, aircraft or the occasionally leased landing barge. There are no publicly supplied utilities. Residents must supply their own electricity and water, and telecommunication is limited to those areas that lie within antenna range/penetration of transceivers located on other islands. The island has a school, a post office and an airstrip. In addition, there is a public dock, a barge landing site and about 3 miles of county roads which are maintained by two part-time employees.

### *Fuels Assessment*

Much of the forests on Waldron were logged during the operation of the Lime Kilns on San Juan Island. Waldron Island is dominated by forests with a few areas cleared for home-sites or minor agriculture activities. The forest cover types are made up of a lush overstory of Douglas fir, grand fir, western red cedar, and shore pine mixed with isolated occurrences of Pacific madrone. The understory vegetation is mostly salal and oceanspray on the deep soil areas under the timber canopy, and grass and sedge on shallow rocky soils or steep south facing slopes. Near riparian areas, aspen, willow, birch and sphagnum moss are often present. Throughout the forest areas down and dead woody material is common on the forest floor in addition to low lying shrubs and

forbs providing ample fuels for wildfire. Scotch broom has become increasingly invasive wherever sunlight penetrates, bringing the added risk of highly flammable ladder fuel. Forest health is variable on the island with some pockets of diseased and insect-infested trees scattered across the landscape. These pockets of dead and dying trees increase the risk but do not dominate the risk assessment.

### *Fire Protection*

The citizens on Waldron Island do not have a fire protection district on their island. Waldron falls under the Washington DNR, which has a cooperative agreement with San Juan Island Fire & Rescue and Orcas Island Fire & Rescue. The anticipated long response times have prompted the development of an informal island fire brigade, and to acquire an old military style truck carrying a 1200 gallon water tank to which a high capacity pump and fire hose were added. With the aid of community funding and support, the Waldron Island Fire Brigade was able to commission the building of 3 smaller water wagons or trailers, each with 200 gallon capacity, mounted high pressure pump and 100+ feet of fire hose. These trailers are strategically placed around the island during the drier months, to allow anyone to hook-up and take them to wherever they are needed. These efforts notwithstanding, islanders are under no illusion that this equipment is sufficient to defeat a significant fire. Rather, they hope that it will help the brigade to control and delay the spread of any wildland fire until external help can reach the island.

### *Community Assessment*

There are a number of roads that crisscross the island to access individual homes and the various public properties on the island (i.e. dock, airstrip, and school), there is not a lot of vehicle traffic however. Most of the homes are separated from one another which adds to the sense of privacy and seclusion of the island. The vast majority of the homes in this community are in need of defensible space and safe evacuation routes. In addition, Waldron Island would benefit from more comprehensive defensible zones; such as shaded fuel breaks. The forestland fuels in this area would support extreme fire behavior including crowning and torching. A continuous, targeted fuels reduction program is needed to help protect this island and its residents.

### *Potential Mitigation Activities*

A homeowner education program should be implemented to advise homeowners about ‘firesafe’ landscaping and home construction materials. Given the rural nature of this community and observations made while visiting with local residents, it is obvious that many living here are very aware of the need for fuels mitigation.

The fuel buildup around homes significantly increases the risk on Waldron. The reduction of fuels around homes would serve as the first step of defensibility. Home site defensibility zones will not be enough to protect the people and structures in this area. A community defensible zone that uses natural terrain breaks, past fire boundaries, and other features to create a shield of treated fuels is strongly recommended, and attention should be given to the condition of potential escape routes, especially those that lead to defensible safe zones.

The acquisition of fire suppression equipment and continued maintenance of that equipment is critical in quickly controlling fires. Annual training for local residents on the equipment and firefighting tactics would contribute to safe and effective fire suppression efforts.

## Outer Islands

The Outer Islands of San Juan County include all the small islands scattered among and between the larger islands of Orcas, Lopez, Shaw, Waldron and San Juan. Most of these islands are inhabited with people on an annual or seasonal basis; however several of the islands are completely non-inhabited due to land ownership, extreme terrain and lack of water. Most of the inhabited islands have well-developed single lane dirt road systems through the interior portions providing access to houses, private air fields and boat ramps. Vegetation is very dense along the roadways traveling through forested areas. The inhabited islands generally have limited firefighting equipment and access into individual homes is often limited to smaller equipment due to narrow driveways and dense roadside vegetation. These smaller, more remote islands have very similar characteristics of cover vegetation and topography. The description that follows is general for all the smaller outer islands except for the islands of Patos, Stuart, and Decatur, which were more closely assessed during the field visit because of their unique character and ownership.

### *Topography / Vegetation*

The Outer Islands as with most of the San Juan's are rugged and mountainous formed from glacial erosion. Their shorelines are deeply indented by narrow fjord like harbors connected by U-shaped glacial water channels that often attain depths of 600-1000 feet or more. The islands are composed of folded and faulted sedimentary rocks that have intrusions of igneous rock. Vegetation on some of the Outer Islands is dense and varied while on others it is wholly lacking. Generally the forested areas are covered with second growth timber, logged off in the early 1900s for fuel to fire the lime kilns. Interspersed with the forest cover are openings in the forest canopy originating from land clearing or thin dry soils capable of only sustaining grass and shrubs. The forest cover types are made up of a lush overstory of Douglas fir, grand fir, western red cedar, and shore pine mixed with isolated occurrences of Pacific Madrone. The understory vegetation is mostly Salal and Oceanspray on the deep soil areas under the timber canopy, and grass and sedge on shallow rocky soils or steep south facing slopes. Near riparian areas, aspen, willow, birch and sphagnum moss are often present. Throughout the forest areas down and dead woody material is common on the forest floor in addition to low lying shrubs and forbs providing ample fuels for wildfire.

### *Access*

Access to the outer islands is entirely by private boat, water taxi or aircraft. The inhabited islands have developed road systems through the interior portions providing access to houses and boat ramps. Vegetation is very dense along the roadways traveling through forested areas. Most of the islands have limited firefighting equipment and access into individual homes is often limited to smaller equipment due to narrow winding driveways and dense roadside vegetation.

### *Fire Protection Services*

The outer islands fall within the Washington Department of Natural Resource, U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service lands are protected by the DNR), and the Bureau of Land Management (also protected under agreement with the WA DNR). San Juan Fire District #3 provides wildland fire protection for the outer islands under contract with the Washington Department of Natural Resources. Residents living on the more populated islands have organized some form of fire cache and equipment to assist in fire protection, but the effort varies by island. For the remote uninhabited or sparsely inhabited islands, fire suppression

would be considerably delayed due to reporting and transportation times. For this reason defensible space and fuels treatment measures around structures is very important.

### *Community Assessment*

#### *Patos Island*

Patos Island is the most northerly island in San Juan County; the island is exclusively owned by the federal government and administered by the Bureau of Land Management. On the western tip of Patos Island is the Patos Island Lighthouse on Alden Point. The island and adjacent inlets comprise Patos Island State Park which has a small campground facility and loop trail. The island is protected by the Orcas Island Fire Department and falls within the jurisdiction of the Bureau of Land Management.

Patos Island has flat terrain. The island is heavily forested with the windward, southwest shore containing a distinctly different forest structure than the interior and leeward forest. The windward forest contains predominantly Douglas-fir with small components of lodgepole (shore) pine, Garry oak, western red cedar, and quaking aspen. Overstory trees are short and the effects of chronic wind damage are readily apparent. The understory is mostly thick salal with some rose, kinnikinnick, salmon berry, and grasses. The more interior and leeward forest type consists of an overstory of Douglas-fir, western red cedar, grand fir, western hemlock, Sitka spruce, Pacific yew, maples, and red alder. These sites are more moist and productive than the windward sites and are also protected from wind and salt spray.<sup>43</sup>

Understory down and dead woody debris is mostly lacking, possibly due to campers collecting fire wood. The canopy is relatively high with few ladder fuels to carry a fire into the upper canopy without a strong wind. Alden Point, where the light house resides is entirely grass covered with scattered tall shrubs. The vegetation around the lighthouse is not maintained on a regular basis, and grass is present right up to the foundation of the light house. In a wild fire situation, the lighthouse could be threatened due to the fact that there are no residence on the island, causing an extensive delay in reporting a fire, and response time by the local fire district which would have to be dispatched by boat.

Since the island is heavily used by boaters and camper, especially during the drier times of the year, the potential for an escaped fire is high. Camp sites have established fire pits with constructed fire rings and bare soil zones around the fire pits aiding in reducing the potential for escaped fire. There are no established fuel breaks between the camping areas and the forest or the camping areas and the grass land surrounding the lighthouse area. Recommended projects for Patos Island include development of fuel breaks between the camp sites and forested areas, and reduction of understory vegetation through thinning or burning on the western side of the island to reduce fuel loading near the lighthouse.

A fire history study of Patos conducted in 2005 documented fires occurring in 1807 and 1837 with secondary evidence of nine other fire years between 1753 and 1913. The authors hypothesized that the historic fire regime on Patos Island was dominated by low severity fires and that the structure of the forest has changed significantly over the past century.<sup>44</sup> The grass

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<sup>43</sup> Gray, R.W. and Dr. L. Daniels. February 2006. *Fire History Analysis for Patos, Washington*. Report to the USDI Bureau of Land Management.

<sup>44</sup> Gray, R.W. and Dr. L. Daniels. February 2006. *Fire History Analysis for Patos, Washington*. Report to the USDI Bureau of Land Management.

around the lighthouse has evidence of native species like camas, but the lack of fire in the meadow area and possibly historical use has diminished the abundance of the native species.

### Stuart Island

Stuart Island is the northwestern most land mass in San Juan County. This 2.9 square mile island is home to two communities of full and part time residence, a state park, a one room school house and two airstrips. The island is mostly private land except for the western tip of the island which is managed by the Bureau of Land Management (Turn Point Light Station and USCG facility), and a portion in the middle of the island, Stuart Island State Park. There are no stores or commercial facilities on the island. Primitive camping with potable water is available at the park. The island is within the jurisdiction the Washington Department of Natural Resources and the Bureau of Land Management. Access to Stuart Island is only by private boat, water taxi or aircraft. Washington State Ferries do not serve Stuart Island. The island has a well-developed single lane dirt road system through the interior portions providing access to houses, private air fields and boat ramps. Vegetation is very dense along the roadways traveling through forested areas. The island has limited firefighting equipment and access into individual homes is often limited to smaller equipment due to narrow driveways and dense roadside vegetation.

Stuart Island has hilly to mountainous terrain toward the west side of the island, and gentle terrain on the east side. The island is covered with second growth conifer forest except for areas with thin soils on dry rocky southern escarpments, and areas cleared for air strips and farm land. The forest is predominantly mixed conifer species dominated by Douglas fir and Pacific madrone with a mosaic understory of tall and short shrubs, low lying salal and grass. Understory down and dead woody debris is moderately high in places and would carry a fire if left unattended.

Turn Point Light Station and the USCG facility are located on the western tip of the island. The light station and USCG facility are administered and maintained by the Bureau of Land Management. A good access road links the facility with a boat dock on the eastern side of the island. The vegetation around the light station is well maintained on a regular basis. There is a lush manicured lawn around all of the buildings, and the forest adjacent to the facility appears to be thinned, reducing the threat from wildfire. Uphill and adjacent to the light station on a steep slope is a USCG facility developed to supply continuous power to the light station. The facility contains propane tanks, solar panels, a generator and substation building. Forest fuels are positioned directly adjacent to this facility. A defensible space and fuels treatment work is needed around this facility. In a wild fire situation, the light station would not be directly threatened due to the well maintained defensible space that exists, and there are people on the island that could alert authorities and provide suppression in a timely manner. The USCG facility however could be threatened since the wildland fuels are in close proximity to propane tanks that could be compromised and escalate the fire condition.

### Decatur Island

Decatur Island is the southeastern most land mass in San Juan County. This 3.5 square mile island is home to 3 private communities of full and part time residence. Access to Decatur Island is only by private boat, private ferry, water taxi or aircraft. There is no Washington State Ferry service to Decatur. The airport on Decatur Island is private and requires permission from the community for use. The island has a well-developed single lane road system through most of the interior portion, linking the private communities and providing access to houses, private air fields and boat ramps. Vegetation is very dense along the roadways traveling through forested

areas. The island has limited firefighting equipment and access into individual homes is often limited for large fire trucks, due to narrow steep driveways and dense roadside vegetation. The island is within the jurisdiction the Washington Department of Natural Resources.

Decatur Northwest located on the west side of the island in Sylvan Cove is a planned community located on 600 acres. This community was developed with preservation for open space in mind. The community has established fire hydrants and the vegetation around houses is kept in check by a large flock of domestic sheep that are managed for that purpose. Decatur Northwest is a Firewise Community with extensive open space with fuel breaks separating it from the adjacent tracks of dense forest.

Decatur Island has hilly to mountainous terrain in the center and southwestern portion of the island, and gentle terrain on the southeast side. The island is covered with second growth conifer forest except for areas with thin rocky soils, and areas cleared for farming and recreation. The forest is predominantly mixed species dominated by Douglas fir, grand fir, shore pine and Pacific madrone with a dense understory of tall and short shrubs, low lying salal and grass. Understory down and dead woody debris is high throughout most of the forested area. Due to the relatively steep terrain and dense forest vegetation on Decatur Island, a fire at lower elevations has the potential to sweep uphill in a short amount of time without warning. Under a wildfire situation, escape routes would be cut-off because of heavy fuels encroaching on roads and driveways. Fuels treatment projects focusing on defensible space and roadway fuel removal should be emphasized throughout the island.

#### *Obstruction Island*

This island has been actively trying to enhance its firefighting capabilities. They currently have two fire equipment caches on either end of the island. Community members have also requested that the county provide them with house numbers and a map. Two individuals created an LZ between their properties which has proved crucial for emergency services.

## Chapter 6

### Mitigation Recommendations

Critical to implementation of this Community Wildfire Protection Plan are the identification and implementation of an integrated schedule of action items targeted at achieving a reduction in the number of human caused fires and the impact of wildland fires in San Juan County. This section of the plan identifies and prioritizes potential mitigation actions, including treatments that can be implemented in the county to pursue that goal. As there are many land management agencies and thousands of private landowners in San Juan County, it is reasonable to expect that differing schedules of adoption will be made and varying degrees of compliance will be observed across various ownerships.

The primary land management agencies in San Juan County, specifically the USDI Bureau of Land Management, National Park Service, and WA Department of Natural Resources are participants in this planning process and have contributed to its development. Where available, their schedule of land treatments have been considered in this planning process to better facilitate a correlation between their identified planning efforts and the efforts of San Juan County.

San Juan County encourages the building of disaster resistance in normal day-to-day operations. By implementing plan activities through existing programs and resources; the cost of mitigation is often a small portion of the overall cost of a project's implementation.

All risk assessments were made based on the conditions existing during 2012. Therefore, the recommendations in this section have been made in light of those conditions. However, the components of risk and the preparedness of the county's resources are not static. It will be necessary to fine-tune this plan's recommendations regularly to adjust for changes in the components of risk, population density changes, infrastructure modifications, and other factors.

### Maintenance and Monitoring

As part of the policy of San Juan County, the Community Wildfire Protection Plan will be reviewed at least annually at special meetings of the CWPP steering committee, open to the public and involving all municipalities/jurisdictions, where action items, priorities, budgets, and modifications can be made or confirmed. Amendments to the plan should be documented and attached to the formal plan as an amendment. Re-evaluation of this plan should be made on the 5<sup>th</sup> anniversary of its acceptance, and every 5-year period following.

### Prioritization of Mitigation Activities

The action items recommended in this chapter were prioritized through a group discussion and voting process. The action items in Tables 6.1 – 6.5 are ranked as “High”, “Moderate”, or “Low” priorities for San Juan County as a whole. The CWPP committee does not want to restrict funding to only those projects that are high priority because what may be a high priority for a specific community may not be a high priority at the county level. Regardless, the project may be just what the community needs to mitigate disaster. The flexibility to fund a variety of diverse projects based on varying criteria is a necessity for a functional mitigation program at the

county and community level. It should be noted that due to the isolation of each island, the issues and concerns that one island has, may not affect any other islands.

### Policy and Planning Efforts

Wildfire mitigation efforts must be supported by a set of policies and regulations at the county level that maintain a solid foundation for safety and consistency. The recommendations enumerated here serve that purpose. Because these items are regulatory in nature, they will not necessarily be accompanied by cost estimates. These recommendations are policy related and therefore are recommendations to the appropriate elected officials; debate and formulation of alternatives will serve to make these recommendations suitable and appropriate.

**Table 6.1. Action Items in Safety and Policy.**

Action Item	Goals Addressed (see page 4)	Responsible Organization	Timeline
6.1.a: Incorporate the San Juan County Community Wildfire Protection Plan as a supplement to the San Juan County Natural Hazards Mitigation Plan.	CWPP Goal #3  Planning Priority: Medium	Lead: DEM  Support: None	6 months
6.1.b: Incorporate the San Juan County Community Wildfire Protection Plan, by reference, in the San Juan County Comprehensive Plan.	CWPP Goal #3, 4  Planning Priority: Medium	Lead: Fire Marshal  Support: Fire Districts, County Development & Planning	2013
6.1.c: Provide support for the committee to address building and development issues within areas considered WUI to address access, defensible space, water supply, etc.	CWPP Goal #3,4,6  Planning Priority: High	Lead: CWPP Committee  Support: Fire Departments, County Planning and Zoning	Continuous
6.1.d: Distribute Firewise-type educational brochures to Chamber of Commerce, Realtors, and with building permit applications.	CWPP Goal #2,4  Planning Priority: Medium	Lead: County Firewise Advisor  Support: Orcas Firewise Representative	2013
6.1.e: Support various types of fuel management techniques, including prescribed fire, as effective tools to reduce hazardous fuels in the WUI within applicable regulations.	CWPP Goal #1,3,5,6  Planning Priority: High	Lead: CWPP Committee  Support: Fire Districts	Continuous
6.1.f: Develop a program to assist landowners with implementing fire safe practices that they have learned from 6.1.c. and 6.1.d.	CWPP Goal #1,2,3,5,6  Planning Priority: High	Lead: CWPP Committee  Support: Firewise	2014

**Table 6.1. Action Items in Safety and Policy.**

<b>Action Item</b>	<b>Goals Addressed (see page 4)</b>	<b>Responsible Organization</b>	<b>Timeline</b>
<b>6.1.g: Identify islands with inadequate fire protection and work with residents and fire service agencies to develop solutions.</b>	<b>CWPP Goals #1,2,3,5,6</b>  Planning Priority: High	<b>Lead: CWPP Committee</b>  <b>Support: Fire Districts, WA DNR</b>	2017
<b>6.1.h: Provide support for a committee to continue addressing building codes and road standards.</b>	<b>CWPP Goals #4,6</b>  Planning Priority: Low	<b>Lead: County Chiefs Association</b>  <b>Support: CWPP Committee, Fire Districts, Firewise</b>	Continuous
<b>6.1.i: Coordinate with Fire Marshal’s office to continue developing uniform standards for review of all building permits and development proposals.</b>	<b>CWPP Goals #4,6</b>  Planning Priority: Medium	<b>Lead: County Chiefs Association</b>  <b>Support: CWPP Committee</b>	Continuous
<b>6.1.j: Continue pre-planning emergency evacuation routes / zones with specifications for varying conditions.</b>	<b>CWPP Goal #1,2,3,4,6</b>  Planning Priority: Medium	<b>Lead: Fire Districts</b>  <b>Support: DEM</b>	Continuous
<b>6.1.k: Begin dialogue between San Juan County, National Park Service, U.S. Fish and Wildlife Service, and the BLM, to provide fire protection services and to participate in committee meetings.</b>	<b>CWPP Goal #3,6</b>  Planning Priority: Medium	<b>Lead: County Chiefs Association</b>  <b>Support: CWPP Committee</b>	2013
<b>6.1.l: Continue to encourage local residents to develop pre-emergency communication plans including phone trees and contact lists. The recent ‘Reverse 911’ system is beneficial to most residents of the county but may be limited given poor cellular coverage throughout the county.</b>	<b>CWPP Goal #1,2,5</b>  Planning Priority: Medium	<b>Lead: Fire Districts</b>  <b>Support: CWPP Committee, Firewise</b>	Continuous

### **Fire Prevention and Education Projects**

The protection of people and structures will be tied together closely because the loss of life in the event of a wildland fire is generally linked to a person who could not, or did not, flee a structure threatened by a wildfire or to a firefighter combating that fire. Many of the recommendations in this section involve education and increasing wildfire awareness among San Juan County residents.

Residents and policy makers of San Juan County should recognize certain factors that exist today, the absence of which would lead to increased risk of wildland fires in San Juan County. The items listed below should be acknowledged and recognized for their contributions to the reduction of wildland fire risks:

**Forest Management** has a significant impact on the fuel composition and structure in San Juan County. The forest management programs of the BLM, NPS, WADNR and numerous private landowners in the region have led to a reduction of wildland fuels. Hazardous fuels generated from forest practices on state and private land are treated in accordance with regulations in Washington Code and Administrative Rules. Furthermore, forests are dynamic systems that will never be completely free from risk. Treated stands will need repeated treatments to reduce the risk to acceptable levels in the long term.

**Table 6.2. Action Items for Fire Prevention, Education, and Mitigation.**

Action Item	Goals Addressed (see page 4)	Responsible Organization	Timeline
<b>6.2.a: Continue to develop youth and adult wildfire educational programs in conjunction with the county Firewise Program to include onsite programs on outer islands.</b>	CWPP Goal #2  Planning Priority: High	<b>Lead: Firewise Communities</b>  <b>Support: Fire Districts, BLM, and Washington DNR</b>	Continuous
<b>6.2.b: Wildfire risk assessments of homes in the wildland-urban interface and promote free (to homeowners) address signs.</b>	CWPP Goal #1,2,3,5,6  Planning Priority: High	<b>Lead: Firewise</b>  <b>Support: Fire Districts</b>	Continuous
<b>6.2.c: Implementation of home site defensible space treatments.</b>	CWPP Goal #1,2,5,6  Planning Priority: High	<b>Lead: Firewise</b>  <b>Support: Fire Districts</b>	Continuous
<b>6.2.d: Implementation of community defensible zone treatments in rural subdivisions or housing clusters.</b>	CWPP Goal #1,2,5,6  Planning Priority: High	<b>Lead: Firewise</b>  <b>Support: Fire Districts</b>	Continuous
<b>6.2.e: Maintenance of home site defensible space.</b>	CWPP Goal #1,2,5,6  Planning Priority: Medium	<b>Lead: Firewise</b>  <b>Support: Fire Districts</b>	Continuous
<b>6.2.f: Continue to encourage area homeowner's associations to foster a Firewise approach to fire protection and awareness.</b>	CWPP Goal #2,6  Planning Priority: Medium	<b>Lead: Firewise</b>  <b>Support: Fire Districts</b>	Continuous
<b>6.2.g: Work with a local recycling center to develop an onsite neighborhood chipping program or drop boxes for large limbs generated by fuels mitigation projects.</b>	CWPP Goal #1,2,5  Planning Priority: High	<b>Lead: Fire Districts</b>  <b>Support: Firewise</b>	2013
<b>6.2.h: Work with local, state, and federal agencies, organizations, county and public to identify and treat high wildfire risk areas in areas experiencing public use.</b>	CWPP Goal #1,2,3,5,6  Planning Priority: High	<b>Lead: CWPP Committee</b>  <b>Support: Fire Districts, Federal &amp; State Agencies</b>	2015

**Table 6.2. Action Items for Fire Prevention, Education, and Mitigation.**

Action Item	Goals Addressed (see page 4)	Responsible Organization	Timeline
<b>6.2.i: Work with the San Juan County Fire Chief’s Association and Firewise Communities Program to develop a continuing public wildfire education program and better capture defensible space and prevention teachable moments.</b>	CWPP Goal #2,6  Planning Priority: Low	<b>Lead: San Juan County Chiefs Association and Firewise Communities</b>  <b>Support: Fire Districts</b>	2014
<b>6.2.j: Explore creating a grant funded fire prevention position for San Juan County.</b>	CWPP Goal #1,2,3,4,5,6  Planning Priority: Medium	<b>Lead: County Chiefs Association</b>  <b>Support: Fire Districts</b>	2015

### Infrastructure Enhancements

Critical infrastructure refers to the communications, transportation (road and ferry networks), power lines, and water supply that service a region or a surrounding area. All of these components are important to western Washington and to San Juan County specifically. These networks are, by definition, a part of the wildland urban interface in the protection of people, structures, infrastructure, and unique ecosystems. Without supporting infrastructure, a community’s structures may be protected, but the economy and way of life lost. As such, a variety of components will be considered here in terms of management philosophy, potential policy recommendations, and mitigation recommendations.

**Table 6.3 Action Items for Infrastructure Enhancement**

Action Item	Goals Addressed (see page 4)	Responsible Organization	Timeline
<b>6.3.a: Make access improvements to substandard culverts and limiting road surfaces.</b>	CWPP Goal #4,6  Planning Priority: Medium	<b>Lead: County Road Department</b>  <b>Support: Fire Districts</b>	2018
<b>6.3.b: Coordinate with private landowners regarding the use of key boxes on gates to improve emergency response times.</b>	CWPP Goal #2,3,5,6  Planning Priority: Medium	<b>Lead: Fire Districts</b>  <b>Support: Firewise</b>	Continuous
<b>6.3.c: Map, develop GIS database, and provide signage for onsite water sources such as hydrants, underground storage tanks, and drafting or dipping sites on all ownerships across the county.</b>	CWPP Goal #3,6  Planning Priority: Medium	<b>Lead: County GIS</b>  <b>Support: Fire Districts</b>	2014

**Table 6.3 Action Items for Infrastructure Enhancement**

Action Item	Goals Addressed (see page 4)	Responsible Organization	Timeline
<b>6.3.d: Develop wildfire protection-specific management plan, including a fuels reduction program, for all watersheds in the county and adjacent properties.</b>	<b>CWPP Goal #1,3,5,6</b>  Committee Priority: High	<b>Lead: CWPP Committee</b>  <b>Support:</b> Friday Harbor, WA DNR, WA State Parks	2015
<b>6.3.e: Support the development and implementation of an improved water system on Lopez that will meet industry standards as well as sustain wildland fire protection of the community and residences.</b>	<b>CWPP Goal #3,4,5,6</b>  Committee Priority: High	<b>Lead: CWPP Committee</b>  <b>Support:</b> Fire Districts	Continuous
<b>6.3.f: Support efforts to provide funding for upgrading the emergency service communication infrastructure to provide for better emergency response and notification countywide.</b>	<b>CWPP Goal #4,6</b>  Committee Priority: Medium	<b>Lead: DEM</b>  <b>Support:</b> Fire Districts	Continuous

**Resource and Capability Enhancements**

There are a number of resource and capability enhancements identified by the rural and wildland firefighting districts in San Juan County. All of the needs identified by the districts are in line with increasing the ability to respond to emergencies and are fully supported by the CWPP steering committee.

The implementation of each action item will rely on either the isolated efforts of the rural fire districts or a concerted effort by the county to achieve equitable enhancements across all of the districts. Given historic trends, individual departments competing against neighboring departments for grant monies and equipment will not necessarily achieve countywide equity.

**Table 6.4 Action Items for Resource and Capability Enhancements**

Action Item	Goals Addressed (see page 4)	Responsible Organization	Timeline
<b>6.4.a: Improve mitigation capabilities by developing a more stable funding mechanism for mitigation and education activities outside of the regular operating budget of local fire districts.</b>	<b>CWPP Goal #1,2,5,6</b>  Committee Priority: Medium	<b>Lead: CWPP Committee</b>  <b>Support:</b> Fire Districts	2014
<b>6.4.b: Develop additional water supply sites and acquire supporting equipment to supplement fire suppression efforts throughout San Juan County.</b>	<b>CWPP Goal #6</b>  Committee Priority: Medium	<b>Lead: County Chiefs Association</b>  <b>Support:</b> Fire Districts and Waldron Fire Brigade	Continuous

**Table 6.4 Action Items for Resource and Capability Enhancements**

Action Item	Goals Addressed (see page 4)	Responsible Organization	Timeline
<p><b>6.4.c: Improve departmental capability by establishing a program to increase the retention and recruitment of volunteer firefighters and encourage firefighters to have wildfire training.</b></p>	<p><b>CWPP Goal #6</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Committee Priority: Medium</div>	<p><b>Lead: County Chiefs Association</b></p> <p><b>Support: Fire Districts</b></p>	<p>Continuous</p>
<p><b>6.4.d: Update personal protective equipment and wildland fire training for all fire districts in San Juan County.</b></p>	<p><b>CWPP Goal #6</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Committee Priority: High</div>	<p><b>Lead: Fire Districts</b></p> <p><b>Support: None</b></p>	<p>Continuous</p>
<p><b>6.4.e: Obtain portable RAWS for recording and monitoring weather, including fuel moisture.</b></p>	<p><b>CWPP Goal #6</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Committee Priority: High</div>	<p><b>Lead: CWPP Committee</b></p> <p><b>Support: Fire Districts, County Chiefs Association</b></p>	<p>2015</p>
<p><b>6.4.f: Acquire apparatus necessary for marine responses including transporting firefighters and their equipment to outer islands for San Juan Island Fire Rescue.</b></p>	<p><b>CWPP Goal #6</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Committee Priority: High</div>	<p><b>Lead: San Juan Island Fire &amp; Rescue</b></p> <p><b>Support: County Chiefs Association</b></p>	<p>2017</p>
<p><b>6.4.g: Improve communication resources between the public, emergency dispatch, and emergency responders.</b></p>	<p><b>CWPP Goal #6</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Committee Priority: High</div>	<p><b>Lead: DEM</b></p> <p><b>Support: Fire Districts, County Chiefs Association</b></p>	<p>Continuous</p>
<p><b>6.4.h: Acquire additional brush fire apparatus and increase water carrying capacity with a third water tender for Lopez Fire District.</b></p>	<p><b>CWPP Goal #6</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Committee Priority: High</div>	<p><b>Lead: Lopez Island Fire &amp; EMS</b></p> <p><b>Support: Fire Districts, County Chiefs Association</b></p>	<p>2017</p>
<p><b>6.4.i: Develop a semi-annual onsite fire training program for informal fire brigades on outer islands.</b></p>	<p><b>CWPP Goal #6</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Committee Priority: High</div>	<p><b>Lead: County Chiefs Association</b></p> <p><b>Support: Waldron Fire Brigade, Obstruction Island Fire Brigade</b></p>	<p>2014</p>
<p><b>6.4.j: Develop a community fund to include a budget line item for a mechanic to service all Waldron Fire Brigade equipment at least annually.</b></p>	<p><b>CWPP Goal #6</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Committee Priority: High</div>	<p><b>Lead: Waldron Fire Brigade</b></p> <p><b>Support: None</b></p>	<p>2013</p>

**Table 6.4 Action Items for Resource and Capability Enhancements**

Action Item	Goals Addressed (see page 4)	Responsible Organization	Timeline
6.4.k: Obtain funding to install a high decibel alarm system on Waldron Island to alert residents to fire and other emergency situations.	CWPP Goal #6	<b>Lead: Waldron Fire Brigade</b>	2015
	Committee Priority: High	<b>Support:</b> Fire Districts, County Chiefs Association, BLM, and Washington DNR	
6.4.l: Orcas Island Fire & Rescue needs to replace two of their aging water tenders with the Vacuum type to allow the ability to draft water from virtually any source.	CWPP Goal #6	<b>Lead: Orcas Island Fire &amp; Rescue</b>	2017
	Committee Priority: High	<b>Support: County Council</b>	

**Proposed Project Areas**

The following project areas were identified by the CWPP steering committee and from citizens’ recommendations during the public meetings. Most of the sites were visited during the field assessment phase. The areas where these projects are located were noted as having multiple factors contributing to the potential wildfire risk to residents, homes, infrastructure, and the ecosystem. Treatments within the project areas will be site specific, but will likely include homeowner education, creation of a wildfire defensible space around structures, fuels reduction, and access corridor improvements. All work on private property will be performed with consent of, and in cooperation with the property owners. Specific site conditions may call for other types of fuels reduction and fire mitigation techniques as well. Defensible space projects may include, but are not limited to commercial or pre-commercial thinning, pruning, brush removal, chipping, prescribed burning, installation of greenbelts or shaded fuel breaks, and general forest and range health improvements.

The steering committee does not want to restrict funding to only those projects that are high priority because what may be a high priority for a specific community may not be a high priority at the county or agency level. Regardless, the project may be just what the community needs to mitigate disaster. The flexibility to fund a variety of diverse projects based on varying criteria, landowner participation, and available dollars is a necessity for a functional mitigation program at the county and community level.

Additional information for projects located on federally managed land is included in the Appendix 4.

Map Id#	Project Name	# of Acres	# of Structures	Priority Ranking
1	Johns Island Roadside Fuels Management	93	19	High
2	Johns Island Defensible Space	188	28	Medium
3	Waldron Island Defensible Space, Roadside Fuels, & Access Improvement Project	2,345	216	High

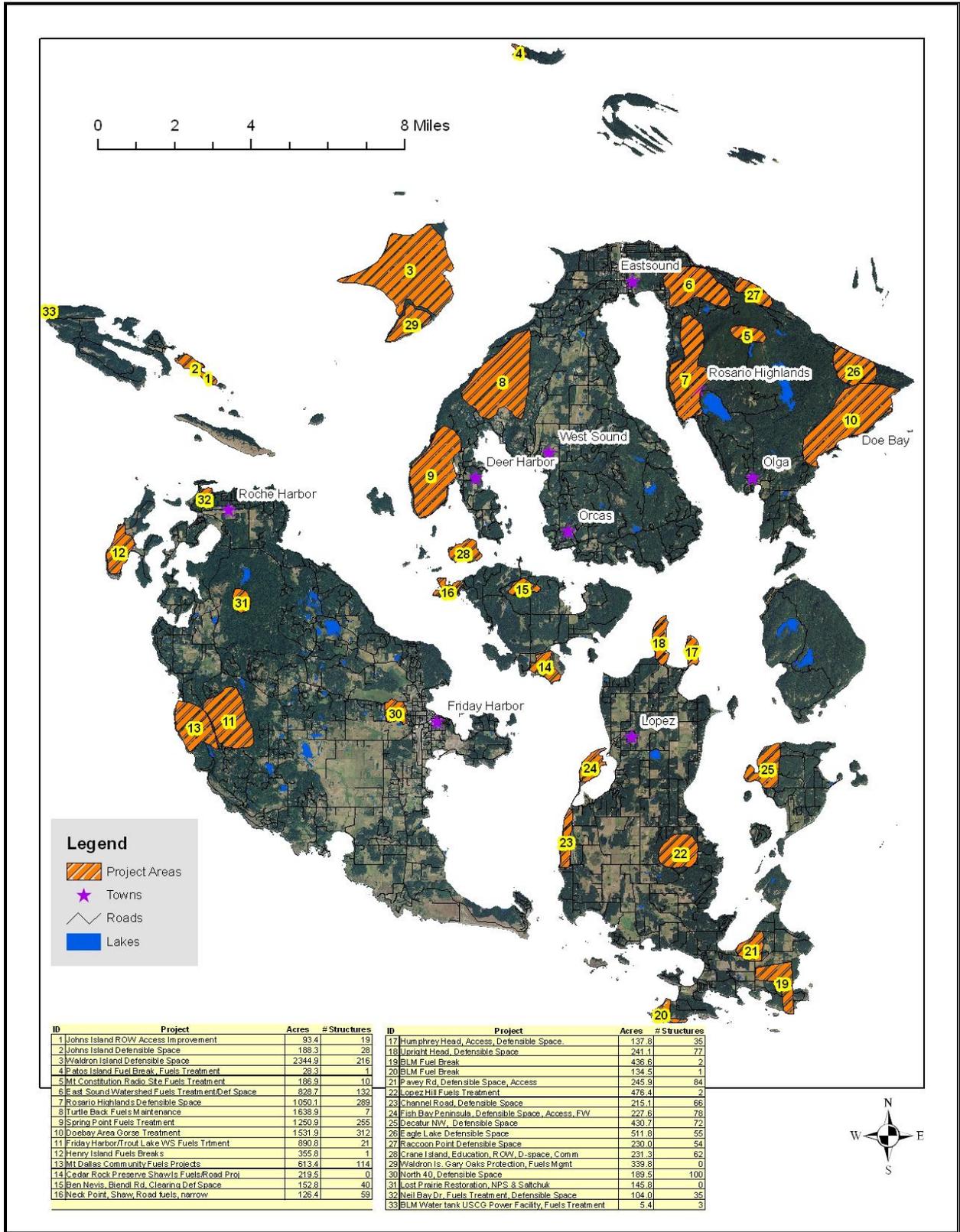
**Table 6.5. Proposed 5- Year Fuels Reduction Project Areas.**

<b>Map Id#</b>	<b>Project Name</b>	<b># of Acres</b>	<b># of Structures</b>	<b>Priority Ranking</b>
4	Patos Island Fuel Treatments	28	1	Medium
5	Mt. Constitution Communication Site Fuels Treatment	187	10	High
6	Eastsound Watershed Forest Management and Defensible Space.	829	132	High
7	Rosario Highlands Defensible Space	1,050	289	High
8	Turtleback Forest Management/Restoration	1,639	7	Medium
9	Spring Point Defensible Space and Roadside Fuels	1,251	255	High
10	Doe Bay Area Gorse Treatment	1,532	312	Medium
11	Trout Lake Watershed Forest Management and Access Improvement	891	21	Medium
12	Henry Island Fuels Breaks	356	1	High
13	Mt Dallas Defensible Space Treatments	613	114	Medium
14	Cedar Rock Preserve Vegetation Management	220	-	Medium
15	Ben Nevis-Biendl Road Defensible Space and Roadside Fuels	153	40	Medium
16	Neck Point Roadside Fuels Treatments and Access Improvement	126	59	High
17	Humphrey Head Defensible Space and Access Improvement	138	35	High
18	Upright Head Defensible Space	241	77	High
19	Chadwick Hill Fuel Break and Forest Management	437	2	Medium
20	Iceberg Point Fuel Break	135	1	Medium
21	Pavey Road Defensible Space and Roadside Fuels Treatment	246	84	High
22	Lopez Hill Forest Management	476	2	Medium
23	Channel Road Defensible Space	215	66	High
24	Fish Bay Peninsula Defensible Space	228	78	High
25	Decatur Northwest Defensible Space	600	87	High

<b>Table 6.5. Proposed 5- Year Fuels Reduction Project Areas.</b>				
<b>Map Id#</b>	<b>Project Name</b>	<b># of Acres</b>	<b># of Structures</b>	<b>Priority Ranking</b>
26	Eagle Lake Defensible Space	512	55	High
27	Raccoon Point Defensible Space	230	54	High
28	Crane Island Defensible Space and Roadside Fuels Treatments	231	62	High
29	Waldron Island Garry Oak Restoration	340	-	Medium
30	North 40 Defensible Space	190	100	Medium
31	Lost Prairie Forest Management and Restoration Treatments	146	-	Medium
32	Neil Bay Drive Defensible Space	104	35	Medium
33	Stuart Island Infrastructure Protection/Fuels Treatment	5	3	High

The Washington Department of Natural Resources, U.S. Fish and Wildlife Service, Bureau of Land Management, National Park Service, and/or individual fire protection districts may take the lead on implementation of many of these projects; however, project boundaries were purposely drawn without regard to land ownership in order to capture the full breadth of the potential wildland fire risk. Coordination and participation by numerous landowners will be required for the successful implementation of the identified projects.

Figure 6.1. Map of Proposed Project Areas.



## Representative Fuels Treatment Project Prescriptions

The following project areas were identified during the field assessments and interviews as potentially having several factors contributing to high wildfire risk as well as being representative of the types of projects likely to be pursued for grant funding. The intent is that these project prescriptions be as site specific as possible, but serve as templates for writing prescriptions for similar projects throughout the County. These projects/templates will aid land stewards in applying for grants specific to their property. The chosen project areas do not reflect the highest priority projects identified by the steering committee, but were written for communities with a high level of existing interest in implementation.

- John's island project represents a remote island with long response times for firefighting personnel. Residents of similar remote islands should consider mitigation activities to compensate for the longer response times for not only their own property but for their neighbors as well. Remember that structure fires can cause wildfires that spread to neighboring structures if enough fuel is present.
- The gorse project may be interchangeable with other invasive species such as Scotch broom that increase the natural fire cycle of the areas that they inhabit. The volatile nature of these particular invasive species may create extreme fire behavior.
- Trout Lake project represents an important natural resource for the Town of Friday Harbor. Watersheds (and other natural resources) can be heavily impacted by wildfires. Fires can cause erosion and water retention issues in watersheds.
- Orcas Highlands is a heavily populated community amongst a forest with a dense canopy and heavy fuel loading on the ground. Many communities throughout the county face similar issues as the Orcas Highlands community.

The project areas were identified without regard for landownership boundaries; thus, site-specific prescriptions will require coordination and approval by the various landowners. The following descriptions provide as much detail as possible regarding the objectives, prescription, and unique nature of each project; however, exact acreages and site plans will be determined after consultation with the affected landowners. The prescriptions described in the following projects may be modified to suit other similar projects, for example the Orcas Highlands project may apply to the community of Mt. Dallas. Contact your local fire department or Firewise representative for assistance in developing goals and prescriptions specific to your project.



### John's Island

John's island is relatively small, with dozens of homes dotting the shoreline and a youth camp located at the north end of the island. The youth camp has numerous structures throughout the property. There are only a few residents that live here year round. An old road bisects the island from southeast to northwest. This road is extremely 'brushed-in' and narrow. Residents have been trying to open this road up to provide ATV access and act as a fuel break. It is important to note here that this project could be extended to

include a majority of the other inhabited outer islands.

The island has a thick understory of salal, oceanspray, and other species. The overstory consists of a dense canopy of firs and pines. Ladder fuels and heavy litter were noted throughout the island.

The youth camp has a small brush fire engine and has agreed to assist on any fires on the island. Island residents have purchased firefighting tools and have strategically placed them in small outdoor lockers throughout the residential areas. Some residents have also been creating defensible space around their homes.

There are two potential safety zones on the island that residents could use in the event of a wildfire. The smaller of the two safety zones is located at the southeastern end of the island. The larger is located at the northwestern 1/3 of the island on the youth camp property.



### *Project Prescription*



In order for the only engine on the island to be effective, the old road needs to be opened up and widened. The old road would also allow island residents to access the two safety zones. This project will take a significant effort as the salal is extremely thick. At a minimum the road should be cleared to 15 feet and if possible, thin brush another 5 to 10 feet on either side. This 'shoulder area' of 5 to 10 feet does not have to be completely cleared, but removing ladder fuels, pruning, and thinning the brush would help make the road more effective as a fuel break. Gaining all of the adjacent landowners (of the road) permission will be difficult, but landowners should be encouraged by the county, fire districts, and Firewise to participate.

Defensible space should also be encouraged on the island by the county, fire districts, and Firewise representatives. Educational workshops should be offered to John's island residents. Individual home risk assessments would also help educate residents and provide them with specific tasks that would reduce the risk of loss to wildfire.

The support and active participation from island residents may motivate any reluctant residents to reduce the fuels on their property. As defensible space increases around the island, residents may consider monitoring the more remote forested areas of the island for signs of poor health and decline.



## Gorse

Gorse (*Ulex europaeus*) is native to western and central Europe, but is considered a weed in more than 30 countries and is listed as one of the top 100 worst invasive species. It is common in disturbed areas, grasslands, shrublands, forest margins, and coastal habitats. Gorse is a very successful and tenacious plant once it becomes established and is extremely competitive, displacing cultivated and native plants, and altering soil conditions by fixing nitrogen and acidifying the soil<sup>45</sup>.

Gorse is a prickly, perennial evergreen legume that will grow to a height of more than 9 feet if left undisturbed. The leaves resemble spines and are grey-green when young, darkening with age. Spines and leaves have a waxy coating and end in a sharp yellow point. Flowers are bright yellow and have a distinct coconut-like smell.

Gorse produces deep and extensive roots and huge numbers of brown to black seeds in grey pods. The seeds have a hard, water-resistant coating which allows them to remain dormant in the soil for up to 30 years. In addition to dispersing a large number of seeds, gorse can spread by coppicing from stumps. As with many fire-adapted species, fire helps propagate new gorse seedlings by cracking the impermeable seed coat as well as clearing the heavy litter associated with mature plants. Post fire regeneration of gorse can be prolific and rapid.

Gorse plants grow outward, leaving a center of dry, dead vegetation. The combination of dead plant material, volatile oil content, and a high surface to volume ration makes gorse a severe fire hazard. Additionally, gorse restricts recreational opportunities and can negatively impact forestland and other native plant communities. Soil is often bare between individual plants, which increases erosion on steep slopes where it has replaced grasses or forbs.

On September 26, 1936, a forest fire ignited a severe gorse infestation in the community of Bandon, Oregon. Bandon resident D.H. Woomeer told a *Coos Bay Times* reporter shortly after the fire, “That Irish hedge was the worst thing - when the fire hit it right across from my house, the flames shot up high into the air. It was just as though there had been gasoline poured on the fire. And water was just no good against it - wouldn’t touch it! The stuff seemed just full of oil.” The fire quickly swept through the town, laying waste to the business district along with hundreds of homes. Only a handful of structures were left standing by the time the fire was suppressed. Most of the town’s 1,800 residents managed to reach safety, but ten people were killed in by gorse-fuel fire.<sup>46</sup>

There are currently at least six individual infestations of gorse on Orcas Island. The largest infestation is located in the Doe Bay area where it has invaded a large portion of coastline and is spreading inland. Numerous private landowners are affected by the infestations as it typically reduces land values and is very difficult and expensive to control.

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<sup>45</sup> Invasive Species Specialist Group (ISSG). “Global Invasive Species Database”. Available online at <http://www.issg.org/database/species/search.asp?st=100ss>. Accessed May 2012

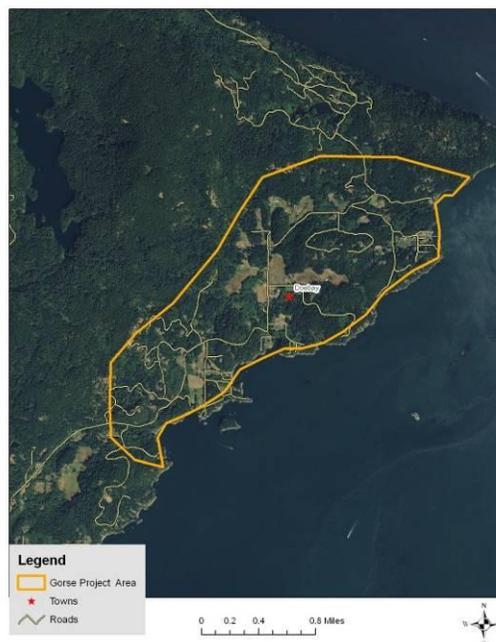
<sup>46</sup> Oregon Invasive Species. “Invasion and Inferno, the Story of the Bandon Fire”. Available online at <http://oregoninvasivespecies.blogspot.com/2010/04/invasion-and-inferno-story-of-bandon.html>. Accessed May 2012.

The San Juan County Noxious Weed Control Board is actively working with landowners to help prevent the spread of gorse and to identify any new populations. So far, the County has been somewhat successful in preventing new populations by manual digging out the plants prior to seed dispersal. However, this method is very labor intensive and will not be effective in the long-term. Biological control, using a gorse mite, has also helped reduce the spread of established infestations.

### *Project Prescription*

There are multiple management techniques that can help control gorse including mechanical removal, grazing, mowing, tilling, burning, chemical treatment, and biological control. After considering the degree of the infestation, the type of land infested, and the landowner's desired future condition, an effective control program will likely require integrating several of these methods.

At this time, research suggests that the most effective control program combines mowing/mulching, herbicides, and establishing competitive species over three growing seasons. This can be done in a three step process. The first step involves controlling the established plants. The second step is to control new plants emerging from seeds and the third step is to plant the infested area with a desirable species that will out-compete the gorse<sup>47</sup>.



San Juan County Noxious Weed Control Board representatives can help landowners determine the most effective treatment method. In general, the following steps, potentially in addition to other methods, will help control active infestations.

1. Determine the available resources and financial limitations.
2. Start treating the most strategic areas first (least infested, highest quality site).
3. Growing Season 1: Mow gorse before seed set and after blossom drop. Mulch woody debris.
4. Growing Season 2: Broadcast spray re-sprouted gorse with herbicide.
5. Growing Season 3: If there is a flush of annual weeds, mow again before seed set (usually mid-summer). Plan at least one more application of herbicide to kill gorse seedlings (late summer). Begin planting a competitive native species (fall).

Long term monitoring and surveying of gorse infestation sites is also necessary to determine the extent of the population as well as the effectiveness of treatments.

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<sup>47</sup> Oregon State Parks. "Gorse Control Strategy". 2011. Available online at <http://mgx.com/blogs/wp-content/uploads/2011/08/OPRD-Gorse-Management-Plan-2011.pdf>



### Town of Friday Harbor - Trout Lake Watershed

The Town of Friday Harbor receives its water supply from diversion of surface water from nearby watersheds. The primary source of water is Trout Lake, located approximately 5 miles west of Town. Trout Lake impoundment was originally constructed in 1928 with a concrete dam, which was improved by raising the dam to the current height of 37 feet in the 1950s. The lake has a surface area of approximately 60 acres when full. Trout

Lake is highly dependent on annual rainfall for recharge. Annual rainfall for the Friday Harbor area is ~28 inches, with the rainfall fairly evenly distributed throughout the year. The wettest month of the year is November with an average rainfall of 4.8 inches. Runoff is affected by soils, underlying bedrock and season. Runoff in the Trout Lake area occurs heaviest from December to March when soils are seasonally saturated.

The Trout Lake watershed is located in the steep remote mountainous interior of San Juan Island, in the San Juan Island's False Bay watershed, and is approximately 840 acres in size. The Town owns approximately 570 acres in the watershed, and prohibits development within the watershed proper. Access into the watershed is restricted by locked gates and closed trails. Trout Lake watershed is a high value asset in the county and is at risk from wildfire.

Potential water contamination sources on the Friday Harbor watershed are primarily downstream from Trout Lake, and include agricultural land use, septic systems and erosion. Erosion, forestry and wildfire however are a potential source of water contamination. The contamination can be thermal or in the form of increased sedimentation and particulate matter from soil erosion and ash. The watershed is closed to the public; however the option for future timber harvests exists, and the potential for a wildfire is ever present. Soil erosion caused by runoff from roads used for hauling may introduce additional sediment into the watershed. Reduced canopy cover from harvesting and thinning will, for a time, reduce capture of rain water in the forest canopy, increasing runoff and sedimentation. On the other hand however, an unmanaged forest may be more prone to wildfires, which will cause substantially more runoff, soil erosion; ash and sediment delivery to the water supply than a managed forest that reduces the potential for a wildfire.

Forest cover provides slope stability, minimizes erosion and reduces sediment input into streams, wetlands and bays. Intact forest canopies provide protection from thermal heating, keeping water temperatures at acceptable levels. The organic layers on the forest floor holds and slowly release ground water into adjacent streams and wetlands. Loss of the forest from wildfire can have long term effects on water quality. The Trout Lake watershed is a heavily forested basin in a remote part of San Juan Island. The forest cover is predominantly mature second growth Douglas fir mixed with grand fir, shore pine, Madrone and western red cedar. Alder and birch are also present along the water edge and in the wet draws. Understory vegetation is mixed throughout the forested area depending on aspect terrain and soil quality. Shrubs generally dominate the favorable sites including Scotch broom which rapidly invades open or disturbed areas, and grass the less favorable sites. Occurrences of down and dead woody debris is common and very heavy with ladder fuels consisting of shrubs and small trees. Access to the water shed is from the south via a single lane gravel road behind a locked gate off of Prohaska Road. This road travels up a shallow draw to the east side of the lake, then skirts around the eastern shore line where it changes to a more primitive dirt road on the north end of the lake.

The road is seasonally submerged in places near the lake edge, with limited areas for turn out. The forest canopy covers most of the road throughout its length, and fuels encroach on the road at the north end.

Based on available modeling tools related to wildfire, that take in to account fuel type, slope, aspect, weather and fuel moisture, the Trout Lake watershed has a moderate to high potential for an intense wildfire. Rate of wildfire spread is estimated to be low and a few areas would have high fire intensity. Population density is increasing around the watershed, increasing the potential for a human caused fire getting away during a dry weather condition only to develop into a wildfire situation. Measures should be taken to reduce the wildfire potential in the watershed, reduce the risk of fires spreading into the watershed from the outside, and provide safe improved access into the watershed for firefighters and suppression equipment.

### *Project Prescription*

In order to protect the watershed, implementation of fuels management projects, roadside fuels treatments, and establishment of fuel breaks will aid in reducing the wildfire potential in and out of the area. Fuels management projects designed to reduce understory fuel loading will reduce the rate of fire spread, should it occur. Access into the area is currently well established for suppression equipment. Reduction of fuels along the road, improvement of the road to allow escape on the north end of the lake, and removal of over topping vegetation will minimize the risk to fire fighters, and allow safe access, in and out, for equipment. Surrounding the water shed is several home sites. Near these areas, shaded fuel breaks in key places will help protect the watershed as well as other residents from fire that may originate from a home site. In addition to this, a program educating the nearby residents in fuels treatment and installation of defensible space around their property will help reduce the potential for fires and fire escape. The objective here is to reduce the potential for wildfire spread outside and inside the watershed, and improve the ability to suppress a fire inside the watershed should one develop. The prescription for this type of work would be site specific, but would likely include both commercial and precommercial thinning, prescribed burning and minor road development.

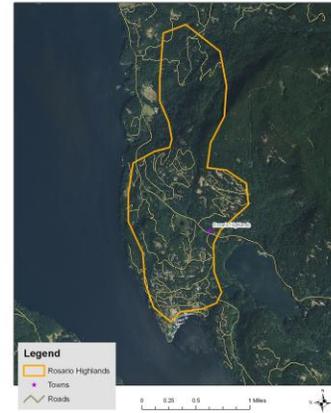




## Orcas Highlands

The Orcas Highlands Association, an Orcas Island community of approximately 100 homes, has been a Firewise Communities/USA site for seven years. Residents there deal with wildland urban interface issues including dense stands of mixed conifers on steep slopes, serious ingress/egress issues, a buildup of down and dead timber, thick vegetation around many structures and a lack of viable evacuation opportunities should a wildfire occur.

Extreme fire behavior within the Highlands would be largely determined by a fire burning in areas of dense, continuous conifer forest accompanied by drought and episodes of low relative humidity (<30%) and strong winds (>20mph). The presence of steep slopes throughout the area will significantly enhance uphill fire spread. The forest in this area was previously harvested and initially did not have the tree canopy height, density and continuity to readily support crown fire. It is now developing into a forest canopy that can produce high intensity crown fire. Locations of heavy accumulations of down and dead woody surface fuel will enhance the crown fire potential. The extent of the high intensity crown fire spread will be limited by the presence of hardwoods. However, under extreme fire behavior conditions, extensive firebrand showering may generate numerous downwind spot ignitions and thus, high percentages of area involvement---including structures. The highest likelihood for generating high intensity crown fires exists in the continuous dense conifer stands largely dominated by Douglas-fir (*Pseudotsuga menziesii*) with associated conifers such as western hemlock (*Tsuga heterophylla*) and western redcedar (*Thuja plicata*). Steep slopes with accompanying heavy accumulations of down and dead surface fuels enhance the crown fire potential in these dense conifer stands. High intensity, active spreading crown fires are unlikely in the areas having high proportions of red alder (*Alnus rubra*), big leaf maple (*Acer macrophyllum*) and madrone (*Arbutus menzeisii*). However, areas of hardwoods and mixed hardwoods/conifers do tend to have heavy accumulations of surface fuels that can produce persistent burning with torching conifers in the mixed timbered areas. Under extreme conditions, fields of cured grass and/or dense shrubs with high proportions of dead material can produce high rates of spread with moderate to high intensities.



### *Citizen Leadership*

Citizen based leadership has been a key component to the success of the Orcas Highlands. Similar to most Firewise Communities, it is the “spark plug” leadership of concerned neighbors that defines the positive outcome. Citizen leadership must be well organized, communicated, and coordinated for mitigation programs to flourish.

Residents of the Highlands have worked hard over the years to improve their wildfire readiness, and at the end of 2011 had invested \$34,572 into wildfire mitigation projects. This total includes volunteer time, a budget line adopted by the Association, and two small grants.

### *Project Prescription*

Vegetation thinning is the key to reducing home loss in the Highlands, starting in the home ignition zones. Further treatment of the mixed conifer stands within the Highlands needs to be conducted, including tree and/or ladder fuel removal.

Further wildfire education within the development that deals specifically with home preparation and other wildfire mitigation issues, including:

- Clearing of dead vegetative material and heavy concentrations of live material from at least ten feet around each house.
- Removing dry needles and other vegetative debris from gutters.
- Separating wood fences and walkways attached to homes with metal flashing. Storing wood and other flammable items away from the house.
- Removing vegetative and other flammable materials from beneath decks and porches.
- Keeping exterior walls free of dead and/or dry vegetation. Cleaning roofs and gutters.

Homeowners also need education concerning home preparation during a wildfire event. Among other things, safe zones---or safe homes---should be identified for shelter for the residents. Pockets of the Highlands could share specific zones or areas.

With neighbors working together as a Firewise Community, the Orcas Highlands has demonstrated significant success in wildfire mitigation.

### **Regional Land Management Recommendations**

Wildfires will continue to ignite and burn depending on the weather conditions and other factors enumerated earlier. All forest and agricultural land owners should be encouraged to actively manage their wildland-urban interface lands in a manner consistent with reducing fuels and risks in this zone.

#### *Targeted Livestock Grazing*

The following section was provided by Bruce Gregory, a San Juan Islands Conservation District employee who has a small working livestock farm on San Juan Island. The San Juan Islands Conservation District frequently recommends; ‘Better Farming With Voisin Management Intensive Grazing’, 3<sup>rd</sup> edition, by Bill Murphy, and ‘Holistic Management: A New Framework For Decision-Making’, by Allan Savory with Jody Butterfield. Mr. Gregory frequently refers to these books on his own farm and used them both to provide information below.

Livestock grazing, particularly sheep, goats and cattle, has been a long-standing tradition from the settlement days in the San Juan Islands. Historically, livestock were used, along with manual forest clearing, to take advantage of the open prairie habitat found throughout the islands during the historic settlement period. Fire related ecology began to change as settlers suppressed fires. This left livestock grazing as one of the few remaining tools.

Current livestock management science agrees that when used for specific situations with tight management timelines, livestock can be used as a tool to lower fire risk by reducing the amount, height and distribution of a heavy fuel load. Livestock, especially sheep and goats, have been and will continue to be a practical tool used to manage invasive weeds and if done with the use of Management Intensive Grazing (MIG) offers a very viable and practical tool for grasslands renewal, forest understory fuel load reduction and wildlife habitat enhancement.

In general livestock grazing is used post-hay harvest in the fall months until heavy rains of winter arrive to further reduce stubble and re-growth that occurs after fall rains return. This when combined with MIG can assist the land manager with needed fuel reduction in the critical dry months.

# Chapter 7

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**Signature Pages**

This San Juan County Community Wildfire Protection Plan has been developed in cooperation and collaboration with representatives of the following organizations and agencies.

**San Juan County Council**

Ordinance No. \_\_\_ - 2012  
Resolution No. \_\_\_ - 2012  
Page \_\_\_ of \_\_\_

ADOPTED this \_\_\_ day of \_\_\_\_\_ 2012.

**COUNTY COUNCIL  
SAN JUAN COUNTY, WASHINGTON**

\_\_\_\_\_  
Patty Miller, Chair  
District 5, Orcas East

\_\_\_\_\_  
Jamie Stephens, Vice Chair  
District 6, Lopez/Shaw

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Lovel Pratt, Member  
District 1, San Juan South

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Richard Peterson, Member  
District 2, San Juan North

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Howard Rosenfeld, Member  
District 3, Friday Harbor

\_\_\_\_\_  
Richard Fralick, Member  
District 4, Orcas West/Waldron

ATTEST: Clerk of the Council

\_\_\_\_\_  
Ingrid Gabriel, Clerk  
Date: \_\_\_\_\_

REVIEWED BY INTERIM COUNTY  
ADMINISTRATOR

\_\_\_\_\_  
Bob Jean                      Date:

RANDALL K. GAYLORD  
APPROVED AS TO FORM ONLY

By: \_\_\_\_\_  
Date

**Signatures of Participation by San Juan County Fire Districts and Departments**

This Community Wildfire Protection Plan and all of its components identified herein were developed in close cooperation with the participating entities listed. These members of the CWPP steering committee formally recommended that this document be adopted by the San Juan County Council.

\_\_\_\_\_  
By: Steve Marler, Chief  
San Juan Island Fire & Rescue

\_\_\_\_\_  
Date

\_\_\_\_\_  
By: Jim Ghiglione, Chief  
Lopez Island Fire & EMS

\_\_\_\_\_  
Date

\_\_\_\_\_  
By: Kevin O'Brien, Chief  
Orcas Island Fire & Rescue

\_\_\_\_\_  
Date

\_\_\_\_\_  
By: Brud Joslin, Chief  
Shaw Island Fire Department

\_\_\_\_\_  
Date

**Signatures of Participation by other San Juan County CWPP Steering Committee Entities**

This Community Wildfire Protection Plan and all of its components identified herein were developed in close cooperation with the participating entities listed. These members of the CWPP steering committee formally recommended that this document be adopted by the San Juan County Council.

By: Linda Coates-Markle, Wenatchee Field Manager  
Spokane District Bureau of Land Management

Date

By:

Date

By:

Date

By:

Date

By:

Date

By:

Date

By:

Date

*Tera R. King*

By: Tera King, Project Manager  
Northwest Management, Inc.

Date

This plan was developed by Northwest Management, Inc. under contract with the Bureau of Land Management and San Juan County Chiefs' Association.

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**Northwest Management, Inc.**  
233 East Palouse River Drive  
PO Box 9748  
Moscow ID 83843

208-883-4488 Telephone  
208-883-1098 Fax  
[NWManage@consulting-foresters.com](mailto:NWManage@consulting-foresters.com)  
<http://www.Consulting-Foresters.com/>