

Adam Zack

From: Katie Fleming <katie@sanjuans.org>
Sent: Wednesday, October 18, 2017 3:09 PM
To: Adam Zack; Comp Plan Update
Subject: Comprehensive Plan Update Comments from Islands Climate Resilience
Attachments: ICR letter to SJC re Comp Plan update 101817 - final.pdf; 2017 SJI Climate Resilient CAP_water chapter.pdf

Dear Community Development Staff,
Please see the attached comments and attachment from Islands Climate Resilience in regard to incorporating climate change policies and goals in each element of the Comprehensive Plan. Please let us know if we can answer any questions or provide more information.

Thank you for your consideration.

Sincerely,

Katie Fleming (Islands Climate Resilience Steering Committee Member)

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Katie Fleming

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October 18, 2017

San Juan County Community Development Staff
P.O. Box 947
Friday Harbor, WA 98250

Dear Community Development Staff:

Islands Climate Resilience, formed in 2014, is a grassroots group of islanders who encourage preparedness for climate related impacts in the San Juan Islands. The current update to the San Juan County Comprehensive Plan provides an important opportunity to proactively build the resilience of our community, economy, and ecosystems to climate change impacts. It also provides a critical opportunity to put ourselves on a low-emissions pathway, making sure that our development and way of life helps to mitigate global climate change.

We therefore ask that this update incorporate climate change policies and goals in each element of the Comprehensive Plan. This letter contains additional information and provides some specific suggestions.

What changes in climate do we need to prepare for?

Climate projections from the University of Washington and other scientific groups indicate that we can expect a number of concerning changes:¹

- Changing precipitation patterns that will bring drier summers as well as more frequent heavy rainfall events in the wintertime. We already experience limited water supply in the summer months, and less rainfall will increase the probability of drought conditions and water shortages. More frequent heavy rainfall events in the winter has the potential to cause stormwater inundation, flooding, erosion, and landslides.
- More extremes in temperature—particularly prolonged heat waves in the summertime—will increase energy demand for cooling. It will also increase demand for water for landscaping and agriculture, even as supply is dropping. Higher summer temperatures compounded by less precipitation increases wildfire risk, which affects air quality, impacting human health. We saw a number of smoky days this year and can expect that to happen more often in the future.
- Sea level rise will affect shoreline stability and coastal zone resources. This will be compounded when storms hit, with resulting damage in shoreline areas from storm surge. Sea level rise in Friday Harbor could be at least 5 inches by 2050 and 1.5 feet by 2100.²
- Ocean acidification (the decreasing pH of marine waters) will harm local shellfish and related recreational and commercial fisheries.

¹ Mauger, G.S., J.H. Casola, H.A. Morgan, R.L. Strauch, B. Jones, B. Curry, T.M. Busch Isaksen, L. Whitely Binder, M.B. Krosby, and A.K. Snover, 2015. *State of Knowledge: Climate Change in Puget Sound*. Climate Impacts Group, University of Washington, Seattle.

² Calculated from Tables 5.3 and A.2 in National Academy of Sciences (2012) *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*, using 75% of the rise projected for Seattle (based on the comparative trends for Friday Harbor and Seattle with barometric pressure and vertical land motion adjustments incorporated).



- The aforementioned changes also affect our flora and fauna. Species distributions will change, endangered species may be even more at risk, invasive species may find increasingly favorable conditions, and insect disturbances affecting the health of our forests may increase.

How can we integrate these issues into the Comprehensive Plan update?

We need to utilize the best available science in our decision-making to ensure that we develop in a way that makes our community, economy, and ecosystems resilient to climate change impacts.

We summarize here the relevance of climate change to each of the Comprehensive Plan elements, and how the Plan could address those projected impacts. Specific suggested language for each element is provided in Attachment 1.

Vision

We have an opportunity to put forward a vision of a sustainable, low-emissions county that is resilient to climate change impacts and other stressors—not only during the period covered by the new Comprehensive Plan, but for generations to come.

Land Use

It will be important to make sure that we avoid future development in places that are very likely to be at risk of coastal flooding as the sea level rises, and places that will have inadequate water.

We need to protect places that will remain and provide critical habitat for shorebirds and other animals as sea level rise and other changes decrease their options.

Housing

We can improve the affordability of housing and achieve climate co-benefits by investing in energy efficiency, energy conservation, and renewable energy generation, which can reduce energy costs for residents.

The development of affordable housing relies on the densities and density bonuses in SJC's UGAs. This combined with the ever-increasing demand for affordable housing and the fact that all SJC UGAs are located on the shoreline heightens the need for affordable housing units that remain permanently affordable. Islands Climate Resilience recommends that any UGA expansions explicitly consider climate change risks and avoid areas projected to have an increased risk of flooding, landslides, severe erosion, and/or water shortages as well as areas that are needed by shoreline species as sea levels rise; and include a permanent affordability requirement for at least 50% of the units created.

Transportation

Overall transportation goals and policies should further the reduction of GHG emissions, including by cutting down on vehicle miles traveled. This should include prioritizing investment in low-carbon transit, providing incentives for adoption of electric vehicles and other low and/or no GHG-emitting transport or ride sharing options, and promoting non-motorized transportation by making roads safer and creating trails for bikes and pedestrians. The previous Transportation Element laid out goals and policies related to non-motorized transportation that should be brought forward and expanded in this Update.

We also need to ensure that existing and new roads, trails, and other transportation infrastructure are sited appropriately and protected from sea level rise and the impacts of extreme weather events.



We should also work with Washington State to ensure that ferry docks and services are resilient to climate change impacts, and that we maximize opportunities to reduce emissions and waste from the ferry service.

Capital Facilities

To protect our investments and people's safety, capital facilities need to be sited in places that are not at risk from potential sea level rise or extreme weather conditions. Energy systems associated with new and existing capital facilities should be low-emissions and energy-efficient to mitigate climate change and save money in the long run.

Utilities

We plan on supporting OPALCO's inputs to this update process and applaud their efforts to help the county be a leader in reducing greenhouse gas emissions and dramatically increasing the use of renewable energy.

Water

Given the critical role that water plays in our health, our lifestyle, our economy, and our environment, effective water resource planning and management are vital to our future. These planning and management efforts will need to consider projected climate change impacts like saltwater intrusion and increased drought, in addition to other stresses. Continued development, for example, means that increases in impervious surfaces also have the potential to generate more runoff and reduce groundwater recharge. Development is also pushing our community up against the carrying capacity limits of our aquifers, making efficient use and careful planning essential.

Natural Resource Land

We need to make sure that our forests remain healthy, contribute to increased carbon sequestration, and provide good habitat for wildlife. As temperatures rise, shade will be increasingly important for animal and human well-being. And as heavy rainfall events become more frequent, the groundwater retention and site stability benefits provided by trees will be critical.

We also want to ensure that island agriculture remains viable, even as temperatures rise, summers become drier, and new pests emerge.

Thank you for your consideration. Our group will be providing more inputs during the update process, and we are available to respond to questions to help the Council think through these issues.

Sincerely,

Islands Climate Resilience Steering Committee

Lovel Pratt – Mulno Cove Consulting
Linda Lyshall – SJI Conservation District
Katie Fleming – Friends of the San Juans
Jane Wentworth – WA Native Plant Society, SJ Islands
Sarah Severn – Washington Business for Climate Action
Kari Koski – Educator, elixirist, and conservationist-at-large



Gretchen Allison – Chef, artist, and climate-activist-at-large
Senior Project Advisor: Nora Ferm Nickum
Special Advisor and Fiscal Agent: Ron Zee, Madrona Institute

Attachments:

1. Specific recommendations for language in the San Juan County Comprehensive Plan.
2. Climate change references in the Bainbridge Island Comprehensive Plan. The Bainbridge Island Comprehensive Plan was adopted in February 2017.
3. Water Resilience chapter of a ICR-led Community Climate Resilience Plan.



Attachment 1. Recommendations for climate change language in the San Juan County Comprehensive Plan.

Suggested additions to the previous Comp Plan language are indicated by orange underlined text.

Vision

We'd like to see the following language included in the Vision Statement:

- Our community, economy, and ecosystems thrive and are resilient in the face of a changing climate and a range of other stressors.
- We work determinedly towards a carbon-neutral future.
- Our policies, programs, and development regulations are informed by the best available science.

Land Use

General policies:

New policy: Increase resilience by avoiding development in sites that are projected to be at risk from climate change impacts like sea level rise, coastal flooding, and inadequate water supplies.

2.2.F Natural Resource Conservation (or could go under Fish, Wildlife, and Native Habitat in the Water chapter)

New policy: Protect rocks and islets that will remain above projected sea level rise for shore bird nesting, roosting, and rearing.

2.2.C Energy

Edits to previous policy: Provide opportunities within land use designations for the development and use of alternative energy resources which are compatible with the natural environment and will contribute to a reduction in greenhouse gas emissions.

Recreation (or might go under **Capital Facilities**)

New policy: Plan for impacts of sea level rise—and accompanying erosion—when undertaking new construction or conducting repairs and maintenance of roads, docks, trails, and campsites near the shoreline.



Housing

General Housing

Edits to previous policy 5: Provide the most up to date information on critical environmental areas and natural resource lands, and incorporate the best available science on climate change projections, to identify potential land development constraints.

Edits to previous policy 6: Identify and address potential mitigation for critical area impacts and climate change risks as early in the permitting process as possible.

Affordable Housing

New policy: In funding affordable housing, include funding to improve the affordability of both new and existing housing through investments in energy conservation and/or efficiency, and renewable energy generation.

New policy: Explicitly consider climate change risks in siting UGA expansions and other new affordable housing locations and avoid sites projected to have increased risk of flooding, landslides, severe erosion, or water shortages.

New policy: Require that UGA expansions include a permanent affordability requirement for at least 50% of the units created.

Transportation

6.4.B Policies related to the Washington State Ferry System

New policy: Encourage the WSF to create and incorporate best practices into ferry services that reduce greenhouse gas emissions, increase recycling and composting rates, and increase the climate resilience of ferry transit to increase the reliability of service in the long term.

6.4.C Policies for County Docks, Barge Landing Sites, Ramps and Associated Parking Areas

New policy: Plan for impacts of sea level rise—and accompanying erosion—when undertaking new construction or conducting repairs and maintenance of docks and associated parking areas.

6.5 Land Transportation Goals and Policies

Edits to Goal 6: To increase education and outreach to improve bicycle and pedestrian safety and healthy lifestyles, and facilitate alternatives to the single-occupant vehicle which conserve energy, reduce greenhouse gas emissions, and reduce reliance on fossil fuels.

Edits to Goal 7: To encourage transit providers to provide and expand low/zero-emissions transportation services that support the needs of local residents and visitors.

New policy: Ensure that all new vehicles procured for County use are electric vehicles.



6.5.A Policies for Road Classification, Right-of-Way, Design and Construction

New policy under Road Design and Construction: Ensure that County road standards and practices are updated to reflect climate change projections, and that new roads are sited appropriately and protected from sea level rise, increased erosion, storm surge, and other impacts of climate variability and change.

6.5.F Policies for Bicycles and Mopeds

Edits to intro language: Bicycling and mopeds are important modes of transportation used by residents and visitors to the islands. Bicycling in particular is a zero-emission alternative that can help further the County's climate change mitigation efforts and that can be more affordable than vehicular travel.

Increases in the numbers of bicycling enthusiasts and recreational tour groups, as well as the use of mopeds, requires planning for the development of transportation facilities and operations that promote safe travelling experiences for all users and benefit the local economy.

6.5 G Policies for Trails

Edits to Policy 1: Support the development of an interconnected system of trails for walking, hiking, bicycling and horseback riding that is consistent with rural, island living, provides for safe and reliable zero-carbon transportation alternatives, promotes healthy lifestyles, and creates amenities that attract tourists and add vitality to the economy.

6.5.H Transit Goals and Policies

New goal: To ensure reliable service even in the context of extreme weather events.

New policy: Identify road sections or transit infrastructure assets that may be at risk of flooding, erosion, or other temporary or prolonged damage, incorporating climate change projections into the analysis, and collaborate with transportation partners to identify alternate routes and develop an emergency response plan.

Capital Facilities

General policies

New policy: Site all new capital facilities in places that are not at risk from potential sea level rise or extreme weather conditions. Use the latest science to identify potential sea level rise, flood zones, and other characteristics when identifying locations for capital facilities infrastructure.

New policy: Install low/zero-emissions and energy-efficient energy systems in any new capital facilities. All new County buildings should be LEED certified at the Gold or Platinum level.

7.3.B Community Water Systems That Serve UGAs, AMIRDs, and MPR Activity Centers

Edits to policy 5 (excerpt): Each plan should include an analysis of the community water system's ability to serve existing and potential land use development and population growth, taking into consideration how climate change is projected to affect water availability.



Utilities

We know that OPALCO is proactively working to increase the use of renewable energy and the implementation of energy efficiency initiatives in the islands, and we support their suggested language for the Comprehensive Plan to clearly establish these efforts—and climate change mitigation—as County priorities.

Water

General Goals and Policies

Edits to previous Goal 1: In consideration of Best Available Science, including the most recent climate change projections, protect & manage the quality and quantity of ground and surface water so as to preserve hydrologic systems, designated beneficial uses, and fish and wildlife habitat that rely on fresh water.

Edits to previous Goal 3: Establish coordinated, cost effective programs for monitoring water quality, water quantity and associated habitats and species so that changes can be identified and protection programs modified as necessary, including in the context of climate change impacts.

Edits to general policy 18: In decision making, utilize locally adopted policies and water resource analysis meeting the Best Available Science Standard and including the latest climate change projections from sources like the University of Washington Climate Impacts Group and NOAA.

New general policy: Ensure that all plans consider climate change projections and anticipated impacts such as saltwater intrusion and precipitation change, and incorporate adaptation measures to increase climate resilience and ensure adequate fresh, clean water in the long term. Include climate change information and adaptation measures in all technical assistance programs.

Water Supply Development Policies

Edits to policy 2: Work cooperatively with State agencies to base future water allocations on capacity by watershed, recognizing the following:

- Agricultural resource lands,
- Streams, wetlands, and nearshore habitat,
- Urban growth areas.
- Domestic supply
- Projected changes in climate

4.1.A. Existing Information

Mention sea level rise studies done in San Juan County in recent years, such as this one:

http://www.sanjuans.org/documents/MacLennanetal_2014_SJC_Sea_Level_Rise_Vulnerability_final.pdf

Stormwater Goals and Policies

Edits to intro language: Soil compaction, altering drainage patterns, and replacing forest with pasture, lawn, driveways, and structures results in less infiltration, more surface runoff, and if not controlled, the discharge of warm, polluted water. Climate change is also increasing the frequency of high-intensity rain



events and therefore increasing runoff. As the amount of runoff increases, less water is available for beneficial uses including drinking water.

New policy 4f: 4. Ensure that clearing, grading and stormwater management regulations and enforcement programs:

f. Take into account projected changes in climate and resulting impacts on stormwater and runoff.

4.2.D. Fish, Wildlife and Native Habitat

Edits to intro language: The complex geology of the San Juans supports a diverse land cover that, in conjunction with our streams, wetlands and nearshore areas, supports a wide array of plants and animals. Our habitats are small, disconnected, and often rocky, and for many of them protection is either recommended or is required by State or Federal law. Climate change presents additional risks to island habitats and plant and animal species, including longer dry seasons, changes in pest and disease type and prevalence, and inundation of nearshore areas; this further increases the importance of protection.

4.2.F. Data Collection Goal & Policies

Edits to policy 6: Monitor indicator habitats and organisms associated with fresh water to identify problem areas, establish trends over time, and evaluate the effectiveness of management strategies, including in light of climate change.

Natural Resource Land

2.2.F Natural Resource Conservation (previously in Land Use element)

Edits to previous policy 3: Encourage sustainable forest management in order to conserve forest lands, sequester carbon, and promote the retention and preservation of forest stands that are particularly important to visual aesthetics, wildlife habitat, groundwater retention and/or site stability.

Edits to previous policy 4: Protect and preserve, wetlands, critical marine and terrestrial wildlife habitats and wildlife corridors, including breeding grounds, resting and feeding areas for migratory birds, nursery areas and habitats of threatened, endangered and sensitive species. Include areas and habitats that can provide refuge for species that are vulnerable to climate change impacts like rising temperatures, and allow for migration of critical marine habitats as sea levels rise.

Edits to previous policy 5. Encourage the reclamation, rehabilitation and enhancements of: (a) wetlands, (b) marine and terrestrial wildlife habitat, and (c) vegetated areas necessary to maintain site stability and groundwater recharge, considering climate change impacts on precipitation patterns and water availability.

New policy: Consider climate impacts and opportunities to reduce climate vulnerability during restoration activities. Examples include opportunities to reduce runoff, mitigate flooding, and retain fresh water resources, and opportunities to use natural shading to conserve moisture in dry sites.

Agricultural Resource Lands

Edits to previous Goal: To ensure the conservation of agricultural resource lands of long-term commercial significance for existing and future generations, and protect these lands from climate



change impacts and from interference by adjacent uses which may affect the continued use of these lands for production of food and agricultural products.

Forest Resource Lands

Edits to previous Goal: To protect and conserve forest lands of long-term commercial significance for sustainable forest productivity and provide for uses which are compatible with forestry activities while maintaining water quality, water quantity, and fish and wildlife habitat; sequestering carbon; and increasing the climate resilience of the forest lands and their resources.



Attachment 2. Climate change references in the 2017 Bainbridge Island Comprehensive Plan

<http://www.bainbridgewa.gov/615/Navigate-Bainbridge-Comprehensive-Plan-U>

Introduction

- Guiding Principle #7 Reduce greenhouse gas emissions and increase the Island’s climate resilience.
 - Guiding Policy 7.1 Mitigation: Participate with state, regional and local partners to reduce greenhouse gas emissions consistent with the 1990 benchmark and future year targets set forth in state law, educate the public about climate change and incentivize Island activities including land use patterns and building practices that reduce greenhouse gas emissions.
 - Guiding Policy 7.2 Adaptation: Minimize or ameliorate the impacts of climate change on our community and our Island’s ecosystems through climate-informed policies, programs and development regulations.
 - Guiding Policy 7.3 Evaluate the climate vulnerabilities and implications of City actions and identify policies that alleviate those vulnerabilities. Consider the effects of shifting conditions (sea level rise, changing rainfall patterns, increasing temperatures and more extreme weather events) and the effects they cause (altered vegetation, changing water demands, economic shifts).

Land Use

- “The GMA requires plans to be based on a twenty-year horizon, but this plan uses a fifty-year/one hundred-year horizon to better account for the implications of climate change and the much longer-term cycles of natural systems and public infrastructure investments.”
- Policy LU 2.5 Prepare a Bainbridge Island Climate Change Strategy and Water Conservation Plan.

Water resources

- Policy WR 3.11 Consider the impacts of climate change and ocean acidification when developing regulations or approving capital projects related to aquatic resources including marine nearshore, wetlands, streams, lakes, creeks, associated vegetated areas and frequently flooded areas.

Transportation

- “Transportation is both a cause of climate change and provides opportunities to mitigate the effects of climate change. Creating a transit plan that reduces emission of greenhouse gases and increases our community’s resilience to the effects of climate change is a priority. These criteria should be used to evaluate all transportation solutions and proposed projects.”
- Policy TR 3.4 Support WSF and other providers to create and incorporate best practices into ferry services that reduce greenhouse gas emissions and vulnerability of ferry transit from climate change.



Economic element

- Policy EC 6.3 Develop urban design strategies to ensure that the built environment is appropriate for present and future conditions, including the impacts of climate change.
- Policy EC 7.8 Support and make Bainbridge Island a model community for climate change preparedness and sustainability practices that ensure long-term business viability while attracting and protecting visitors, businesses and residents.

Utilities

- GOAL U-4 Ensure that the provision of utility services is environmentally responsible and sustainable, and encourage utility services that are carbon neutral and do not contribute to climate change.

Environmental element

- “As our Island grows and develops continued protection of varied open space areas and environmentally sensitive landscape is necessary to maintain the quality of life that is currently enjoyed on Bainbridge Island. Additionally, the unpredictable cumulative impacts of climate change in our region justify appeals to the precautionary principle. Climate change may require that the areas we protect and approaches we use to achieve our goals and policies will change.”
- Policy EN 1.8 Consider the potential impacts of climate change and its impacts in all decisions related to natural systems and environmental quality.
- GOAL EN-7 Anticipate and prepare for the consequences of sea level rise.
 - Policy EN 7.1 Consider the implications of sea level rise in all relevant decision-making by using regional sea level rise projections and shoreline instability maps (as provided by the WA Department of Ecology and utilized and interpreted with the Bainbridge Island Climate Impact Assessment).
- GOAL EN-12 Reduce greenhouse gas emissions through compliance with federal, state and regional policies while developing local strategies to reduce emissions further.
 - Policy EN 12.1 Support and implement climate pledges and commitments undertaken by the City and other multi-jurisdictional efforts to reduce greenhouse gas emissions, address climate change, sealevel rise, ocean acidification and other impacts of changing global conditions.
 - Policy EN 12.2 Facilitate the improvement and convenience of low carbon mass transit and increased carsharing, cycling, walking and the development of alternative vehicle infrastructure (e.g., charging stations) to reduce greenhouse gas emissions.
 - Policy EN 12.3 Strive for reduced greenhouse gas emissions by, among other actions, integrating climate change into the city planning process, including land use and transportation planning and management, and making climate change considerations and meeting greenhouse gas emission reduction goals a component of city decision making.
 - Policy EN 12.4 Establish benchmarks, metrics and targets for reduction of greenhouse gas emissions, assess current conditions and progress in reducing greenhouse gas emissions from municipal, commercial, residential and transportation-related land uses, projects and programs.



- Policy EN 12.5 Support the development of a public education program which informs all citizens on the methods and progress for meeting the Island’s greenhouse gas emission goals and ways citizens can assist in reaching the reduction goals.
- Policy EN 12.6 Promote energy conservation measures by all government entities including:
 - Retrofitting offices, shops and garages with high-efficiency lighting;
 - Converting vehicles to hybrid fuel vehicles as replacement or new vehicles are acquired;
 - Converting traffic signals and lighting to the most energy efficient and spectrum appropriate technology available; and
 - Adopting incentive programs and design standards that encourage the employment of renewable energy sources and energy efficient appliances on the Island.
- Policy EN 12.7 Promote the installation of residential solar panels and the adoption of other energy saving technologies such as LED lights, heat pumps and insulation.



Attachment 3. ICR Water Resilience chapter of a forthcoming Community Climate Resilience Plan.

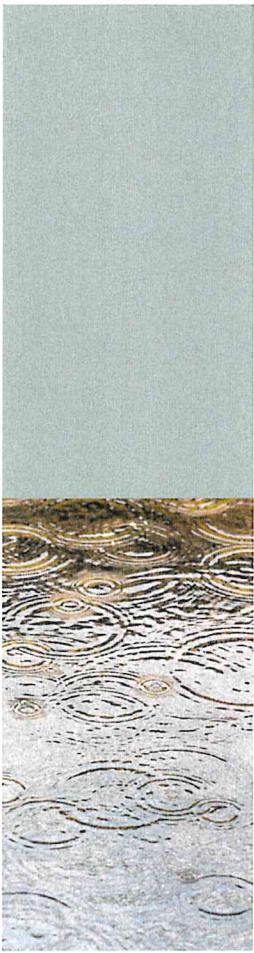
This chapter was developed in 2016-2017 by a group of resident experts in a volunteer capacity. The initial plan will cover selected sectors and resources, with others to be added at a later date.



SAN JUAN ISLANDS

**CLIMATE RESILIENT
COMMUNITY
ACTION PLAN:
WATER**

APRIL 2017



WATER RESOURCES

Introduction

The San Juan Islands have a single source for all of our freshwater resources: precipitation.¹ The rain that falls on each island is the only way our lakes and ponds are refreshed, and our groundwater is recharged. The Islands' water supplies are not sourced from rivers that flow from distant lands or snow melting on mainland peaks. The fresh water on each island is isolated by the surrounding seawater.

The climate in the San Juan Islands is highlighted by our glorious but dry summer seasons and our overcast winters with frequent precipitation. Our summers are very dry, as only a small portion of the total annual precipitation falls in that season. What precipitation does occur in the summer months does not contribute to recharge in any meaningful way; we depend primarily on winter rains to recharge our lakes and aquifers.

In the summertime, demand for water rises sharply due to the arrival of tourists and summer residents, as well as irrigation applications. It is common for San Juan County water systems to see summer demand be more than double the annual monthly average. Summer water use spikes in the San Juan Islands partly due to outdoor water use. Eastsound Water undertook a study of its summer residential water uses and found that the top six percent of water uses accounted for 26.5 percent of the total residential water use.²

Future increases in the island population are likely to lead to more competition for a finite water supply. Continued development means that increases in impervious surfaces also have the potential to reduce groundwater recharge. Water is a public resource that is critical for meeting the needs of the human population as well as wildlife.

Given the critical role that water plays in our health, our lifestyle, our economy, and our environment, effective water resource planning and management are vital to our future. These planning and management efforts will need to consider projected climate change impacts, in addition to other stresses.

¹ With the exception of a limited but growing amount of water collected through desalination plants.
² Paul Kamin report to the 2016 Eastsound Water Annual Meeting.



Anticipated Climate Change Impacts on Island Water Resources

Climate changes in the Pacific Northwest are likely to impact the San Juan Islands’ water resources in a number of ways. As noted in the earlier chapter on climate change projections, the best available science on climate change in the Pacific Northwest suggests that the San Juan Islands’ total annual precipitation is likely to remain similar to historic levels. Seasonal distribution of rainfall may change, and more of the rain may fall in more intense events.

It is during the summer when water resource stresses will be most obvious and potentially problematic. By mid-century, summer dry seasons will likely be warmer and longer, which could exacerbate water scarcity concerns. Climate change could extend the period between the end of the late winter recharge and the start of the next recharge season. The finite water in our lakes, streams, and aquifers will have to be “stretched further.” At the same time, drier summers could increase demand for water for gardens and landscaping.

Meanwhile, climate change will also mean that our winters will feature slightly milder temperatures and perhaps more heavy precipitation events, which could contribute to more runoff. Finally, sea level rise could lead to increased saltwater intrusion into our water sources.

The remainder of this section highlights the importance of two components of our water—surface water and groundwater—and the potential consequences of climate change impacts on these components.

Surface Water

Most of the Islands’ larger water systems depend on surface water. According to the 2004 San Juan County Water Resources Management Plan, 40 percent of the county’s population receives its drinking water from surface water systems. Of the county’s nine water systems with at least 100 connections, seven utilize surface water (see Table 1).

Throughout the summer, the only available water resource that the Islands’ largest water purveyors can access to meet their customer needs, aside from some that are turning to desalinization facilities, is that stored in their lakes. Each of the lakes is drawn down to varying degrees during the summer. Trans- evaporation can be a significant portion of the summer drawdown. Warmer summers, a longer dry season, and increased evaporation could therefore present increasing challenges to these water systems in the future. Currently, the dry season is estimated to run from mid-June through the end of September, or roughly 15 weeks. Extending this by even just two weeks would mean that available water in these lakes would have to be stretched to last 13 percent longer.

Warm summer temperature can also have a significant impact on the quality of water in lakes. Summer’s longer days, increased sunlight, and warmer temperatures stimulate biologic activity. The potential for more summer algae blooms in lakes could create difficulties for existing water treatment plants. Friday Harbor’s Trout Lake has had algae bloom issues in the past.

SUMMER DROUGHT PREDICTIONS

During the summer drought of 2015, most water systems in the San Juan Islands saw a significant increase in water use. Eastsound’s increase in June, for example, was 20 percent over the previous year.³ The drought of 2015 is emblematic of what a normal summer could be in the future, and can therefore give us a sense of what to expect.



³ Eastsound Water Users Association 2016 Annual Report

Table 1. San Juan County's nine water systems.
Source: SENTRY database, WA Department of Health.

Water System	Island	Source Type	Source	Connections
FRIDAY HARBOR, TOWN OF	San Juan	Surface Water	Trout Lake	1,808
EASTSOUND WATER USERS ASSOCIATION	Orcas	Surface AND Ground Water	Purdue Lake	1,300
ROSARIO	Orcas	Surface Water	Cascade Lake	223
ROCHE HARBOR WATER SYSTEM INC	San Juan	Surface Water	Briggs Lake	445
DOE BAY WATER USERS ASSOC	Orcas	Surface Water	Mountain Lake	276
OLGA WATER USERS INC	Orcas	Surface Water	Cascade Creek/Mountain Lake	130
FISHERMAN BAY WATER ASSOCIATION	Lopez	Groundwater		152
ORCAS HIGHLANDS ASSOCIATION, INC.	Orcas	Surface Water	Cascade Lake	117
CAPE SAN JUAN WATER DISTRICT	San Juan	Groundwater		143

Recently, Roche Harbor expanded their Briggs Lake reservoir. This kind of measure may be an option for helping to address climate change, but it can be challenging. The Roche Harbor project was more than 15 years in the making, requiring significant environmental review, procurement of water rights from the Department of Ecology, land acquisition for the expanded footprint of the dams, and changes to their water treatment plant. Raising Briggs Lake also triggered significant water quality issues that required water system shut downs and management adjustments.

The increased risk of wildland fires due to climate change also has the potential to adversely impact surface water reservoirs. Soils and groundcover in burned areas are less stable and more susceptible to erosion. Runoff from burned areas can adversely impact reservoir water quality. Most of San Juan County's largest water systems do not have a backup water source, relying predominantly on surface water. These systems could be adversely affected if their reservoirs were fouled by runoff choked with sediment from burned surroundings. While there are fewer lightning strikes in the San Juans compared to east of the Cascades, other factors contribute to forest fire risk in the islands, including development in hard-to-reach areas, limited water resources for fire-fighting in the summertime, campfires, and fuel buildup as a result of a long era of fire suppression.

Ground Water

San Juan County has over 5,000 groundwater wells, or one for every three people.⁴ These wells are dependent on water stored in underground reservoirs called aquifers. There are multiple groundwater aquifers on each of the larger islands in the San Juan Islands. Water levels in these aquifers fluctuate seasonally, being drawn down during the summer and refilled during the winter.

The San Juan Islands have a very low aquifer recharge rate. Only a small portion of our precipitation actually finds its way into our aquifers (see Table 1). The vast majority of precipitation instead becomes part of stormwater run-off, evaporates, or is absorbed into the soil.

Any diversion or diminishment of groundwater recharge—whether from climate change or other factors, such as diverting stormwater, diverting water to ponds, or covering a recharge area with an impervious surface like pavement—could directly affect water availability.

⁴ DOE well log database.



Table 2. Annual recharge amounts by island, and compared to other places in the region. Source: USGS 2004.

Island	Average annual recharge amount	Percent of total rainfall
Lopez	2.49 inches	9%
San Juan	1.99 inches	6%
Orcas	1.46 inches	5%
Shaw	1.44 inches	5%

The extended summer dry season projected in climate change scenarios may lead to additional stress on aquifer capacity in some parts of the Islands. Already, it is not uncommon to hear locals in the summer say, “My well has gone dry!” When that happens, water is bought and trucked in, or wells are deepened. In the new drought conservation plan for the Islands, Al Mauldin—who has been drilling wells in the San Juan Islands since the 1970s—is quoted as saying that he saw more wells deepened during the summer of 2015 than in any previous year since 1979.⁵ It is likely that climate change will mean that more wells will be unable to meet the demand placed on them during the summer season.

Figure 3. San Juan County groundwater contours and chloride results. Source: SJC HCS 10/2015 draft.

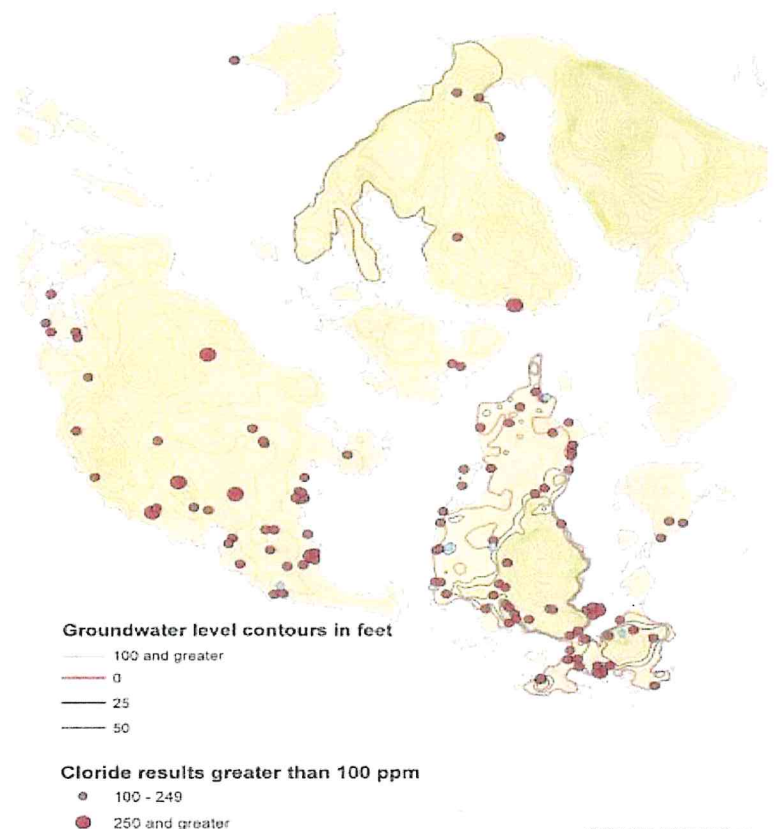
Saltwater intrusion is also a threat to the San Juan Islands’ groundwater. The introduction of saltwater contaminates groundwater and can render wells unusable. There are already multiple nearshore wells that are affected by saltwater intrusion. Fresh groundwater normally has chloride levels under 30 mg/l. Figure 1 shows locations where chlorides have been found over 100 mg/l, which is considered symptomatic of a seawater intrusion potential.⁶ Saltwater intrusion is expected to increase as climate change brings rising sea levels. The seawater/freshwater balance can also be disturbed by over-pumping a well, which means that more water has been withdrawn than the well can sustainably produce.

Lopez Island’s geology creates the highest potential for seawater intrusion. It is also more dependent on groundwater than San Juan or Orcas.

Ecosystems

Our island biodiversity, natural resources, living amenities, tourism industry, and property values rely on having healthy freshwater habitats. Freshwater habitats in the islands have already been altered through non-climate stressors like invasive species,

San Juan County Groundwater Contours and Chloride results



⁵ San Juan County Drought Conservation Plan.
⁶ EPA’s maximum contaminant level for chlorides in potable water sources is 250 mg/l.

livestock grazing, fish blockages, ditches, water appropriation, filling and grading of wetlands and streams, pollution, riparian devegetation, and increased pulses of runoff from impervious surfaces. Additional pressure from climate change stressors further affects the health of these ecosystems.

Water Conflicts

As we have seen around the world, when the demand for water begins reaching the capacity of the available resources, conflicts invariably arise. Potential sources of conflict in the San Juan Islands include conflicts between human users drawing from the same supply, and conflicts between human and non-human users drawing from the same supply. Specific examples could include:

- Over-withdrawals that impair water availability. This could include over-withdrawal by one exempt well owner that impairs the production of a neighboring well, or over-withdrawal from a shoreline water system that leads to seawater intrusion and contamination of an entire aquifer.

- A senior water right holder seeking shut-off of a junior water right holder to protect their “First in Time, First in Right” status.

- Conflicts resulting from existing over-allocation of water resources: the amount available is far less than what has already been officially allocated.⁷

- Tradeoffs between human use and natural resource needs, such as drawing water from watersheds (e.g., False Bay Creek) that need it to support fish.

One of the consequences of increased conflict is increased litigation, which in turn can divert resources and time from County, state, federal, and land managers.

In Washington, there are longstanding water laws that exist to address these types of conflicts. Unfortunately, these laws can promote excessive water use by those who want to protect their water allocations, and they do not attempt to allocate water equitably among all users based on demonstrated need. The most successful outcomes in situations of limited resource availability are created when the issues are approached proactively in ways that strive to understand and respect all parties’ needs.

Potential Economic Impacts

The local population increases substantially in the dry, summer season, with the arrival of tourists and part-time seasonal residents who own second homes in the islands. The County has estimated that on any given summer date, there are as many summer residents, vacation home visitors, and hotel guests on the island as there are year-round residents.⁸ Any future water shortage could limit the capacity of our hospitality industry to meet the needs of visitors, challenge their operations due to additional water use restrictions, or increase their costs and potentially oblige them to raise prices for their customers. Limits to the availability of fresh water would, at best, lead to increased costs, and, at worst, insufficient supply to meet demand. This in turn could possibly have a dampening effect on the local economy.⁹

7 The 2004 San Juan County Water Resource Management Plan indicates that as of about 2002, the state had legally allocated approximately 580-870% of the available water for withdrawal. Fortunately, many users do not currently use the full amount that they have been allocated, and septic systems may return some water to the aquifer. Still, the over-allocation may become more of a problem—particularly in the densely developed areas—when water supplies diminish further.

8 San Juan Scenic Byway Corridor Management Plan. <https://www.visitsanjuans.com/sites/default/files/uploads/sb/section-5.pdf>

9 In 2014, leisure and hospitality accounted for 25.8% of San Juan County jobs: <https://fortress.wa.gov/esd/employmentdata/reports-publications/regional-reports/county-profiles/san-juan-county-profile>



In addition to the water needed by hotels, vacation rentals, and guest houses during the tourist and summer resident season—which peaks in the driest months—changes in water availability can have other impacts on the islands’ economy. Water uses at risk include:

- **Development:** Proven water supply necessary for building permits for planned real estate/subdivision development.
- **Events:** Catering for events (e.g., weddings) where large amounts of water are required to comply with state regulations.
- **Gardening, farming, and livestock:** Increased home garden and commercial agriculture irrigation and livestock watering needs due to drier, hotter summers.

Existing Efforts

There are a number of existing plans and ongoing programs and projects that directly or indirectly help to build climate resilience in the water sector. These include the following:

- The **San Juan County Water Resource Management Committee (WRMC)** serves as the designated planning unit for watershed planning under the Watershed Management Act of 1998. The WRMC has worked with the County to produce reports on local groundwater monitoring, desalination systems, water supply recommendations, and surface water storage, among others.
- **San Juan County Health and Community Services** is the lead agency for water resource planning in San Juan County and works in partnership with the WRMC and its subcommittees.
- The San Juan Islands Conservation District has developed a **drought conservation plan** in collaboration with San Juan County’s Water Resource Management Committee and the Islands Climate Resilience (ICR) Water Resiliency Work Group. This plan provides an overview of water management within the county, resource conditions and concerns, and conservation, mitigation, and adaptation strategies to address seasonal drought. Funding for the initial draft of the plan was provided by the Washington State Conservation Commission and the Natural Resources Conservation Service, and planning coincided with the ICR Water Resiliency Work Group process.
- Some places in the islands have **tiered water rate structures** that charge more for incrementally greater water use in order to encourage conservation. Eastsound has some of the highest surplus water rates in the state and among the County’s lowest per person water use, due in part to implementing a tiered water rate system.¹⁰ Friday Harbor also has tiered charges for single family residential water users.¹¹ In the summertime, Friday Harbor promotes conservation

10 Presentation at the 2016 Eastsound Water Annual Meeting, <https://eastsoundwater.org/wp-content/uploads/2016/11/2016-Annual-Meeting-Facilities-Report.pdf>. EWUA tiered rate structure, <https://eastsoundwater.org/wp-content/uploads/2016/08/2016-ewua-RATES.pdf>.

11 Single family residential water users are charged \$7.20 per 1,000 gallons for the first 3,500 gallons per month; \$9.00 per 1,000 gallons for the next 3,500 gallons, \$11.95 per 1,000 gallons for the next 3,500 gallons, and \$14.35 per 1,000 gallons for anything above 10,500 gallons in a month (on top of the base charge) (Friday Harbor Municipal Code Chapter 13.05). The fourth tier was added in 1999, and the revenue from this tier helps fund the local water conservation program (Friday Harbor Water System Plan Update, June 2013).



with a surcharge for multi-family residences and commercial water users.¹² In particularly dry years, if the town council passes a resolution determining that a moderate, severe, or critical drought is occurring, rates are increased further for water used beyond a certain threshold, and those users are notified by letter of their excessive use.¹³

The County's GIS department has assisted with multiple **water resource studies**, such as mapping water rights and water system boundaries. The department has also helped to map precipitation runoff to better track stream flow.

The County has installed **groundwater monitoring networks** on Lopez and in Eastsound, the two most sensitive groundwater aquifers in the county.

- The SJICD offers a variety of **resources to assist landowners to offset costs to implement Best Management Practices** for water conservation and drought mitigation.¹⁴
- **Federal agencies** (e.g., the U.S. Department of Agriculture) and **state agencies** (e.g., the Washington State Department of Agriculture, the Department of Natural Resources, the Department of Ecology, and the Office of the Washington State Climatologist) provide assistance programs, climate data, seasonal forecasts, and information to help communities cope with drought.
- There are **financial assistance programs for agricultural producers** that want to implement conservation practices; these include the Agricultural Management Assistance Program, the Environmental Quality Incentives Program, and the Conservation Stewardship Program, among others.

Adaptation Measures

A Water Resiliency Work Group was organized following an ICR-sponsored panel of local water resource experts discussing The Future of Water Resources in the San Juan Islands. Following the presentation to the community, ICR extended an invitation to interested community members and water resource experts to participate in a work group to develop a water resiliency plan as part of a larger San Juan Islands Community Climate Resiliency Action Plan. Information about the resulting work group membership, structure, and goals can be found in Appendix 1.

The ICR Water Resiliency Work Group met throughout 2016 to discuss needs and adaptation measures. The following measures were identified by the work group and are presented here in unranked order.

Wells

- **Meter all new wells and encourage voluntary metering of old wells.** San Juan County Code requires meters on all new sources. Ideally, all water sources would be metered, and the metering data would be collected and available for research. New technologies are making this cost-effective and less intrusive. All meters should be read and data recorded on a regular basis. In addition to providing information that can inform responses to climate change, water metering data is necessary for protecting individual water sources from potential impairment.

¹² In 1996, the rate structure was updated so that multi-family residences and commercial water users can be subject to rate increases during 'summer,' defined as June through September. In 2000, for example, that meant an increase from \$3.80 to \$4.75 per 1,000 gallons. (Friday Harbor Water System Plan Update, June 2013)

¹³ Friday Harbor Municipal Code, 13.05.060 Drought water rates.

¹⁴ San Juan County Drought Plan.



- **Implement smart water metering in priority areas.** San Juan County could implement an “incentivized” smart metering system for private well owners and Group B systems. New technology is available to allow a property owner to monitor the water use from their well online and receive leak detection alerts electronically. Smart meters can also report water use to a central database.
- **Encourage all well owners to do depth-to-water measurements of their wells at least twice yearly.** The County might consider this as a fee-for-service, benefiting by acquiring the data in the process. Depth-to-water measurement is particularly important for shoreline wells.

Water systems

- **Design water system rates to further encourage conservation.** Tiered water rate structures that charge more for incrementally greater water use have been proven to decrease water use by the highest users. Water systems in the county can continue to update their rates to incentivize more water conservation.
- **Require that water systems be operated by certified water system operators.** Currently San Juan County requires new water systems to hire a certified “water system operator or water system management agency” as part of the permitting/approval process. Unfortunately, there is no requirement that the water system continue to employ an operator or manager after it is approved, or to continue to properly manage the water system after it is approved. The majority of County-regulated water systems are not run by certified operators. Certified operators—or County-trained neighborhood operators—would improve water system efficiency, water system reporting and compliance, and public health.

Efficient use

- **Educate homeowners and gardeners on efficient outdoor water use.** Water systems, the Conservation District, and other public agencies could develop and distribute educational materials on efficient outdoor water use. Trainings could also help homeowners be more judicious water users.
- **Work with agricultural producers, Master Gardeners/landscapers, and the Agriculture Guild to promote the efficient use of water.** Encourage drip irrigation, mulching, native plants, xeriscaping, and other low-intensity water use practices for landscaping and gardens. On farms, improve rates of water infiltration into soil by planting high residue crops (e.g., corn, small grains, cover crops), using reduced tillage methods, and applying animal manure. Ensure that irrigation pipes do not have leaks, and optimize the timing and amount of irrigation water based on crop needs.
- **Promote indoor water conservation practices at residences, businesses, and public buildings.** These include installing low-flow toilets and showerheads, fixing leaky faucets, and washing full loads of laundry.
- **Conduct a visitor campaign.** Educate summer visitors and residents about the challenges facing the Islands’ water resources, and the actions they can take to help.
- **Encourage on-site greywater reuse.** Greywater, the water from tubs, sinks, and washing machines, can be used to water trees and gardens, saving potable water for drinking and cooking. Greywater reuse is regulated in Washington State. In San Juan County, which uses the regulations adopted in 2007, fruit trees



or bushes may be irrigated by a septic drain field. Laundry water can be used for garden irrigation, but a tank, filter, and permit from the local health officer are required. More recent greywater regulations have been adopted in Washington State, but they have not yet been adopted in San Juan County.

Encourage Washington State to draft ways to permit and ensure the safe operation of Reclaimed Water Reuse systems. Our Urban Growth Areas each have well-run sewer systems, which effectively treat and then discharge almost 250,000 gallons of water per day into the Sound. The technology exists for a water treatment plant to take the discharge of our sewer systems, remove all contaminants, including pharmaceutical residuals, and reintroduce the water back into our aquifers or the potable water distribution system. Reclaimed water reuse is being successfully done around the world, with much lower energy demands than desalination. Washington State’s Department of Health has not yet developed the regulations to permit and monitor such a system.

Incentivize water use efficiency by publishing relevant data and developing standards for Group B systems. Many systems waste water. The state’s Water Use Efficiency Rule applies only to larger Group A water systems managed by the state. San Juan County should explore developing “water use efficiency standards” for the 250 Group B (3-14 connections) that it regulates. We can also incentivize testing for and repairing leaks in individual residential water systems.

Encourage an examination by the Washington State Department of Health of rules that currently allow—or lead to—wasteful water practices in the restaurant and hospitality industries (including homeowners doing Airbnb and vacation rentals). Advocate for regulatory changes that push these industries to be more water efficient.

Ecosystems

- **Protecting and restoring freshwater habitats.** We need to increase protection and restoration efforts.

Research and monitoring

- **Provide funding to maintain and expand the County’s groundwater monitoring capacity.** The groundwater monitoring networks on Lopez and in Eastsound require continued attention to remain functional. The data from these networks also requires regular analysis to detect trends and provide early warning signs of over-withdrawal or changing conditions. Meanwhile, there are no data loggers recording groundwater levels on San Juan Island.
- **Increase the capacity of the existing County GIS department.** GIS (Geospatial Information Systems) is a vital data management tool, and the County’s GIS department has done multiple water resource studies. Maintaining and strengthening the capacity of this department is important to the County’s ability to identify and monitor water resource challenges.
- **Conduct additional research on local sea level rise projections.** Sea level rise presents a significant threat to our groundwater resources. In the Puget Sound area, rising seas may be partially moderated by our rising land mass.



Collect additional data on agricultural water use. There are very limited data on how much water the agricultural producers in the Islands use, but it could be an important part of the water resource protection puzzle.¹⁵ The County Council could task the Agriculture Resource Committee to undertake a more extensive study of water use associated with our local agricultural industry. Key questions could include: 1) Where, when and how is water a limiting factor for agricultural production in the islands? 2) What does the future of agricultural production look like in the islands? 3) Will water shortages change the crops that can be grown in the islands?

Conduct surveys or studies to better understand current water usage patterns and amounts for landscaping and home gardens in the Islands.

¹⁵ The 2012 USDA Census of Agriculture reported that San Juan County had 343 acres of irrigated land, a decrease from 393 acres in 2007.

APPENDICES

1. ICR Water Resiliency Work Group Structure and Membership
2. Additional information about the San Juan County Water Resource Management Committee
3. Additional Resources and Reports
4. “The Future of Water Resources in the San Juan Islands” Community Panel Agenda



Appendix 1. ICR Water Resiliency Work Group

Water Resiliency Work Group Tasks:

- Summarize anticipated challenges/impacts to local water resources under a changing climate;
- Identify existing programs, projects, and plans (County, State, NGOs, etc.) that help address specific impacts;
- Identify gaps in knowledge and programs; complete SWOT (strengths, weaknesses, opportunities and threats) analysis;
- Brainstorm strategies, and develop a short list of Adaptation Measures;
- Share findings and with key stakeholders for feedback and complete draft Water Resiliency Plan chapter.

Water Resiliency Work Group Structure:

The Islands Climate Resilience group served as the umbrella organizing the overall process and work group. Other key actors included:

- Lead Organization: San Juan County Water Resource Management Committee;
- Supporting Organizations: San Juan Islands Conservation District, San Juan County Health & Environment, Cascadia Consulting, Seattle, WA;
- Other Support: Islands residents who have attended recent ICR events and signed up to volunteer assistance;

Work Group members and roles:

- San Juan County Water Resource Management Committee representatives: Vicki Heater (Waldron), Paul Kamin (Orcas), Kyle Loring (SJI)
- San Juan County Public Health & Environment: Kyle Dodd (SJI)
- San Juan Islands Conservation District representative: Linda Lyshall (SJI, ICR)
- Work group advisor, co-facilitator: Nora Ferm Nickum (Cascadia Consulting Group, Seattle)
- ICR liaison/ Meeting coordinator: Kari Koski (SJI)
- Chair: Jennifer Thomas (SJI)
- Co-chair: Loren Johnson (SJI)
- Meeting notes: Carol Kibble (SJI)
- Information, resources & background gathering: Steve Ulvi (SJI), Jana Marks (SJI), Patti Garcia (SJI), Alison Longley (SJI), Tom Munsey (Orcas)
- Other Meeting Attendees: Lovel Pratt (ICR, SJI), Jane Wentworth (ICR, SJI), Doug McCutchen (ICR, SJI), Ethan Schmidt (SJI)

Appendix 2: Additional Information about the San Juan County Water Resource Management Committee

Goals:

1. Retain enough water in streams and wetlands to protect water quality and support diverse, healthy, and abundant plant and wildlife communities.
2. Integrate water supply planning with growth management planning and determine the availability of water supplies in approved growth areas.
3. Establish a county resource management program that addresses all water use, including exempt wells and alternative sources, and includes decision-making based on long-term development and analysis of resource information.

<http://www.sanjuanco.com/439/Water-Resource-Management>

Available on-line:

- San Juan County Water Resource Management Committee reports and studies, 1997-2015 Funding by Washington State Department of Ecology
- San Juan County Watershed Management Action Plan and Characterization Report, 2000
- Lopez Village Water Supply Report, 2003
- San Juan County Water Resource Management Plan, 2004
- East Orcas Water Supply Report, 2006
- Eastsound Water Supply Report, 2008



Appendix 3. Additional Reports and Resources

Note: Most of these are available on the WRMC website.

San Juan County Drought Plan, <https://static1.squarespace.com/static/57732786f5e231100a586a29/t/57b73432414fb51e1ec906>

Is Seawater Intrusion Affecting Groundwater on Lopez Island, Washington? USGS, 1998

Estimates of Groundwater Recharge, USGS WRIR 02-4114

San Juan County Final Monitoring Report, Huxley College, 1999

San Juan County Technical Assessment, Pacific Groundwater Group, 2002

Lopez Village Model Report, Pacific Groundwater Group, 2003

San Juan County Stream Gauge Report, DTA, 2003

Multi-purpose Surface Water Storage Assessment, Montgomery Water Group, 2004

Interim Aquifer Protection Report, Eastsound, Pacific Groundwater Group, 2008

San Juan County Groundwater Monitoring Report, Pacific Groundwater Group, 2008

San Juan County Groundwater Monitoring Report, Pacific Groundwater Group, 2009

San Juan County Groundwater Monitoring Report, Pacific Groundwater Group, 2011

San Juan County Groundwater Monitoring Report, Pacific Groundwater Group, 2012-20013

San Juan County Groundwater Monitoring Report, Pacific Groundwater Group, 2015

Status of Desalination in San Juan County, Mayo, 2009

San Juan County Groundwater Sub-Basins and Water Level Contours, Pacific Groundwater Group, 2010

WRIA 2 Basin Report (municipal water rights by groundwater basin), HCS, 2013

East Orcas Water Budget Study, RH2, 2015

Groundwater quality results 2015, HCS

Other reports and databases:

Eastsound Nitrate Study, Chazen, 2010

Well Monitoring Report (Lopez Village), Richey, 2003

Final False Bay Flow and Habitat Assessment, Washington Water Trust, 2012

AnnualReports&WorkPlans-2007-2015

HydroDB, Doug Kelly (well log database), Located in N:\Environmental Hea\Drinking Water\Welldata\HydroDB\SJC-HydroData.mdb

San Juan County Water Level DB (for analyzing datalogger results), PGG, Located in N:\Environmental Hea\WRIA\Monitoring\MonitoringDatabasefromPGG\San_Juan_WL_AC2003_V2.03.zip

San Juan County Code 8.06, revisions 1999-2015

San Juan County Water Systems, Polaris mapping application, 2015

Washington State resources:

EPA Water Sense Program: Saving Water in Washington, https://www3.epa.gov/watersense/docs/washington_state_fact_sheet.pdf

USGS Washington Water Science Center, https://wa.water.usgs.gov/water_issues/watercensus.htm

Washington State Department of Ecology Water Resources, <http://www.ecy.wa.gov/programs/wr/wrhome.html>

Washington State Department of Ecology: Climate Change Effects on Water Resources, <http://www.ecy.wa.gov/climatechange/2012ccrs/water.htm>



Appendix 4. "The Future of Water Resources in the San Juan Islands" Community Panel Agenda

Monday, November 16, 2015, 6:00 PM – 8:30 PM

Purpose and Goals

ICR- Increasing understanding of water resources and needs in the county

What is Currently Known about Water Resources in the San Juan Islands?

Vicki Heater, SJC Water Resource Management Committee Member What are Current Water

Usage and Conservation Efforts?

Paul Kamin, SJC Water Resource Management Committee Member

What are Our Habitat Needs?

Kimbal Sundberg, SJC Water Resource Management Committee Member

What are Our Agricultural Needs?

Tom Schultz, Former WSU Extension Director

What are the Current Water Use and Systems Regulations?

Grey Water Systems: Kyle Dodd, WRMC Member

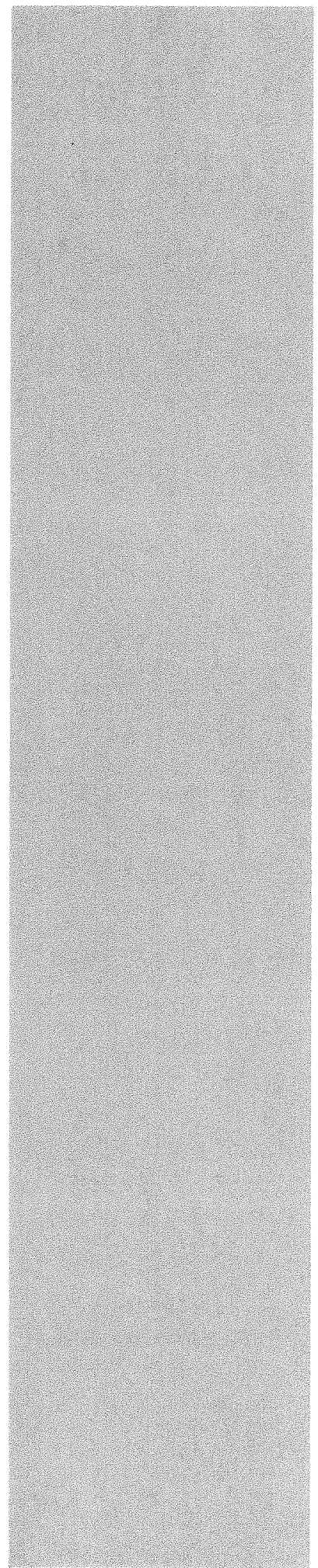
Reclaimed Water & Catchment Systems: Peter Kilpatrick

Desalination Systems: Paul Kamin, WRMC Member

Water Panel Community Discussion

All Water Panel Q&A

Evaluation and Interest Survey



DETAILED Oct. 20 2017 TRANSMITTAL TO COUNTY TREASURER
 SAN JUAN COUNTY, WASHINGTON

FUND NAME	REVENUE SOURCE CODE	REVENUE SOURCE NAME	AMOUNT REMITTED
0001.40	322.90.00.0003	San Juan fire 3 FM burn permits for SJC Fire Marshal's Office permits 3246 - 3262 17 permits 2 \$250 permits \$300 ⁰⁰ 15 \$20 permits \$300 ⁰⁰ \$ 800 ⁰⁰	\$ 800 ⁰⁰
TRANSMITTING AGENCY		TOTAL DEPOSIT	\$ 800 ⁰⁰
DEPT: <u>San Juan County Fire Dist. #3</u>		MISCELLANEOUS RECEIPT #: <u>3246 - 3262</u>	
BY: <u>C. Hudson</u>			



Islanders helping Islanders
since 1981.

RECEIPT Drawer: 50104 10/20/17
 Trans#: 113 15:29:37
 *****2272 Checking Deposit
\$ 800.00

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 FREE Cyber Security Seminars!

Deposits may not be available for immediate withdrawal.



SAN JUAN COUNTY DEPARTMENT OF COMMUNITY DEVELOPMENT

135 Rhone Street, PO Box 947, Friday Harbor, WA 98250
(360) 378-2354 | (360) 378-2116 | Fax (360) 378-3922
dcd@sanjuanco.com | www.sanjuanco.com

0003249

SAN JUAN COUNTY FIRE MARSHAL

360-378-3473 (378-FIRE) sanjuanco.com/1088

PROPERTY INFORMATION (PLEASE PRINT LEGIBLY AND INCLUDE THE TAX PARCEL NUMBER IF NO ADDRESS IS AVAILABLE)

Land Owner Name Ed Rouleau Phone: 378-4317
Burn Location Address (if assigned): end of Three Corner Lake Rd.
Tax Parcel Number (if no address): Island:

APPLICANT INFORMATION

Permit Holder / Contact Name (if different than landowner) Phone:
Mailing Address:
E-mail:

CONDITIONS OF PERMIT:

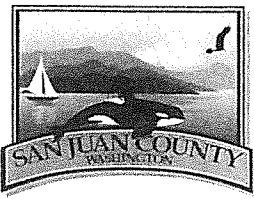
Residential Permit:
1. Burn piles may be no larger than 10 feet in diameter.
2. The area around the burn pile must be cleared to mineral earth (dirt, gravel or rock) for a minimum of 4 feet in every direction around the pile.
Commercial Permit:
1. Burn piles may be no larger than 16 feet in diameter.
2. The area around the burn pile must be cleared to mineral earth (dirt, gravel or rock) for a minimum of feet in every direction around the pile.
3. The following equipment with operator is required: Hoe

ADDITIONAL CONDITIONS REQUIRED FOR ALL PERMITS:

- 1. Valid permit must be on site at all times.
2. Only one pile may be burned at a time.
3. There must be a charged water hose and shovel at the site. If a water hose is not available, the following water requirements must be adhered to:
4. Fires must be at least 50 feet from any structure.
5. There must be a responsible adult in attendance at all times while burning. The fire must be completely extinguished before leaving it unattended.
6. Do not burn if wind is blowing more than 10 miles per hour.
7. When the fire danger is LOW, fires are allowed at all times of the day
8. When the fire danger is MODERATE, fires are allowed from 6 am to noon only. All fires must be completely out by noon.
9. No fires are allowed when the fire danger is HIGH or EXTREME, or when there is a declared BURN BAN.
10. Only natural vegetation may be burned. Do not burn paper, painted or treated lumber, rubber products, plastics, asphalt, paint, garbage, petroleum products, dead animals, cardboard or any material that emits black smoke or an offensive odor.
11. The permittee accepts all responsibility for fire suppression costs incurred and any damage sustained by any person resulting from fires caused by the permittee. If the fire escapes, regardless of cause, the permittee shall be responsible for all costs for suppression as required by 52.12.RCW.
12. Laws and regulations regarding burning may change without notice at any time. All applicants must comply with all regulations in effect at the time. This listing is not a complete listing of all applicable laws and regulations.
13. Permit valid 10-1-17 to 5-31-18.

I AGREE TO COMPLY WITH ALL REQUIREMENTS STATED ABOVE TOGETHER WITH ALL APPLICABLE LAWS AND REGULATIONS IN EFFECT, INCLUDING 70.94 RCW THE WASHINGTON CLEAN AIR ACT.

Permit Holder Signature: Ed Rouleau Date: 10-19-17
Check #: Amount: \$ Cash: \$ 2000 Issued by: [Signature]



SAN JUAN COUNTY DEPARTMENT OF COMMUNITY DEVELOPMENT

135 Rhone Street, PO Box 947, Friday Harbor, WA 98250
(360) 378-2354 | (360) 378-2116 | Fax (360) 378-3922
dcd@sanjuanco.com | www.sanjuanco.com

0003250

SAN JUAN COUNTY FIRE MARSHAL

360-378-3473 (378-FIRE) sanjuanco.com/1088

PROPERTY INFORMATION (PLEASE PRINT LEGIBLY AND INCLUDE THE TAX PARCEL NUMBER IF NO ADDRESS IS AVAILABLE)

Land Owner Name: Corliss Phone:
Burn Location Address (if assigned): 534 Afterglow
Tax Parcel Number (if no address): Island: San Juan

APPLICANT INFORMATION

Permit Holder / Contact Name (if different than landowner): Thad Cochran Phone: 360-317-5268
Mailing Address: PO Box 1711 FH WA 98250
E-mail:

CONDITIONS OF PERMIT:

Residential Permit:
1. Burn piles may be no larger than 10 feet in diameter.
2. The area around the burn pile must be cleared to mineral earth (dirt, gravel or rock) for a minimum of 4 feet in every direction around the pile.
Commercial Permit:
1. Burn piles may be no larger than ___ feet in diameter.
2. The area around the burn pile must be cleared to mineral earth (dirt, gravel or rock) for a minimum of ___ feet in every direction around the pile.
3. The following equipment with operator is required:

ADDITIONAL CONDITIONS REQUIRED FOR ALL PERMITS:

- 1. Valid permit must be on site at all times.
2. Only one pile may be burned at a time.
3. There must be a charged water hose and shovel at the site. If a water hose is not available, the following water requirements must be adhered to:
4. Fires must be at least 50 feet from any structure.
5. There must be a responsible adult in attendance at all times while burning. The fire must be completely extinguished before leaving it unattended.
6. Do not burn if wind is blowing more than 10 miles per hour.
7. When the fire danger is LOW, fires are allowed at all times of the day
8. When the fire danger is MODERATE, fires are allowed from 6 am to noon only. All fires must be completely out by noon.
9. No fires are allowed when the fire danger is HIGH or EXTREME, or when there is a declared BURN BAN.
10. Only natural vegetation may be burned. Do not burn paper, painted or treated lumber, rubber products, plastics, asphalt, paint, garbage, petroleum products, dead animals, cardboard or any material that emits black smoke or an offensive odor.
11. The permittee accepts all responsibility for fire suppression costs incurred and any damage sustained by any person resulting from fires caused by the permittee. If the fire escapes, regardless of cause, the permittee shall be responsible for all costs for suppression as required by 52.12.RCW.
12. Laws and regulations regarding burning may change without notice at any time. All applicants must comply with all regulations in effect at the time. This listing is not a complete listing of all applicable laws and regulations.
13. Permit valid 10-1-17 to 5-31-18

I AGREE TO COMPLY WITH ALL REQUIREMENTS STATED ABOVE TOGETHER WITH ALL APPLICABLE LAWS AND REGULATIONS IN EFFECT, INCLUDING 70.94 RCW THE WASHINGTON CLEAN AIR ACT.

Permit Holder Signature: [Signature]

Date: 10-19-17

Check #: Amount: \$ Cash: \$ 2000

Issued by: [Signature]