

ISLANDS TRUST AREA GROUNDWATER SUSTAINABILITY SCIENCE PROGRAM

Galiano Island Community Information Meeting

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September 1, 2021



Islands Trust

to preserve and protect the trust area and its unique amenities and environment for the benefit of residents of the trust area and of the province generally,

in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the Government of British Columbia

Global Groundwater Sustainability: A Call to Action



Global Groundwater Statement

A global group of scientists, practitioners, and experts calling for action to ensure groundwater benefits society now and into the **future.**

GroundwaterStatement.ORG





**Put the spotlight on
global groundwater
sustainability**



**Manage and govern
groundwater sustainability
from local to global scales**



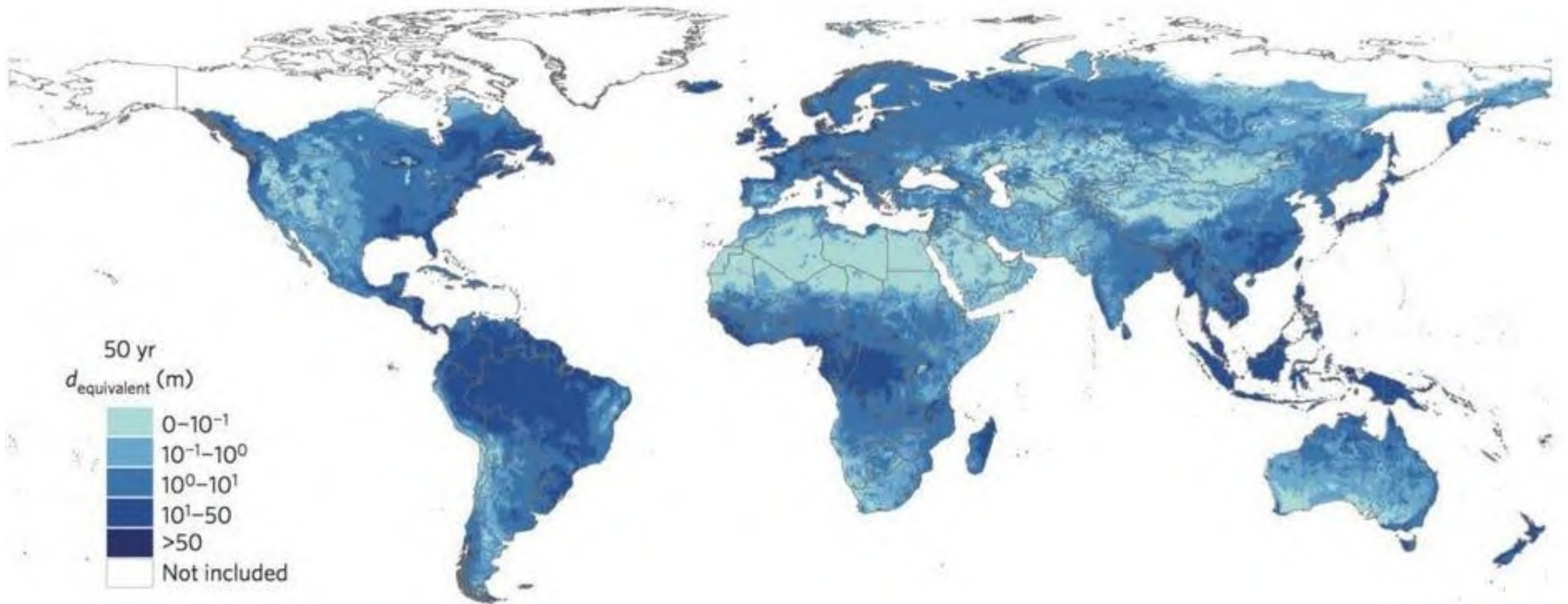
**Invest in groundwater
governance and
management**

GroundwaterStatement.ORG

www.groundwatervisible.org

MAKING GROUNDWATER VISIBLE

— A STORIES PHOTO BOOK —



Gleeson, T., Wada, Y., Bierkens, M. et al. ***Water balance of global aquifers revealed by groundwater footprint.*** Nature 488, 197–200 (2012). <https://doi.org/10.1038/nature11295>

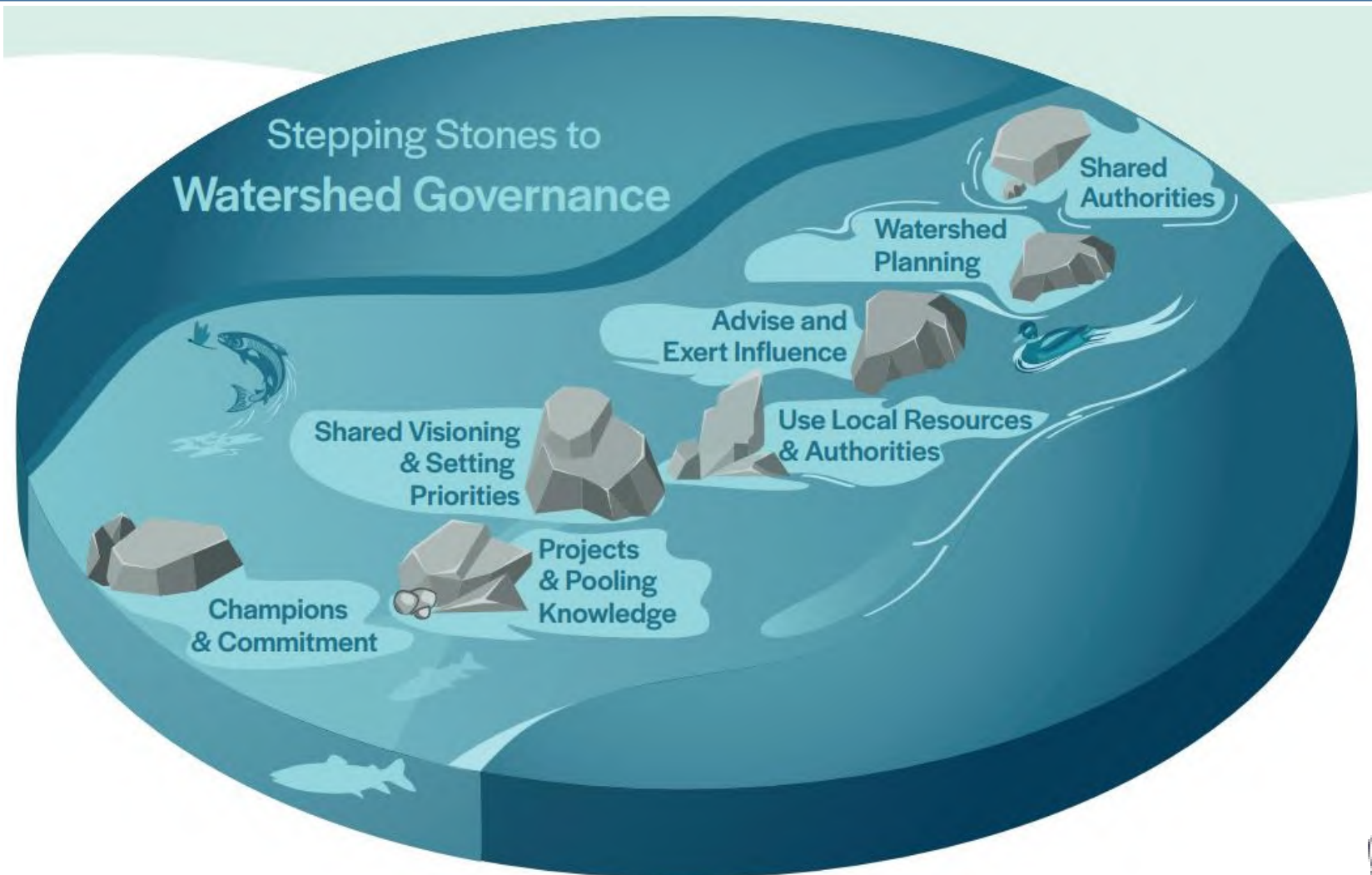


Establishing the *Groundwater Footprint* of the Islands Trust Area is a giant leap in evidence-based sustainability planning.

Historically, precautionary principles aided planning through a lack of knowledge of groundwater recharge, availability, and vulnerability.

However, with a changing climate and increasing societal stresses....

We cannot use the past to plan for the future.



Water Champions are freshwater stewards that hold governments accountable

POLIS

the root of word of "politics"
a term that represents a rootedness in place and community.

the highest of human ideals
the ability to make decisions collectively for the greater good



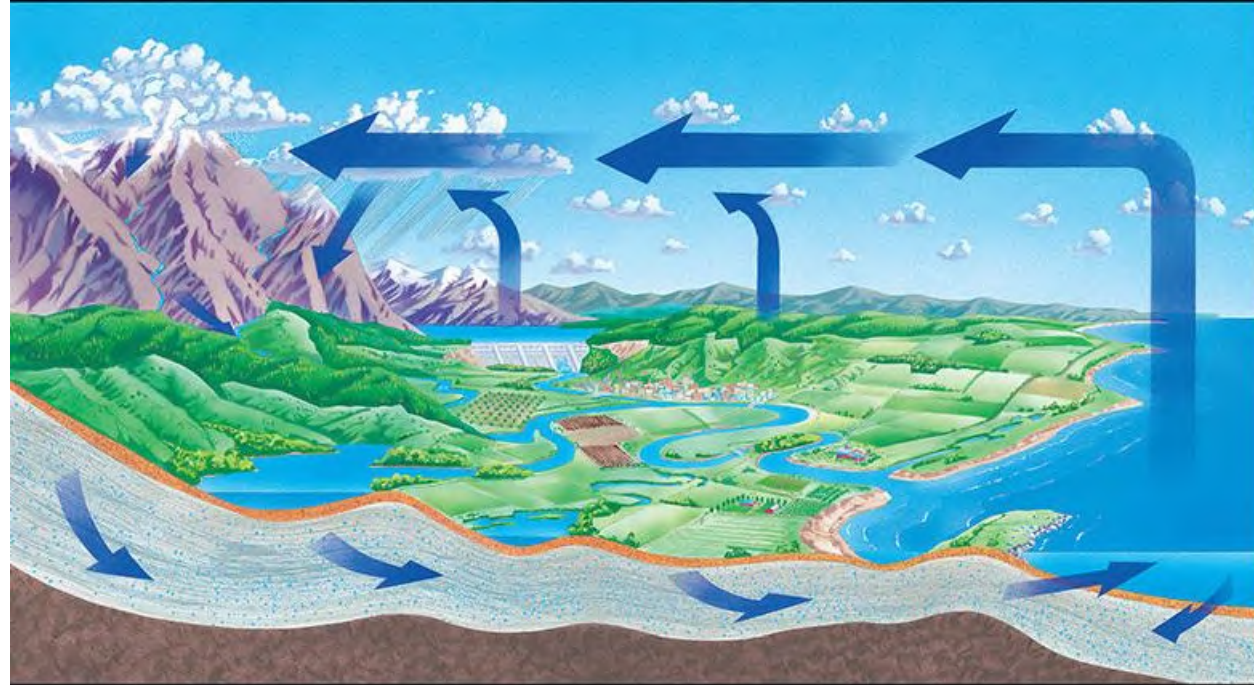
POLIS Project on Ecological Governance

watersustainabilityproject

POLIS (2019) *A Handbook for Water Champions: Strengthening Decision-Making and Collaboration for Healthy Watersheds*. www.poliswaterproject.org

Mapping is Art.

matthewgoodbandtheaudioofbeing



Understanding freshwater from community values and traditional knowledge through storytelling and lived experience supports quantitative science.

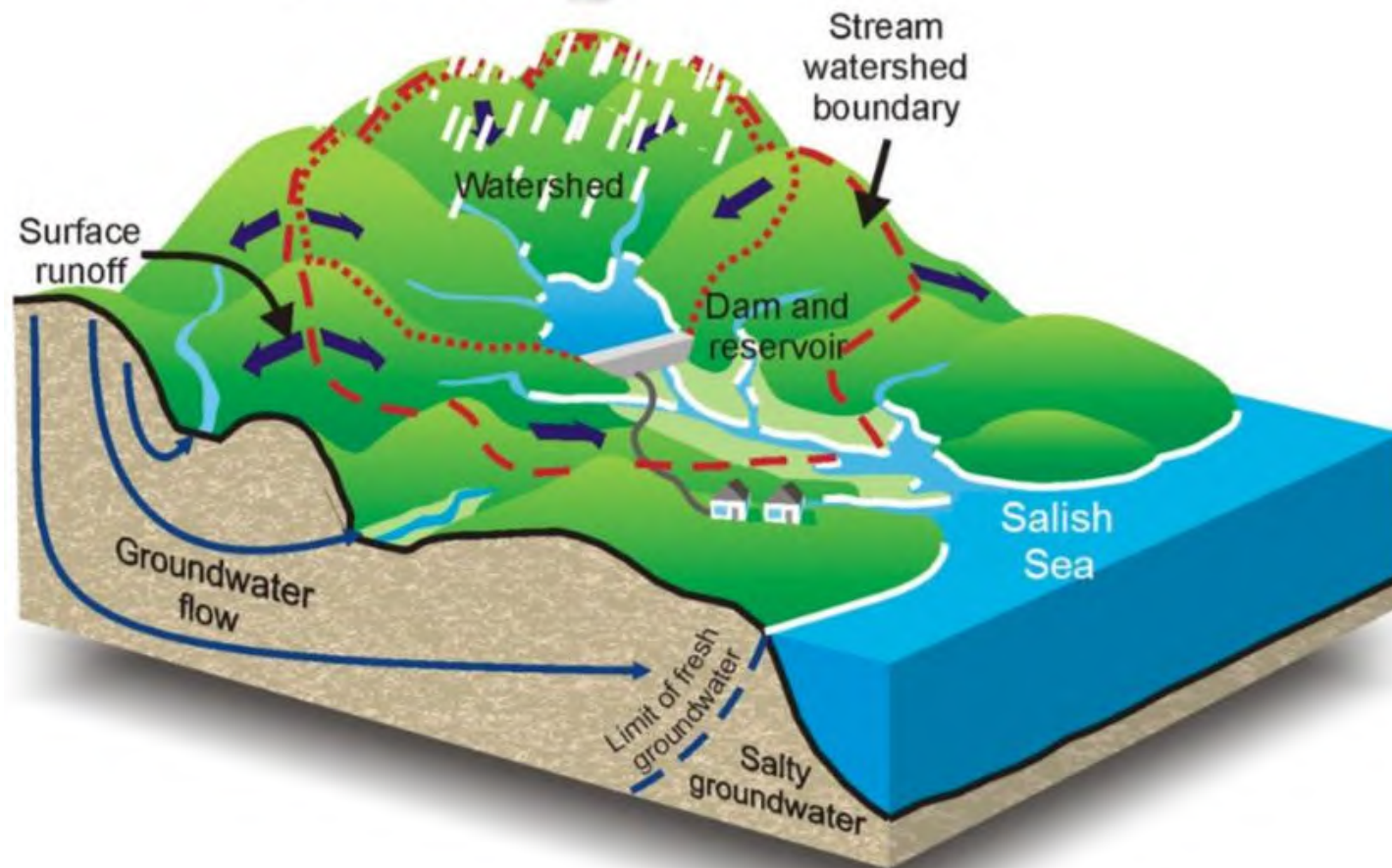
Exploring groundwater resources is at the nexus of science, technology, and art.

ISLANDS TRUST AREA AQUIFER CONCEPTUALIZATION PROJECT

Groundwater Sustainability Science Program



Groundwater is a unique amenity in the Islands Trust Area

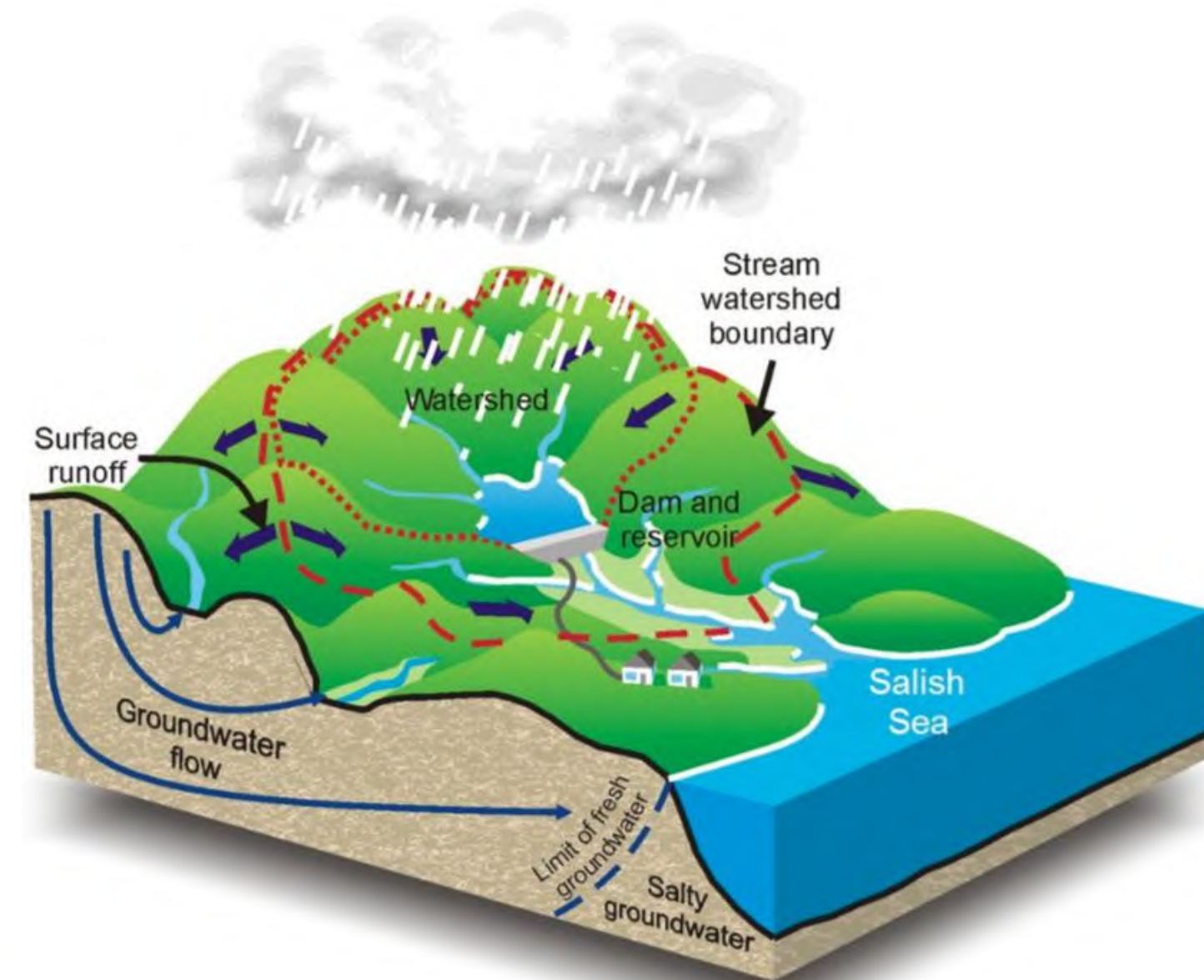


All groundwater comes from **meteoric** water.

Rain, snow, and fog provide all essential freshwater for island life.

What is an Aquifer?

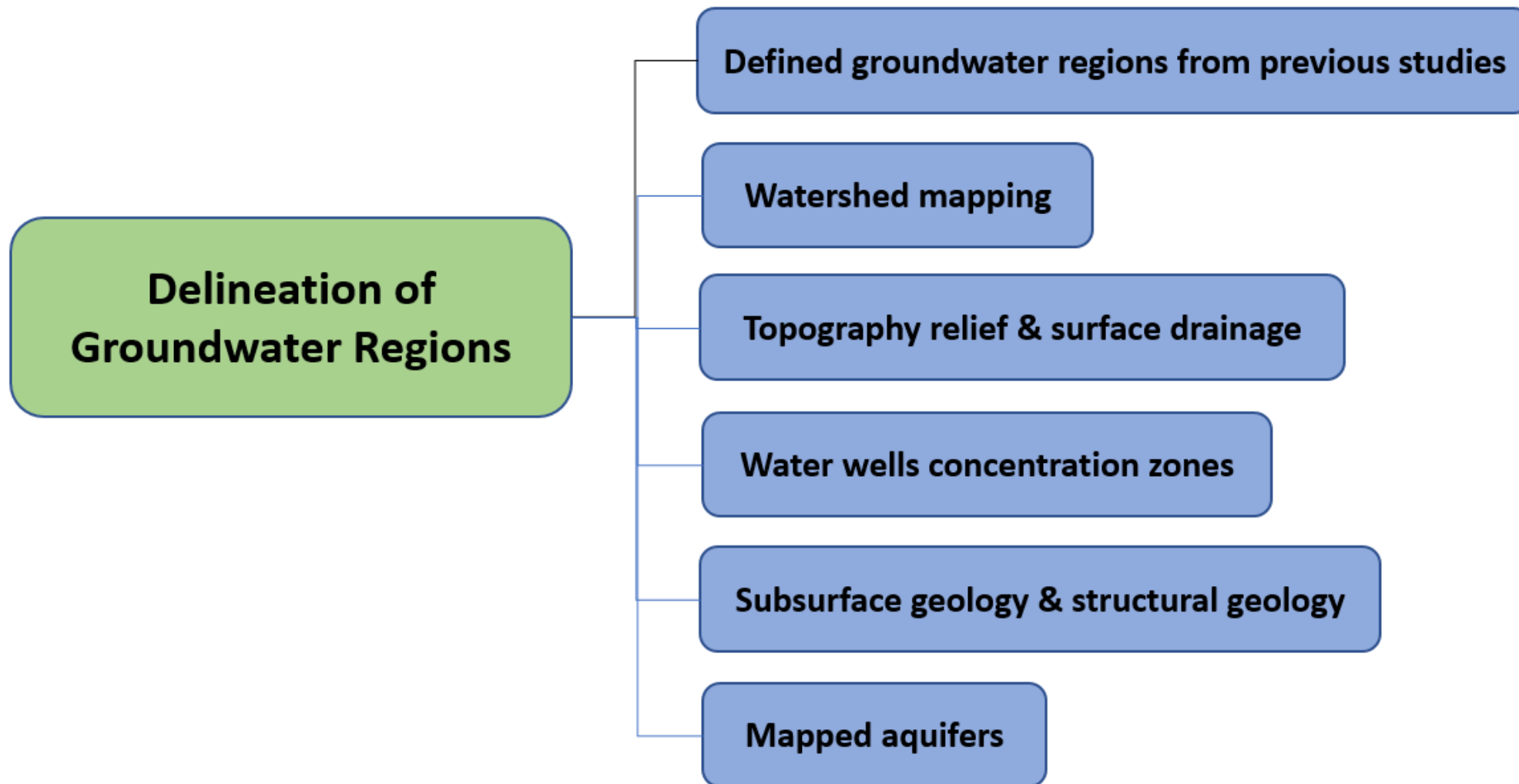
A subterranean geological unit that can store and transmit water in useful quantities for domestic, industrial, and ecological use.

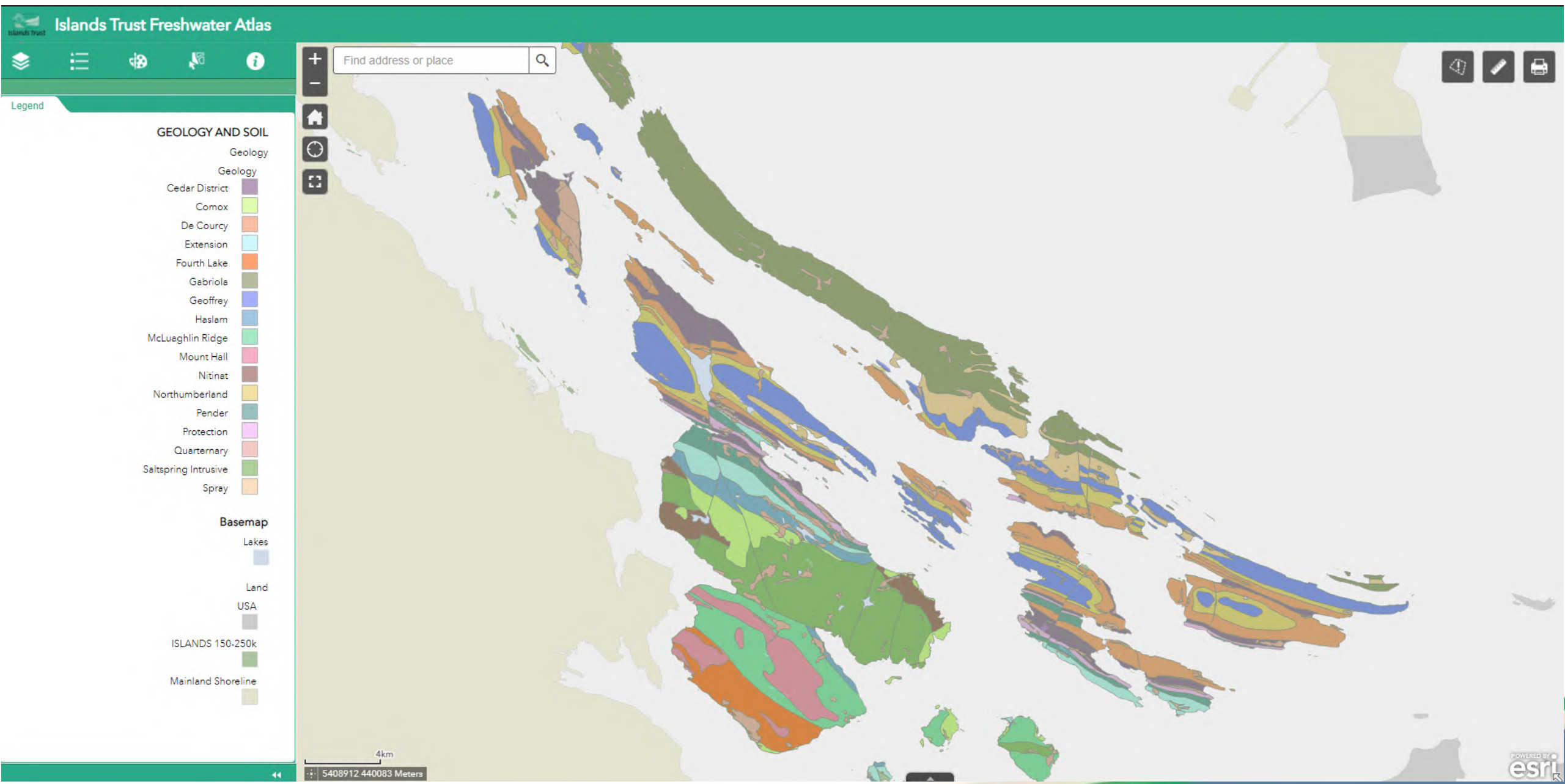






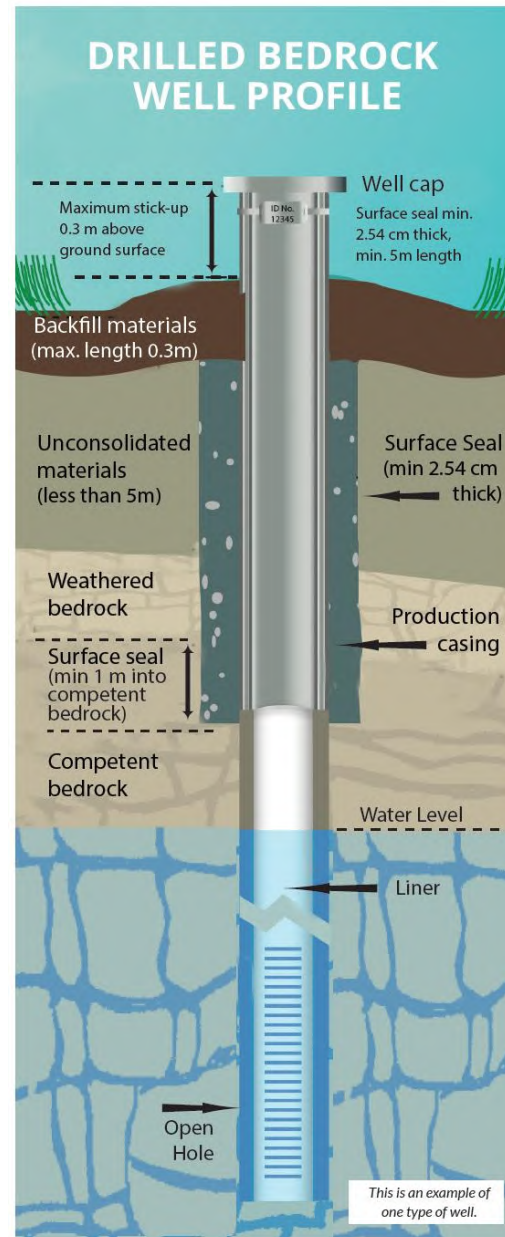
Groundwater regions are *Water Management Units* for land-use planning and water authorizations.





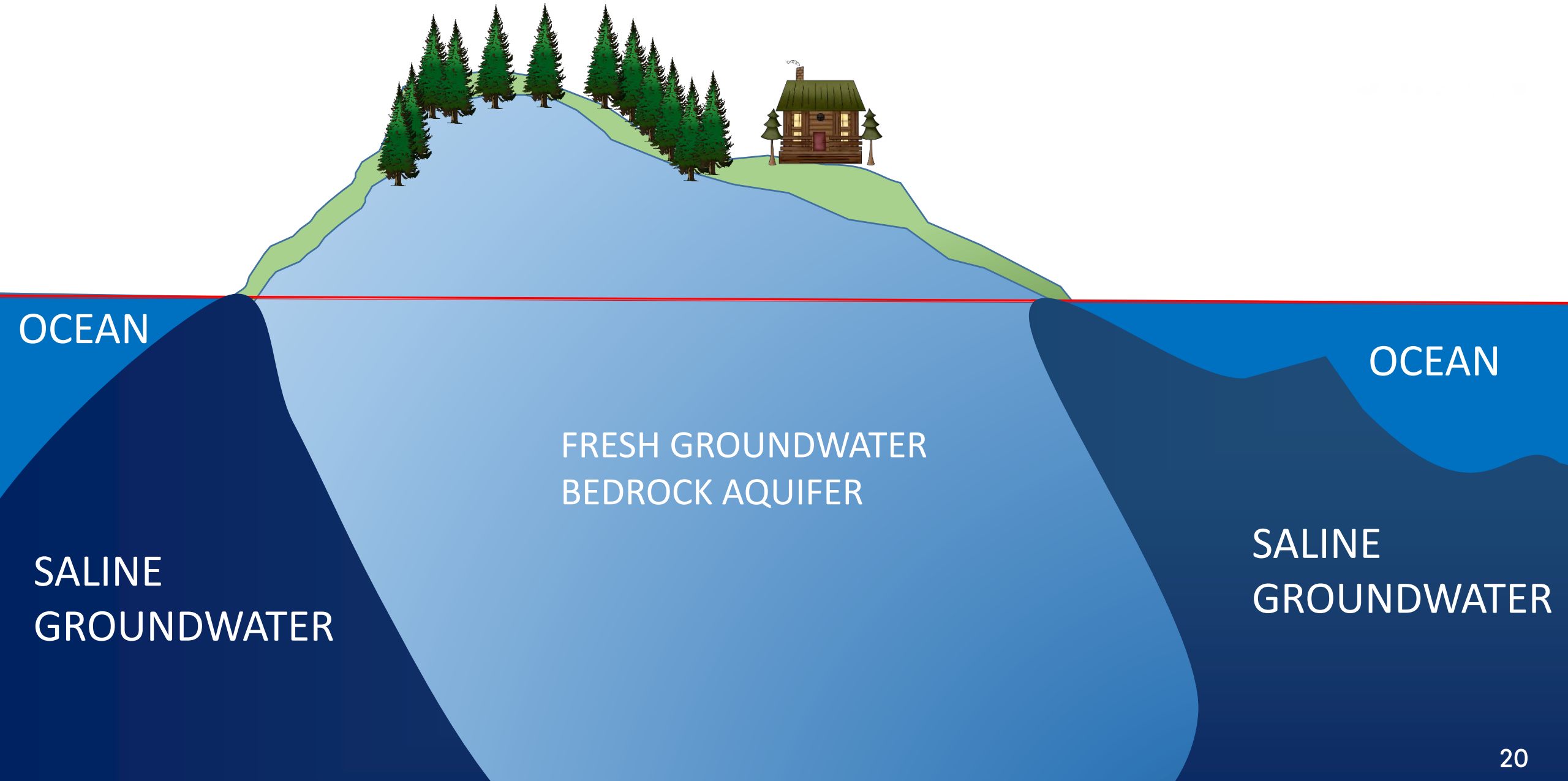


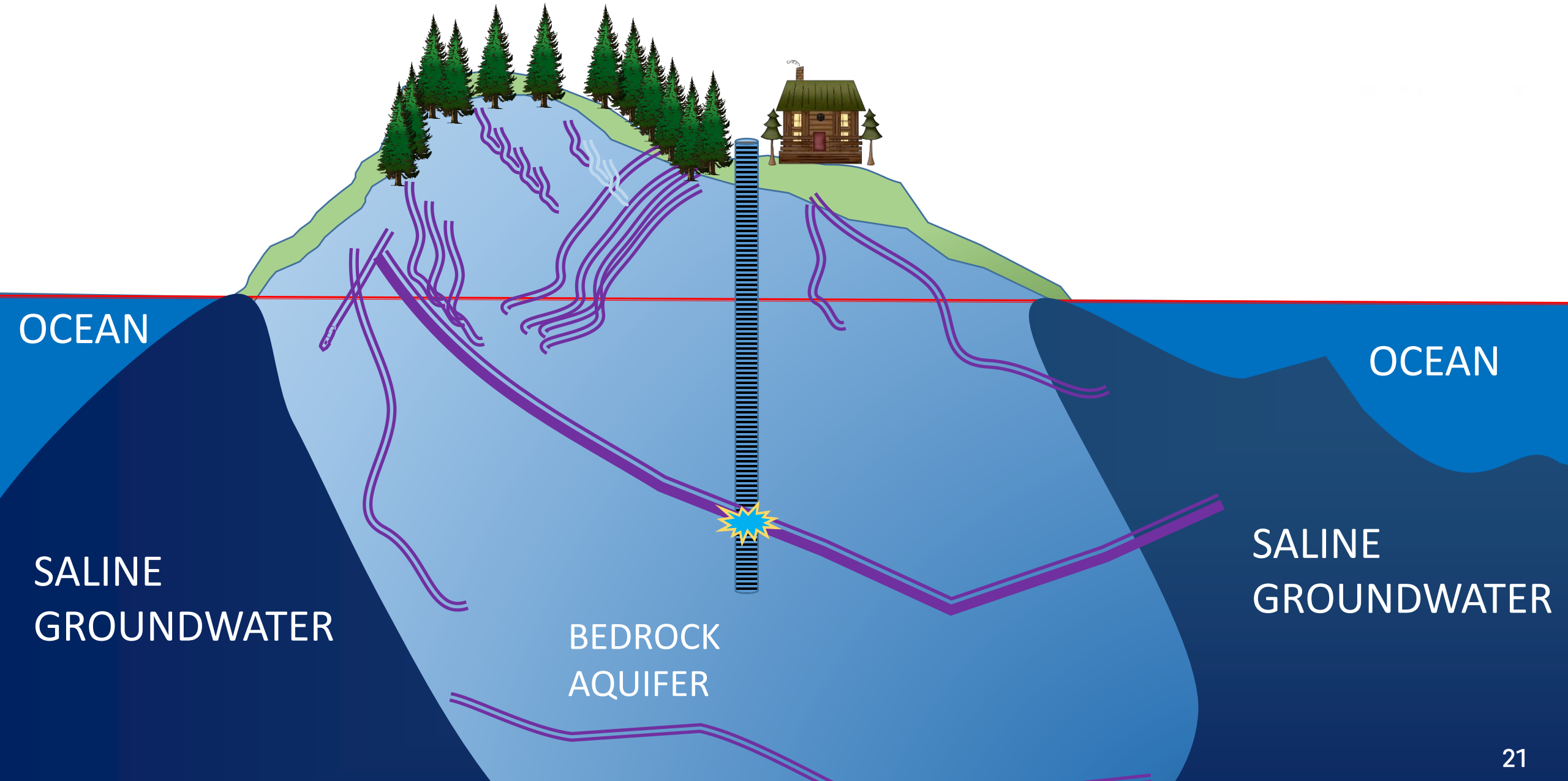
WELL LOCATION

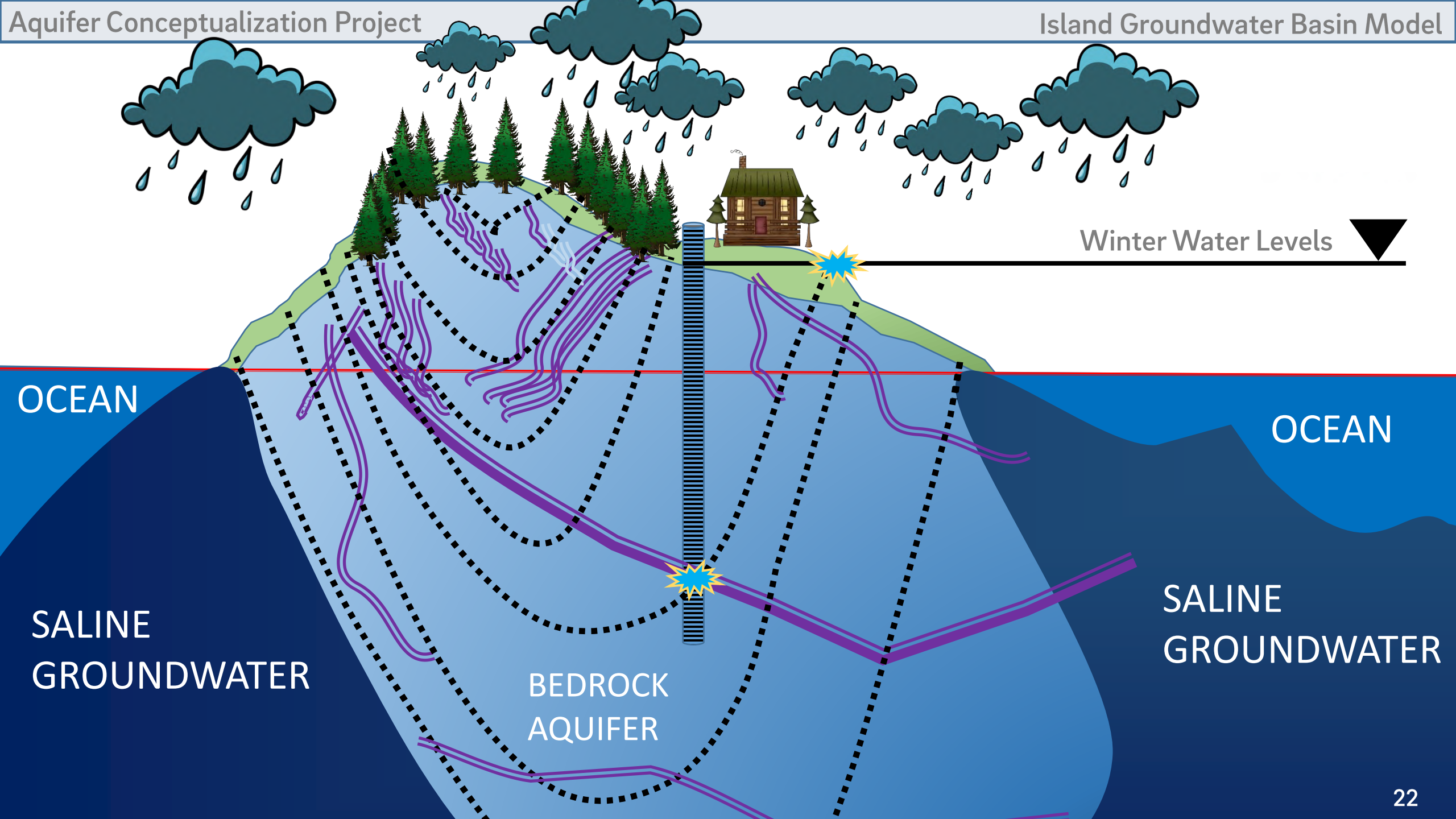


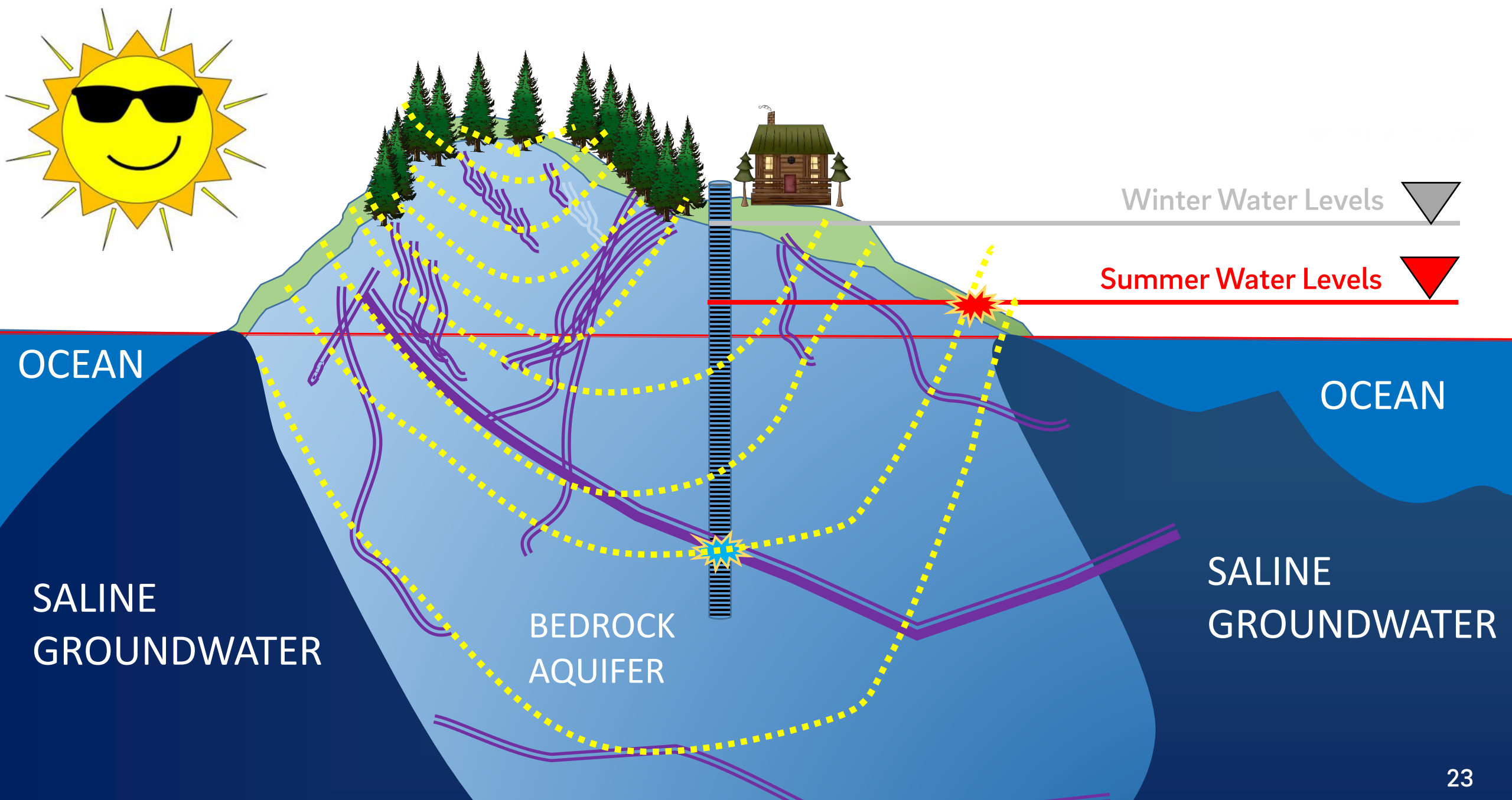
What is a well?

Provides homeowners, municipalities, industry, and farms access to water stored underground









Winter Water Levels ▼
Summer Water Levels ▼

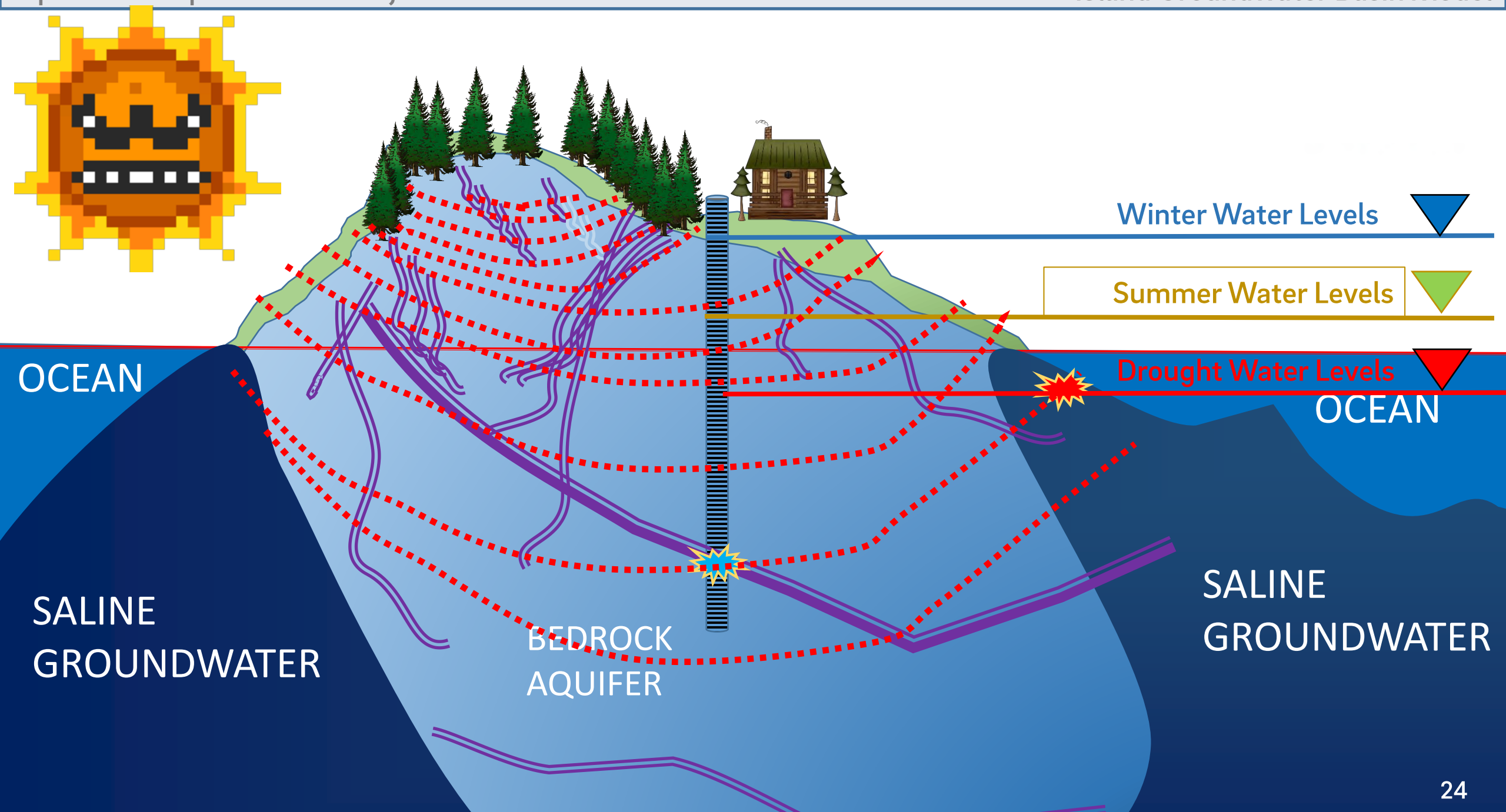
OCEAN

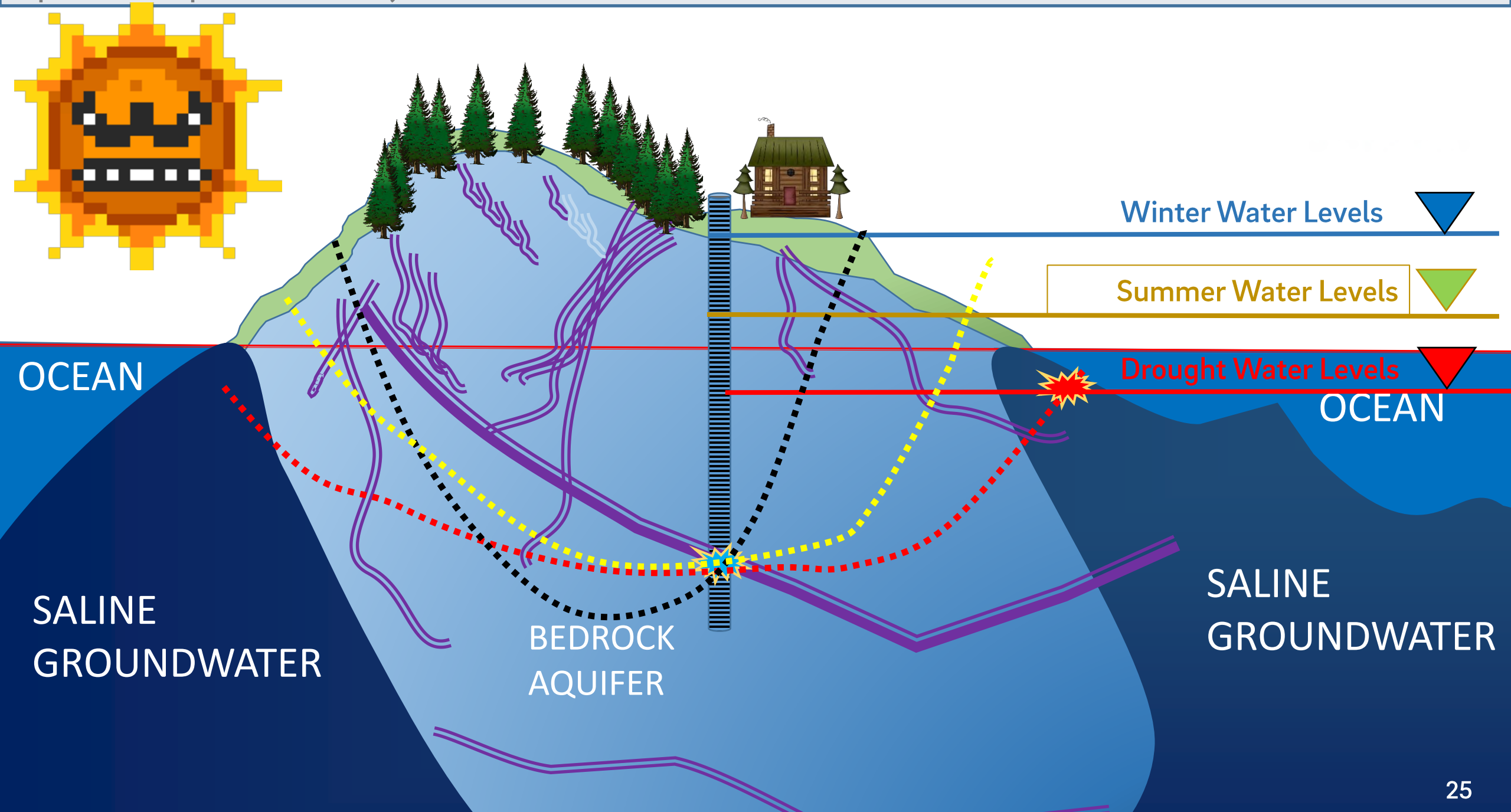
OCEAN

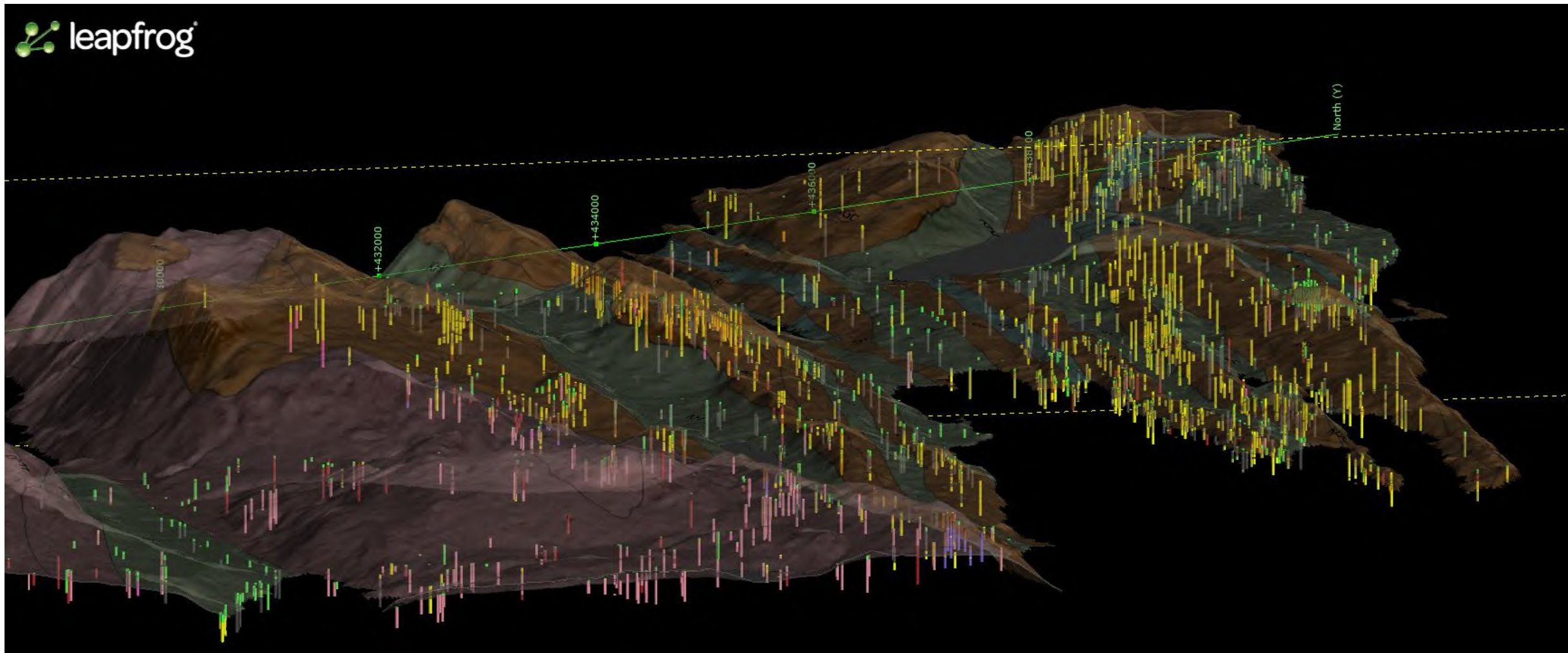
SALINE
GROUNDWATER

BEDROCK
AQUIFER

SALINE
GROUNDWATER







LeapFrog3D Model Demo

ISLANDS TRUST AREA GROUNDWATER RECHARGE MAPPING PROJECT

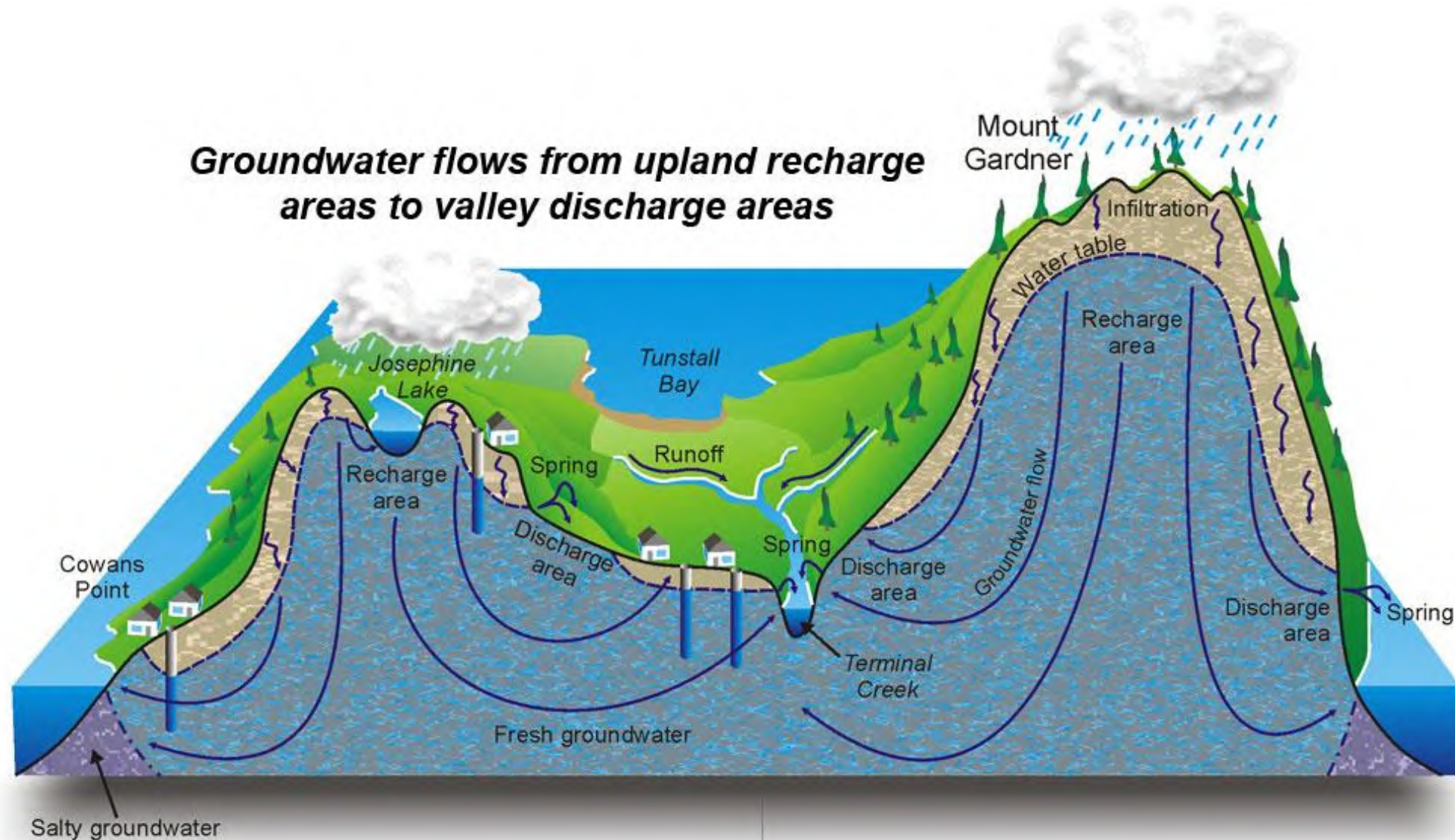
Groundwater Sustainability Science Program



GW SOLUTIONS
ASSESSMENT & PROTECTION OF GROUNDWATER

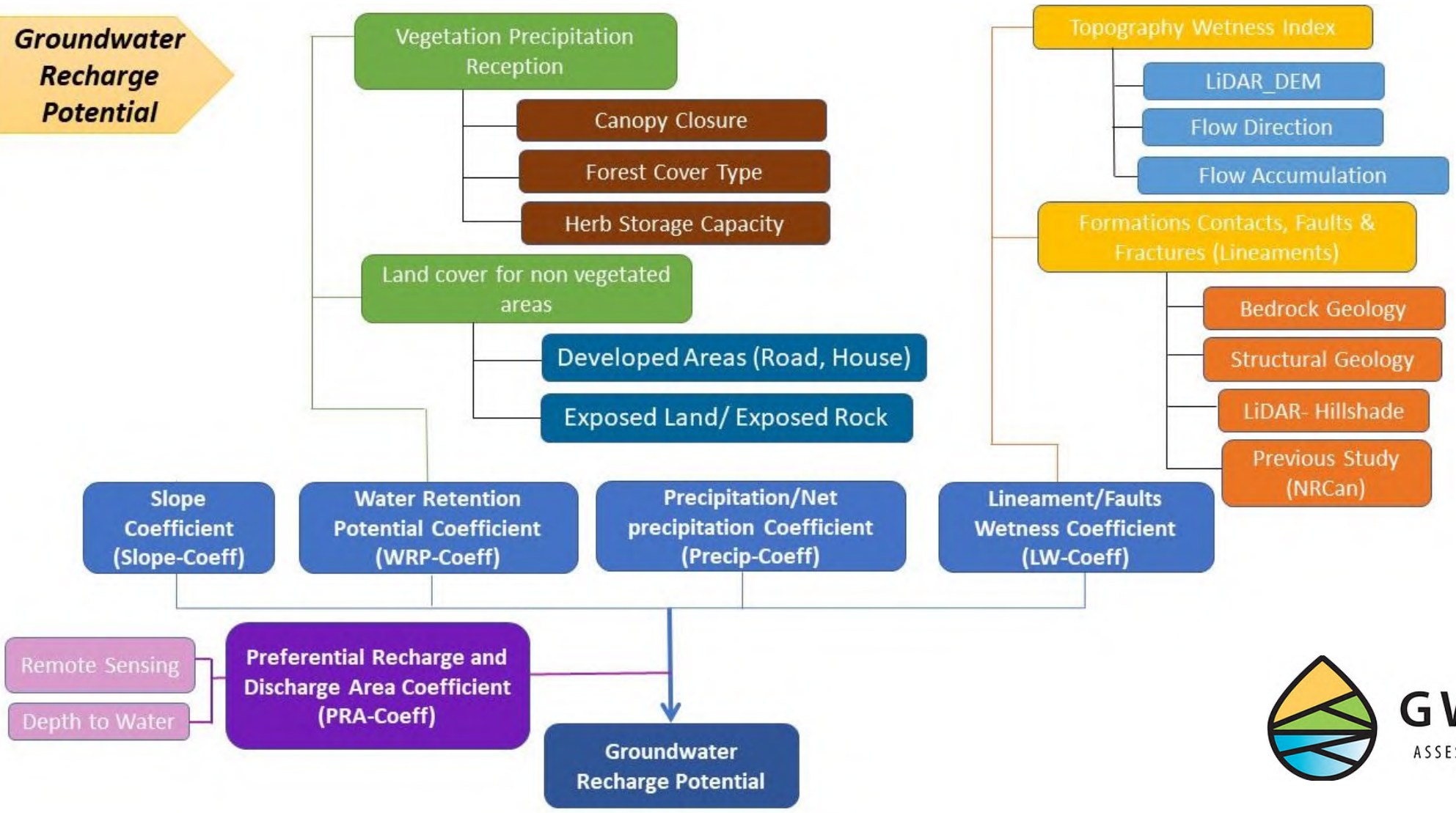


Islands Trust





Groundwater Recharge Potential



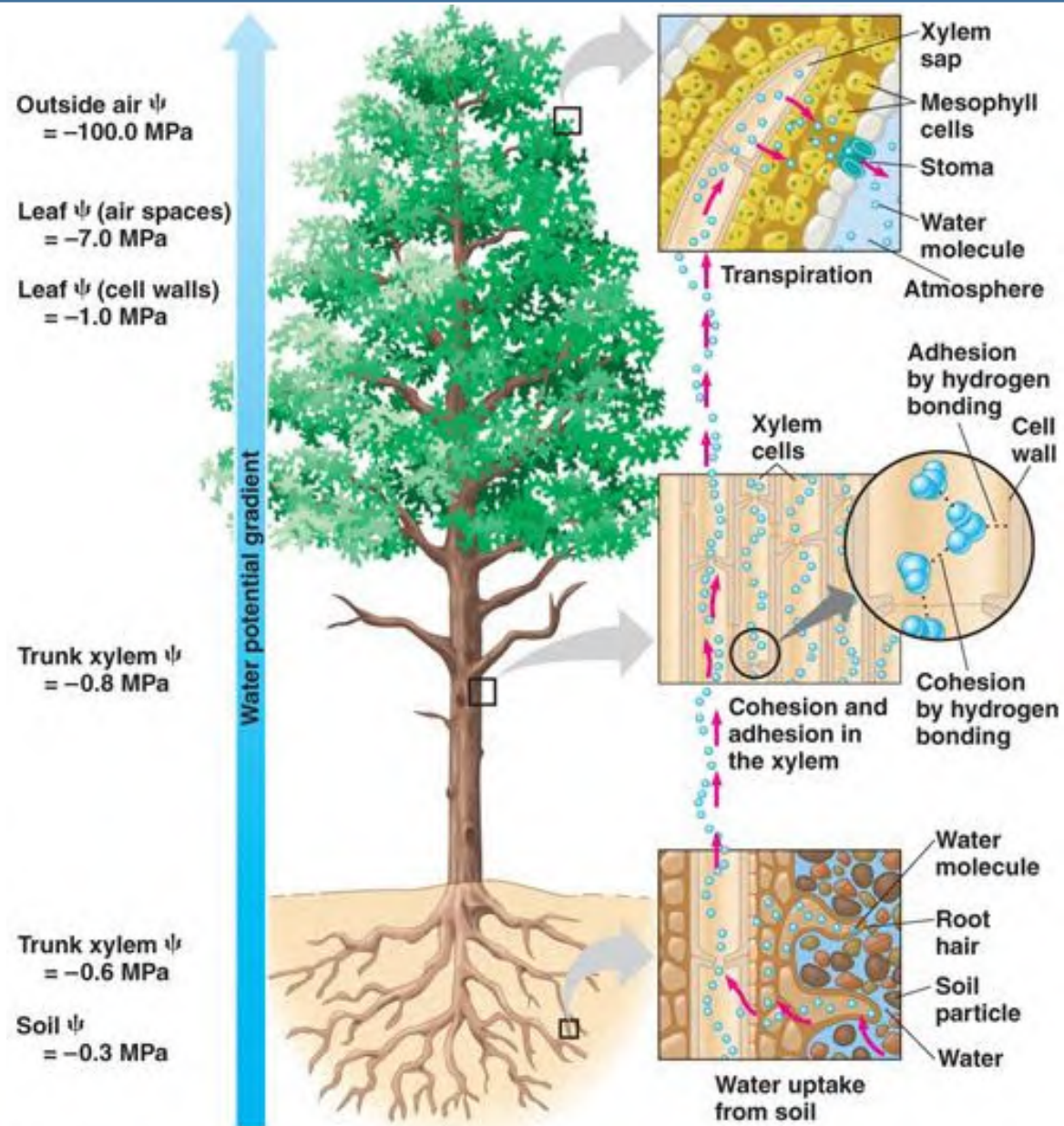
GW SOLUTIONS
ASSESSMENT & PROTECTION OF GROUNDWATER



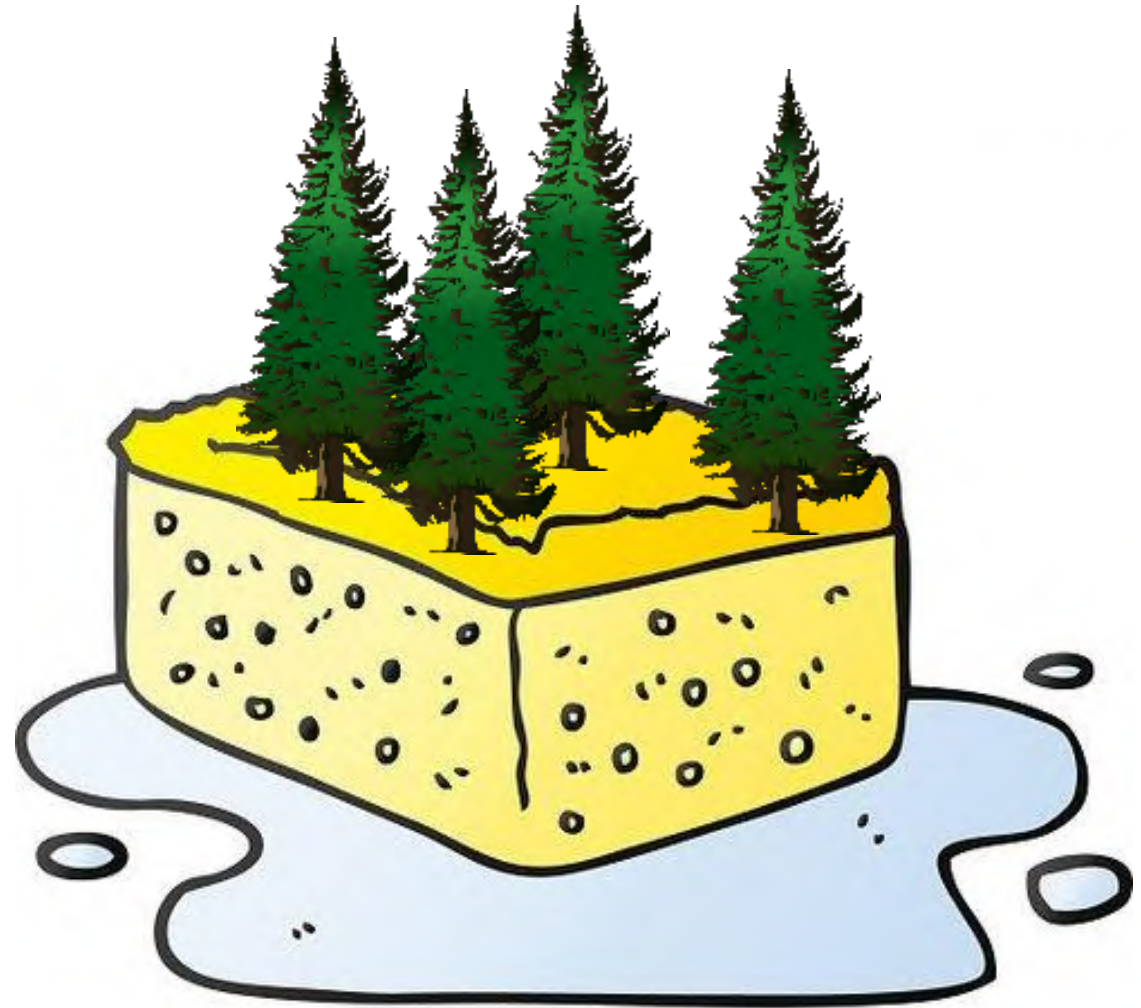
Healthy watersheds and thirsty trees support groundwater recharge and support soil moisture through *capillary pressure*.

Forests are Freshwater Stewards.



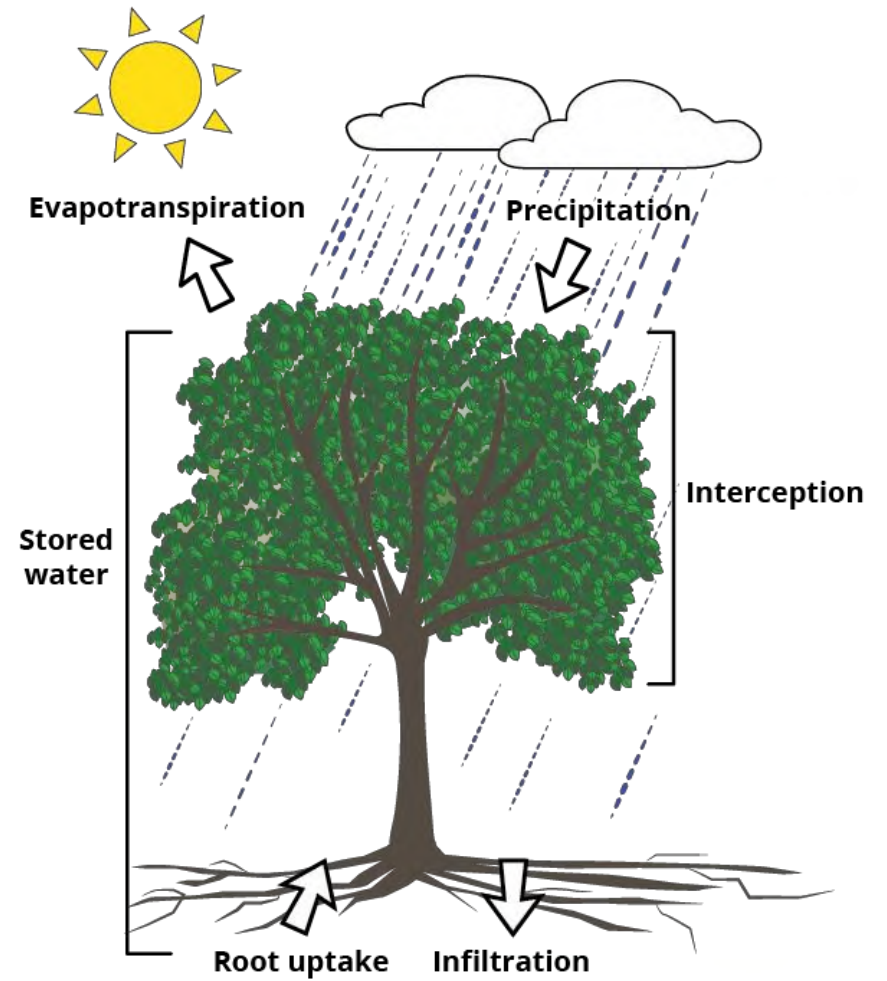
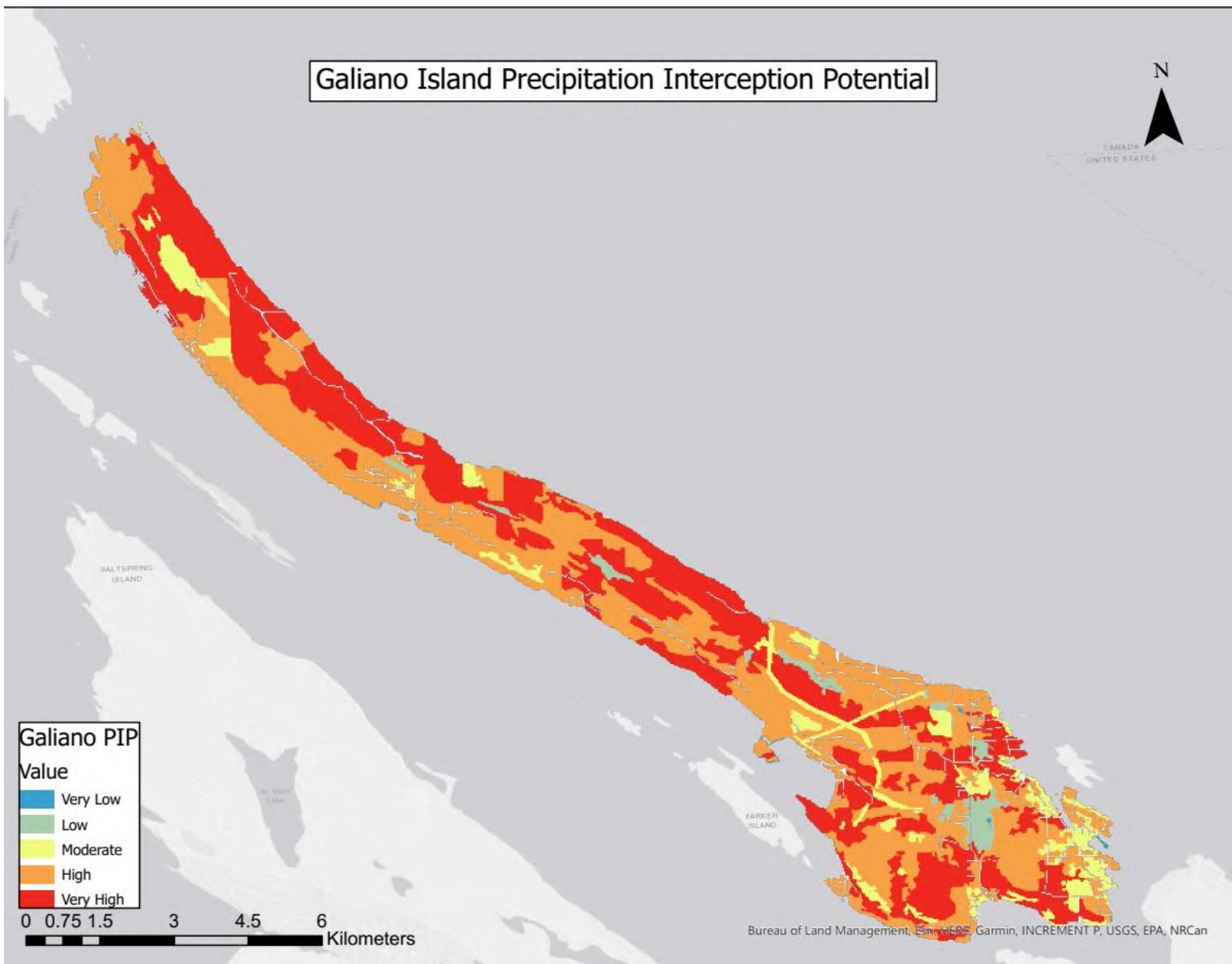


Thirsty forests make healthy soils



Copyright © 2008 Pearson Education, Inc., publishing as Pearson Benjamin Cummings.

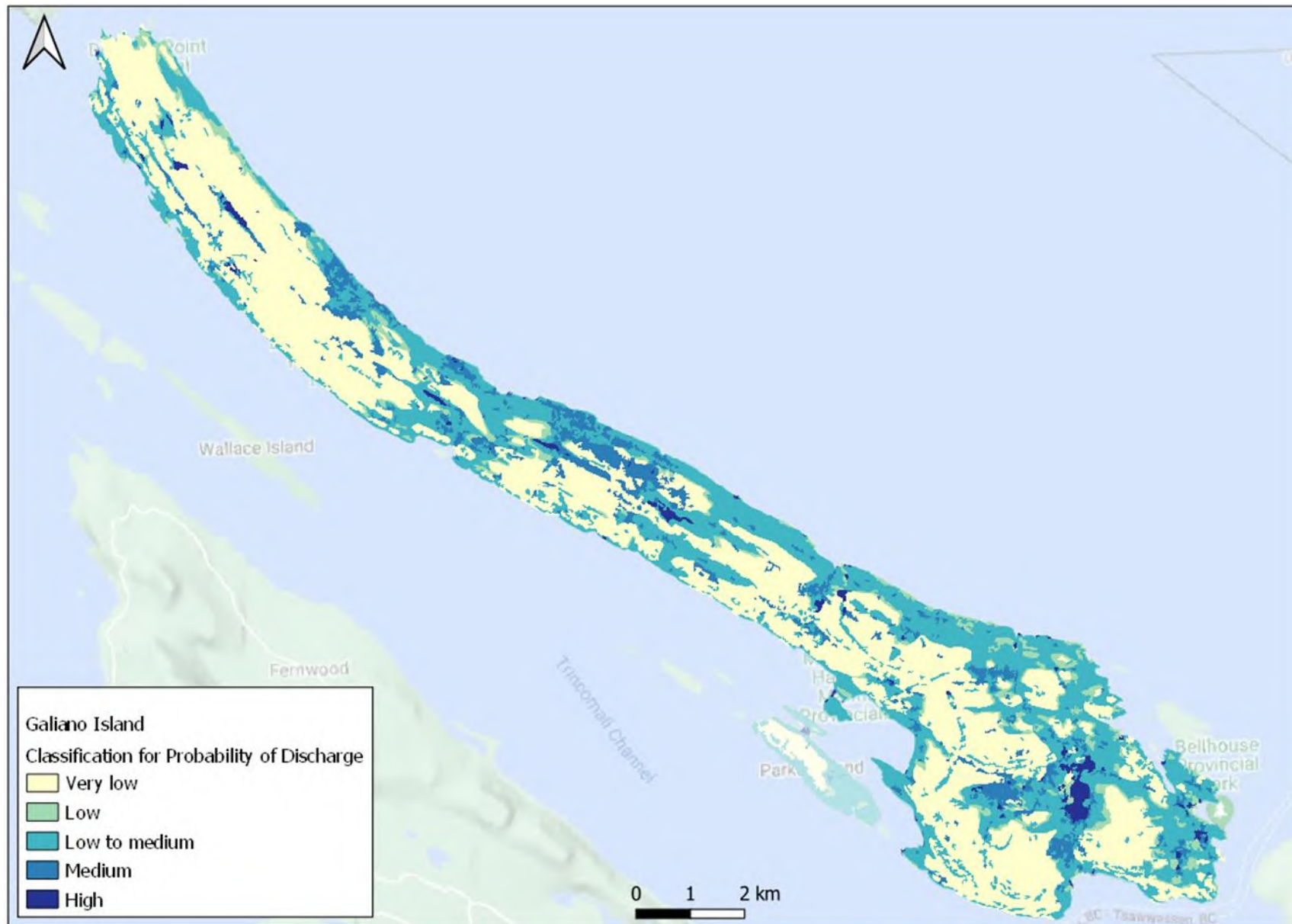
Galiano Island Precipitation Interception Potential



How much rain does not make it to the ground?



Mapping Wet Areas... from Space with Sentinel

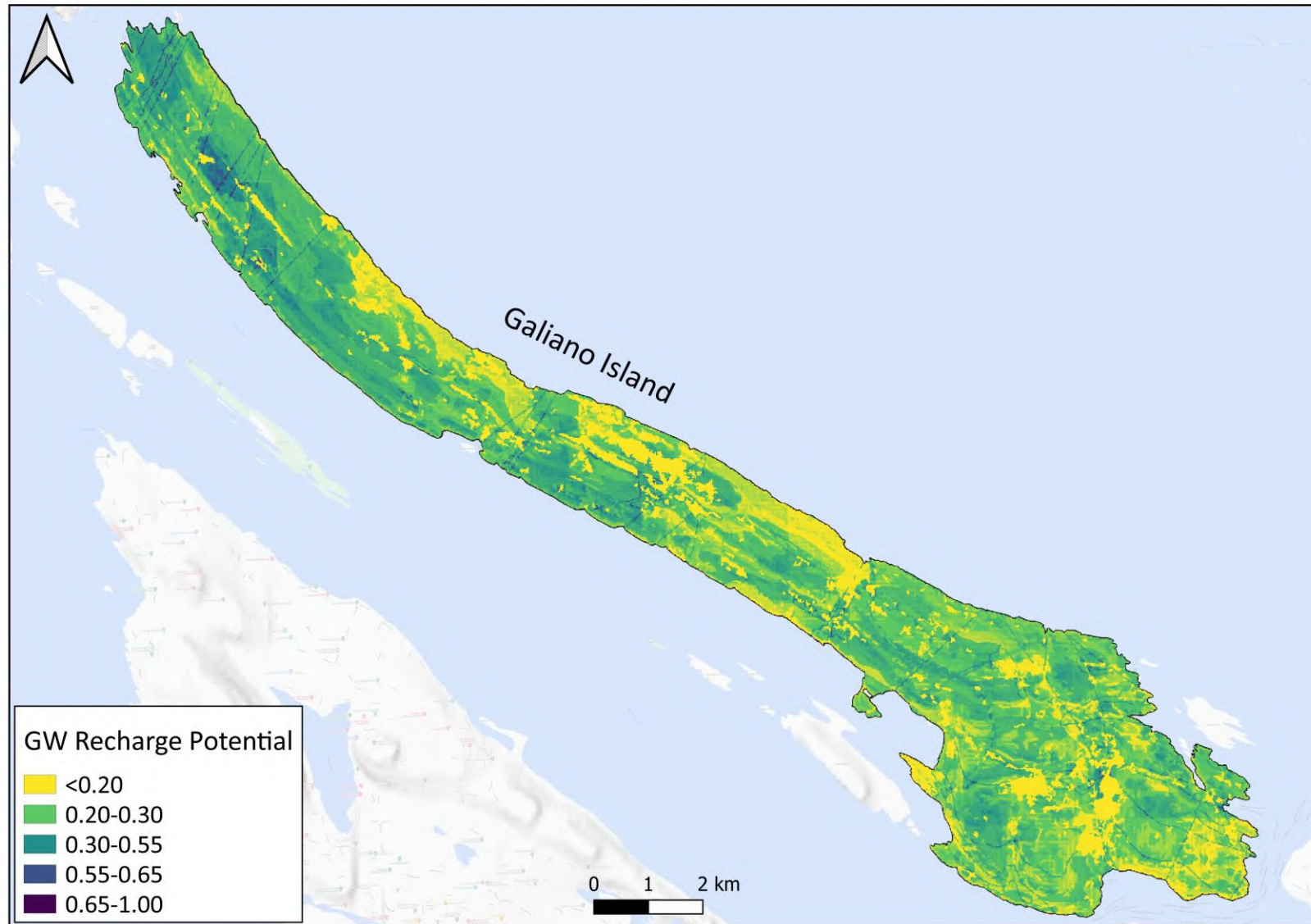


Discharge Probability...

The wet areas on the island



Discharge/Recharge Coefficient



Groundwater Recharge Potential



GW SOLUTIONS

ASSESSMENT & PROTECTION OF GROUNDWATER

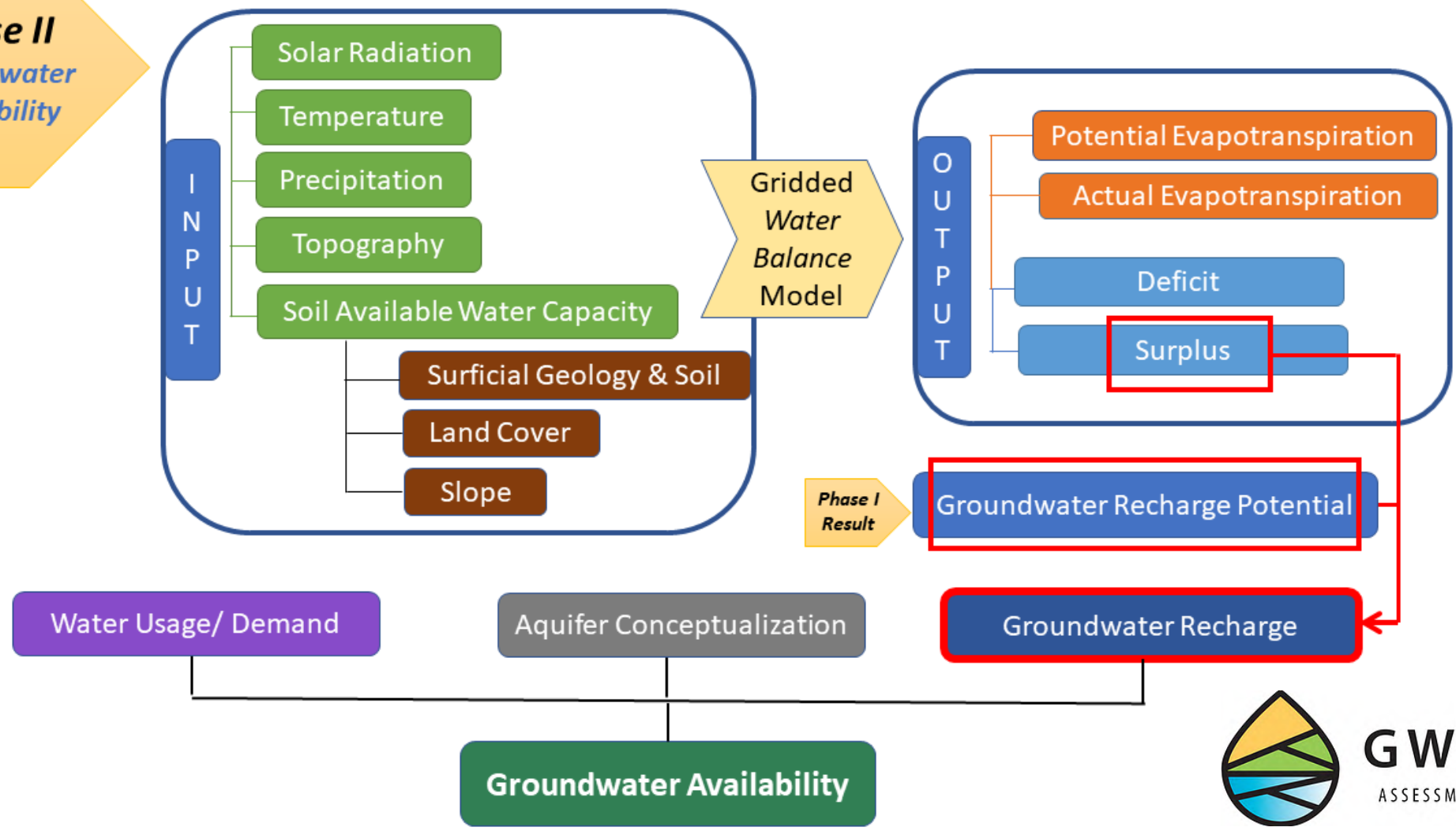
SOUTHERN GULF ISLANDS REGIONAL GROUNDWATER AVAILABILITY PROJECT

Groundwater Sustainability Science Program

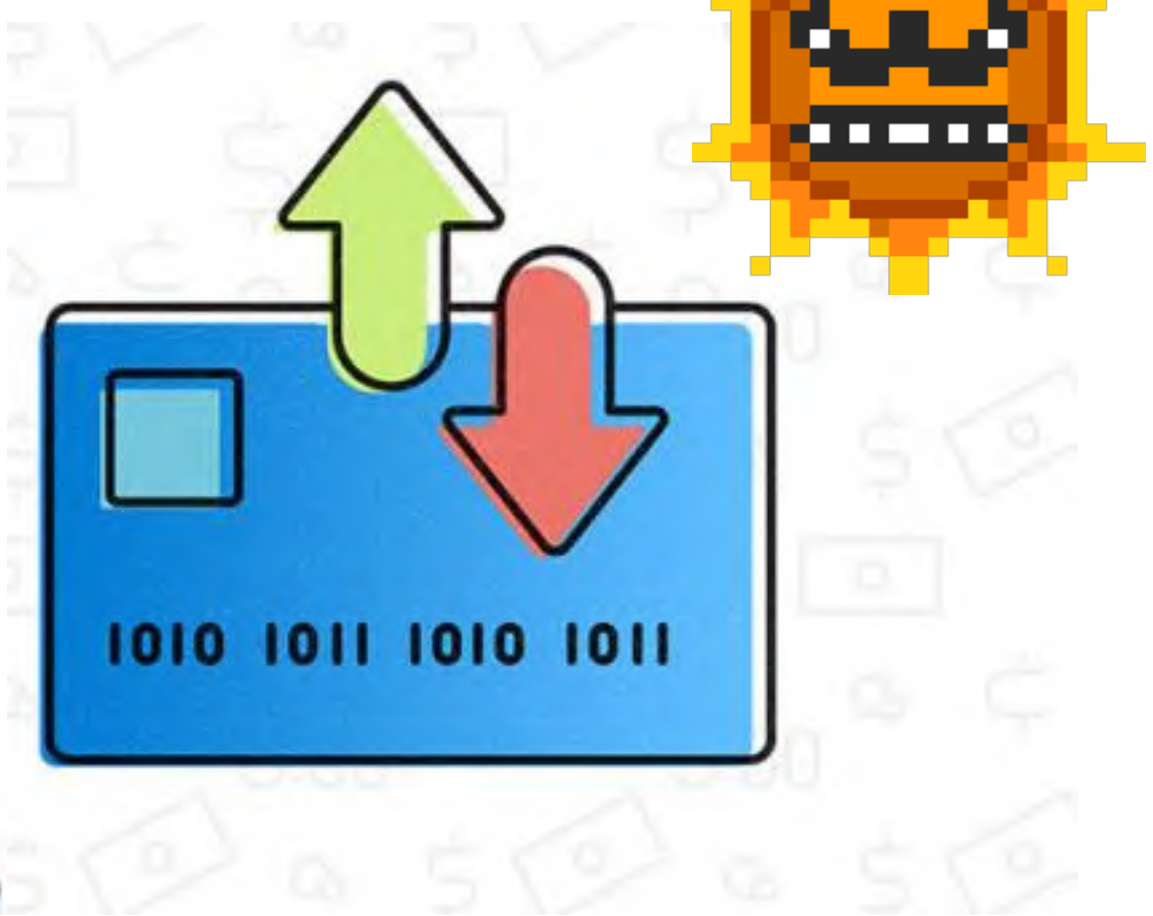


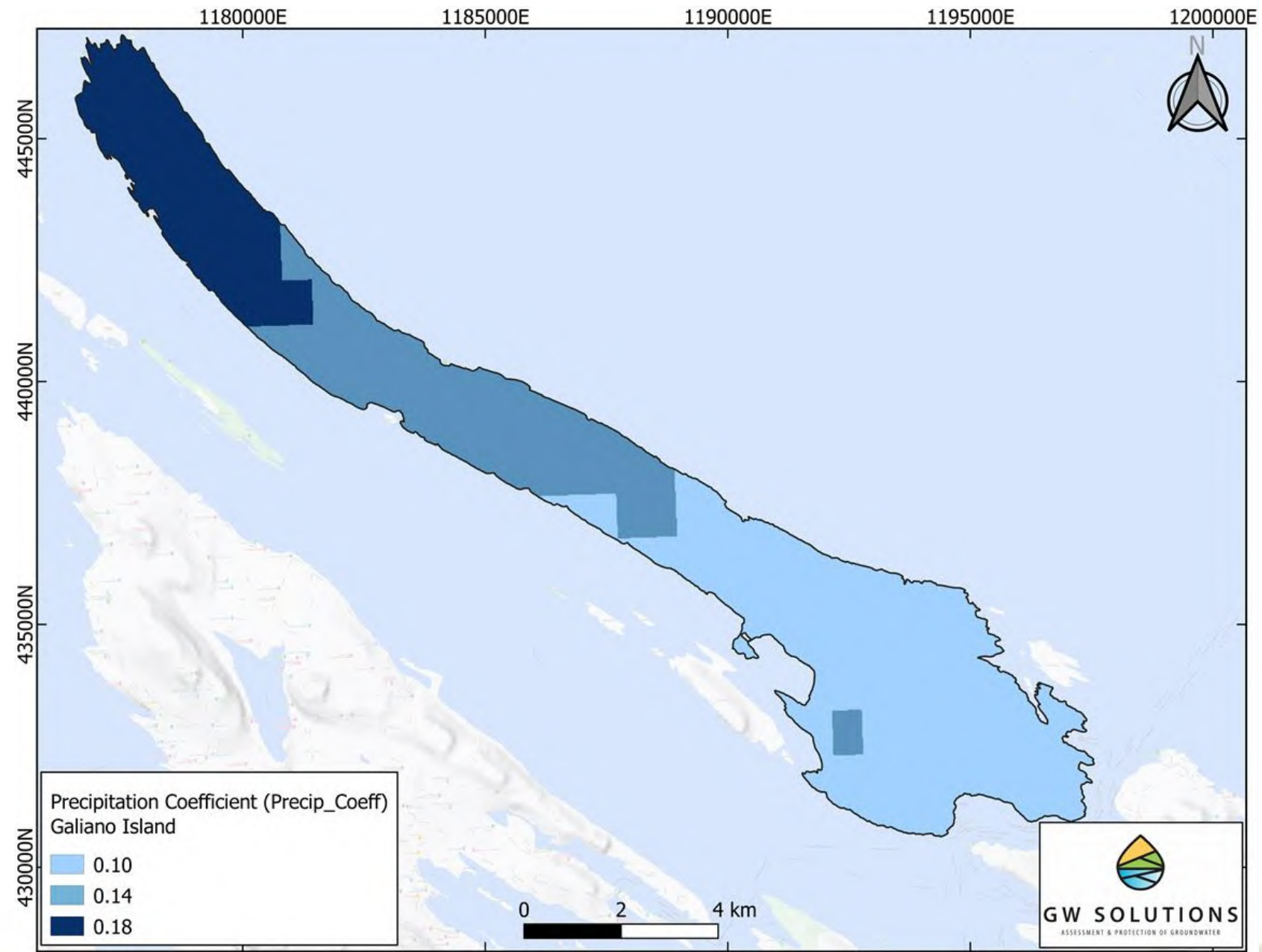
Islands Trust

Phase II
Groundwater
Availability

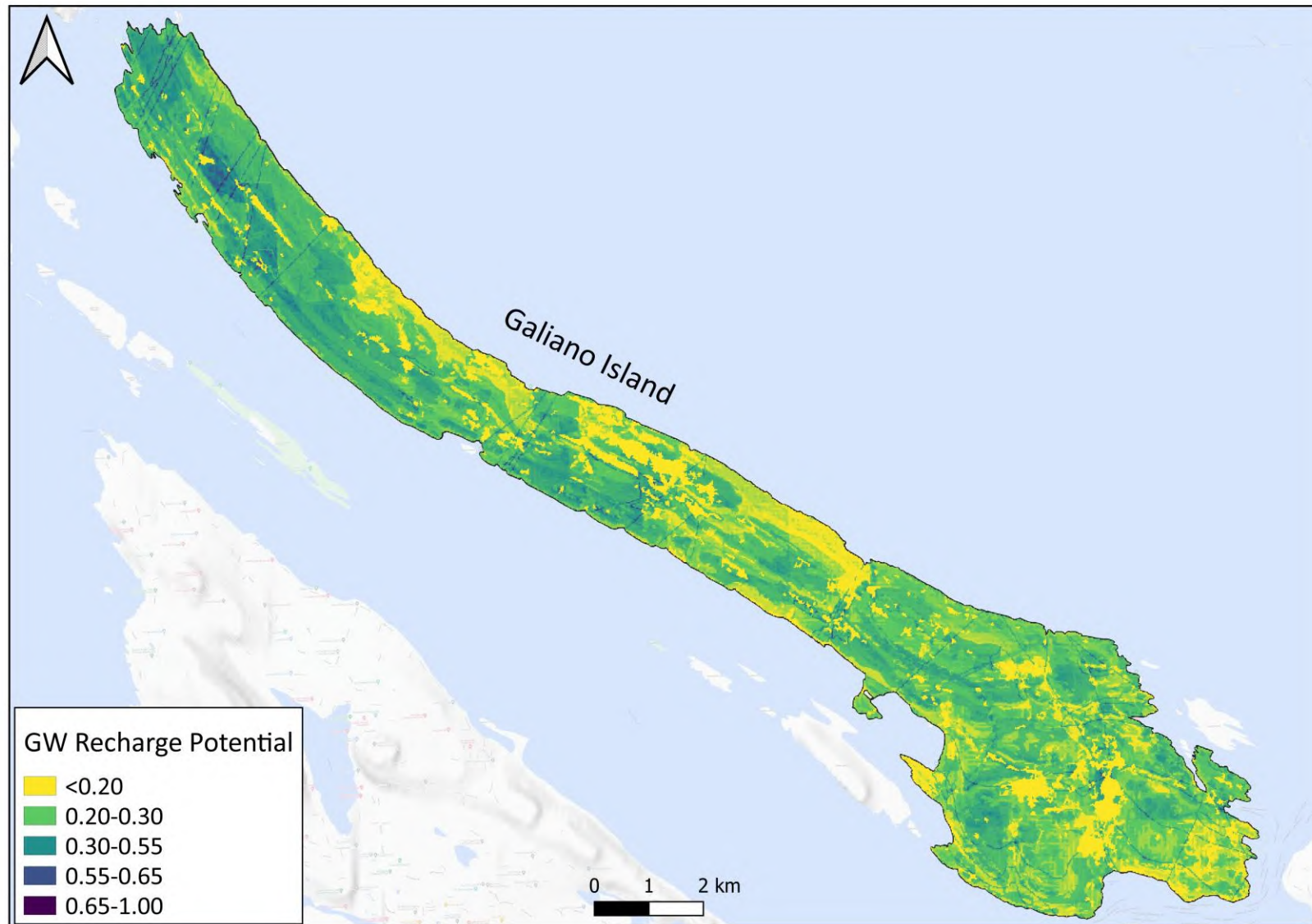


GW SOLUTIONS
ASSESSMENT & PROTECTION OF GROUNDWATER



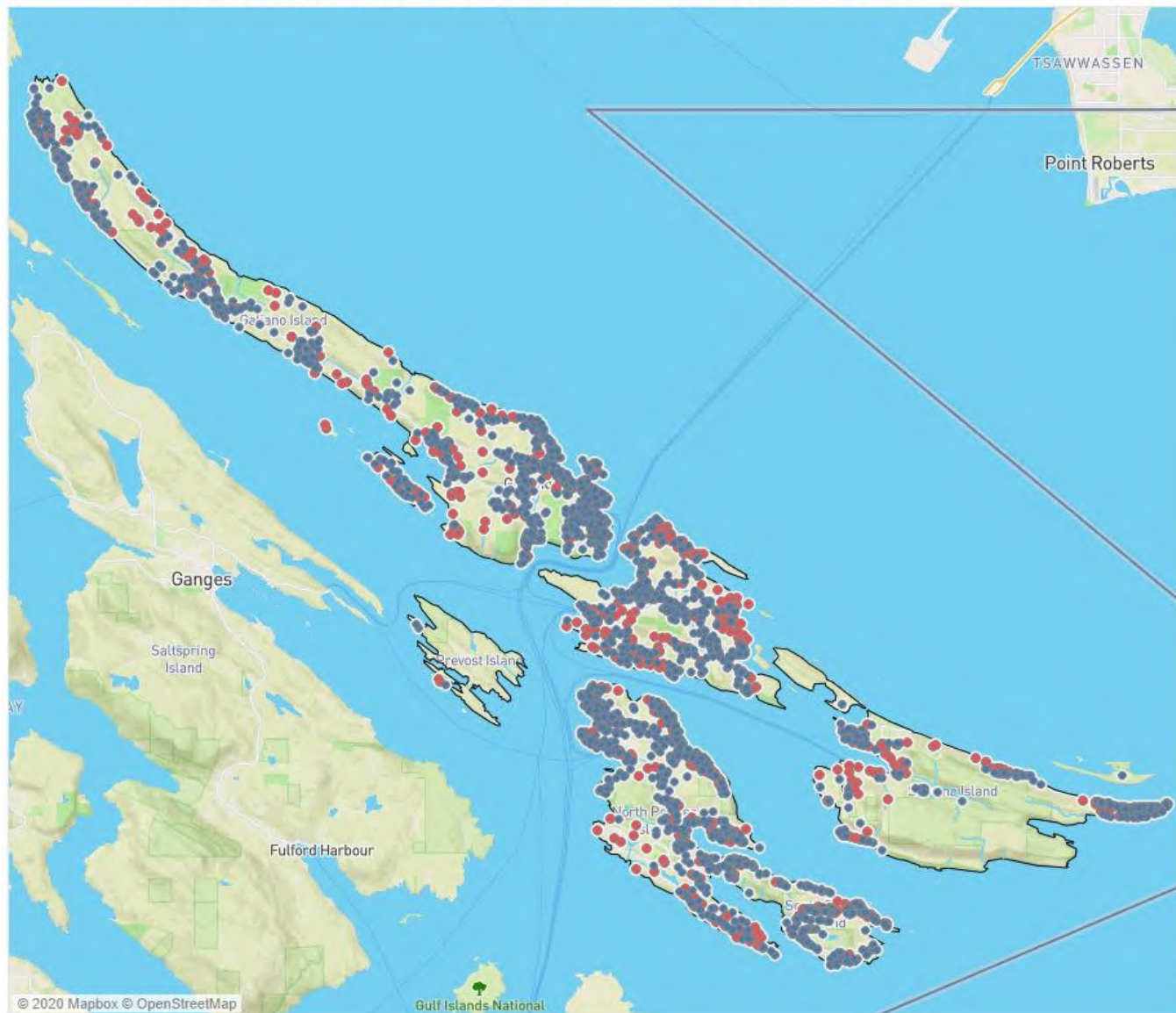


How much does it rain?



Groundwater Recharge Potential

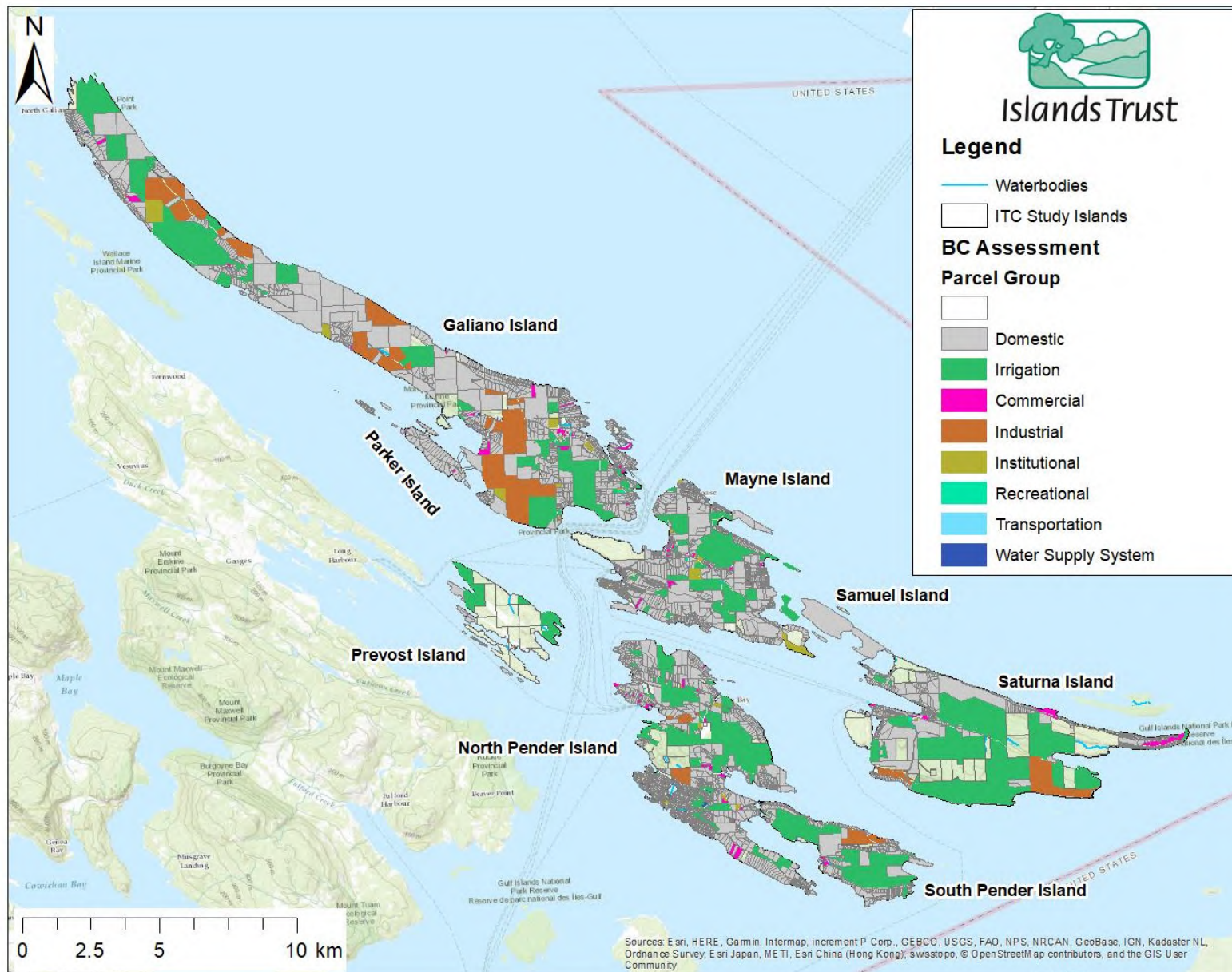
BC Well Database classified based on the use of water (Active and not active)



- Active/Not Active
 - Yes, water used
 - No, water not used
- Active/Not Active
 - Yes, water used
 - No, water not used
- Active/Not Active
 - ☑ No, water not used
 - ☑ Yes, water used

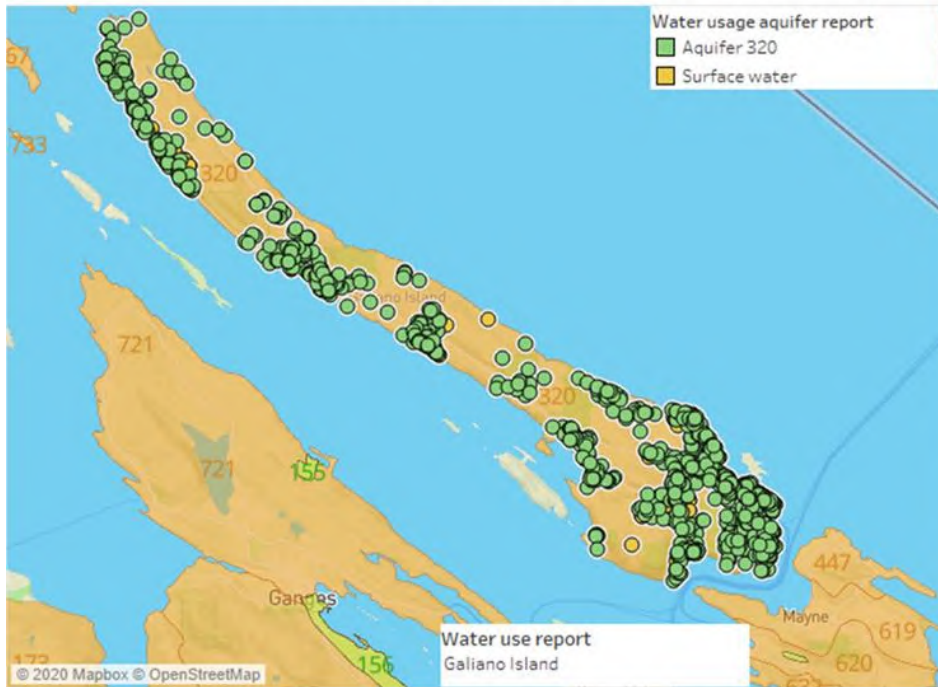
How much is used?



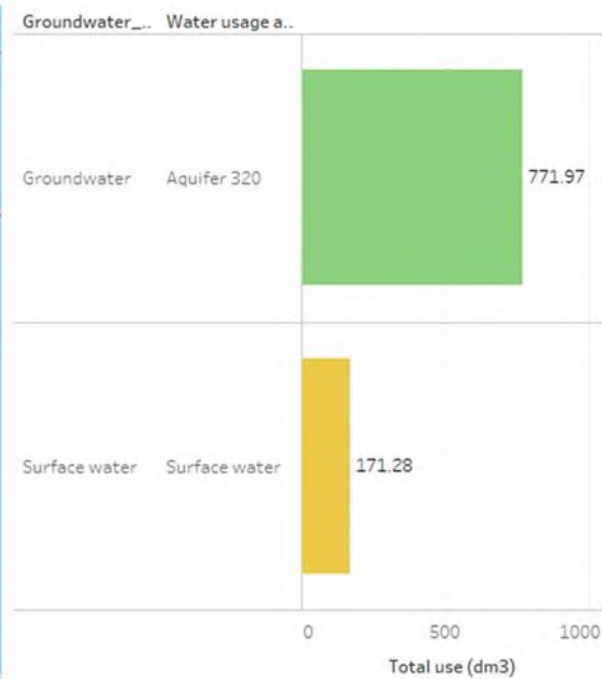


How much is used?

Water Usage for Galiano Island

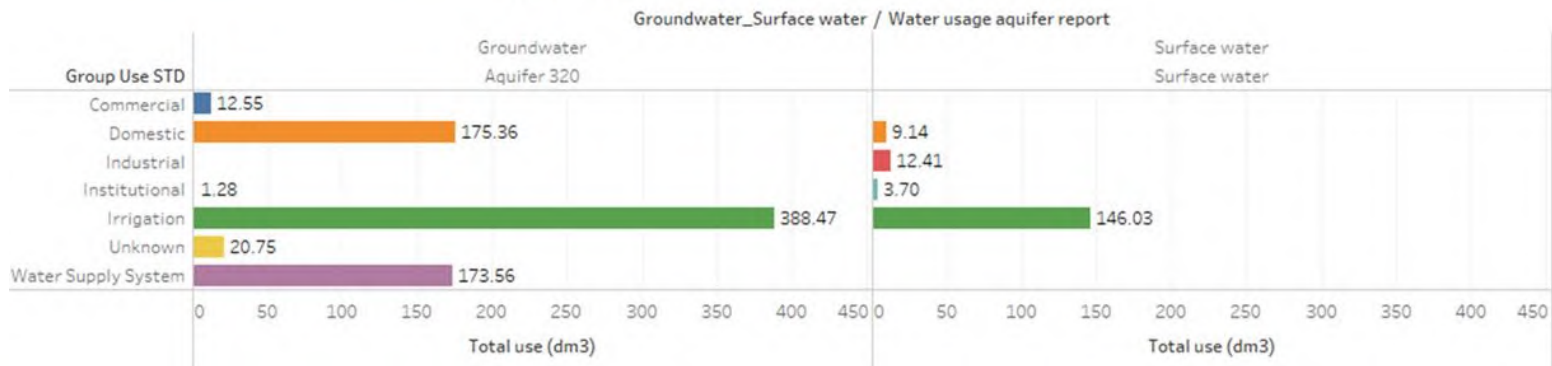


Total water usage by source and aquifer



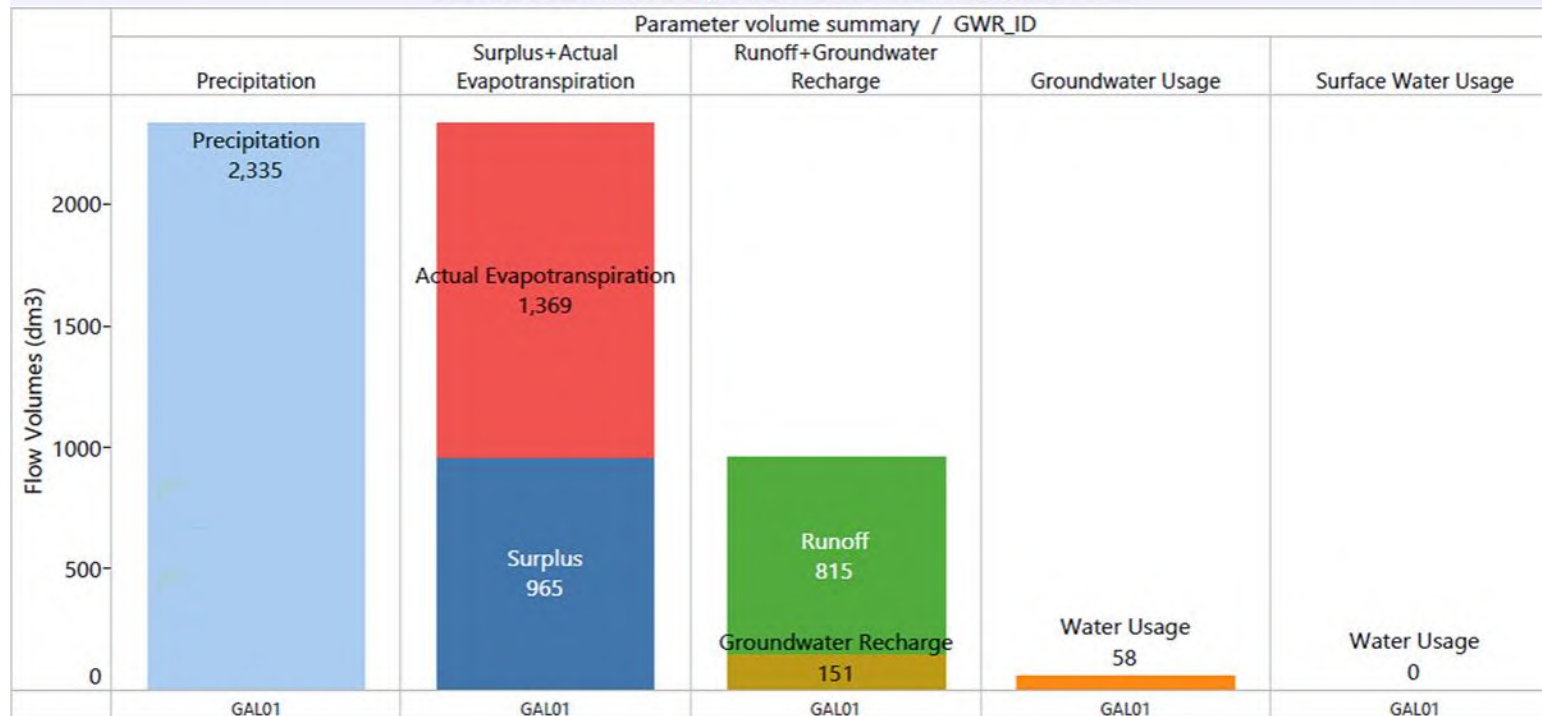
Island Wide
Groundwater Availability
DATA DASHBOARD

Total water usage by source and aquifer





Annual flow volume report for North Galiano_Spanish Hills



Groundwater Region Annual Groundwater Availability DATA DASHBOARD

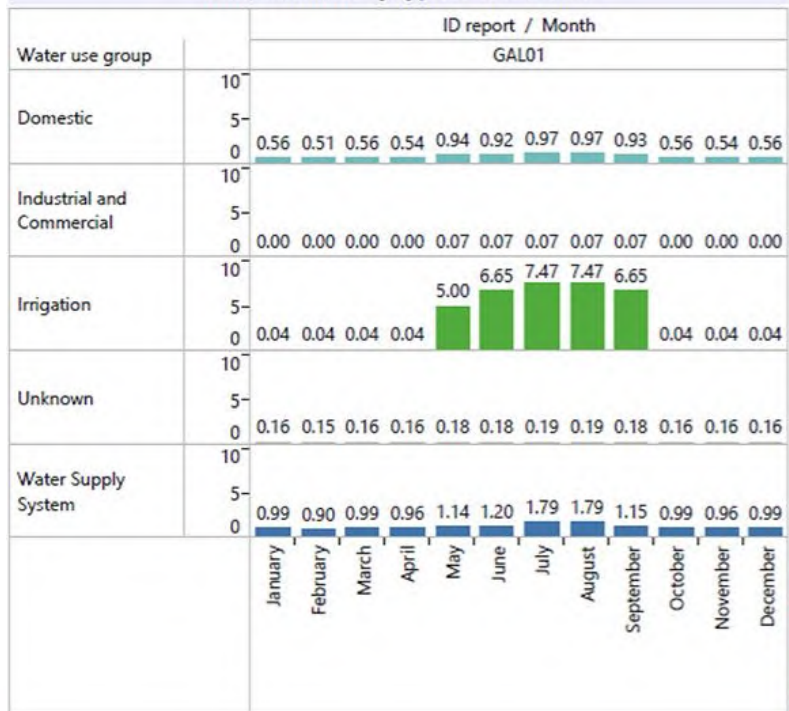
Water budget report for the watershed: North Galiano_Spanish Hills



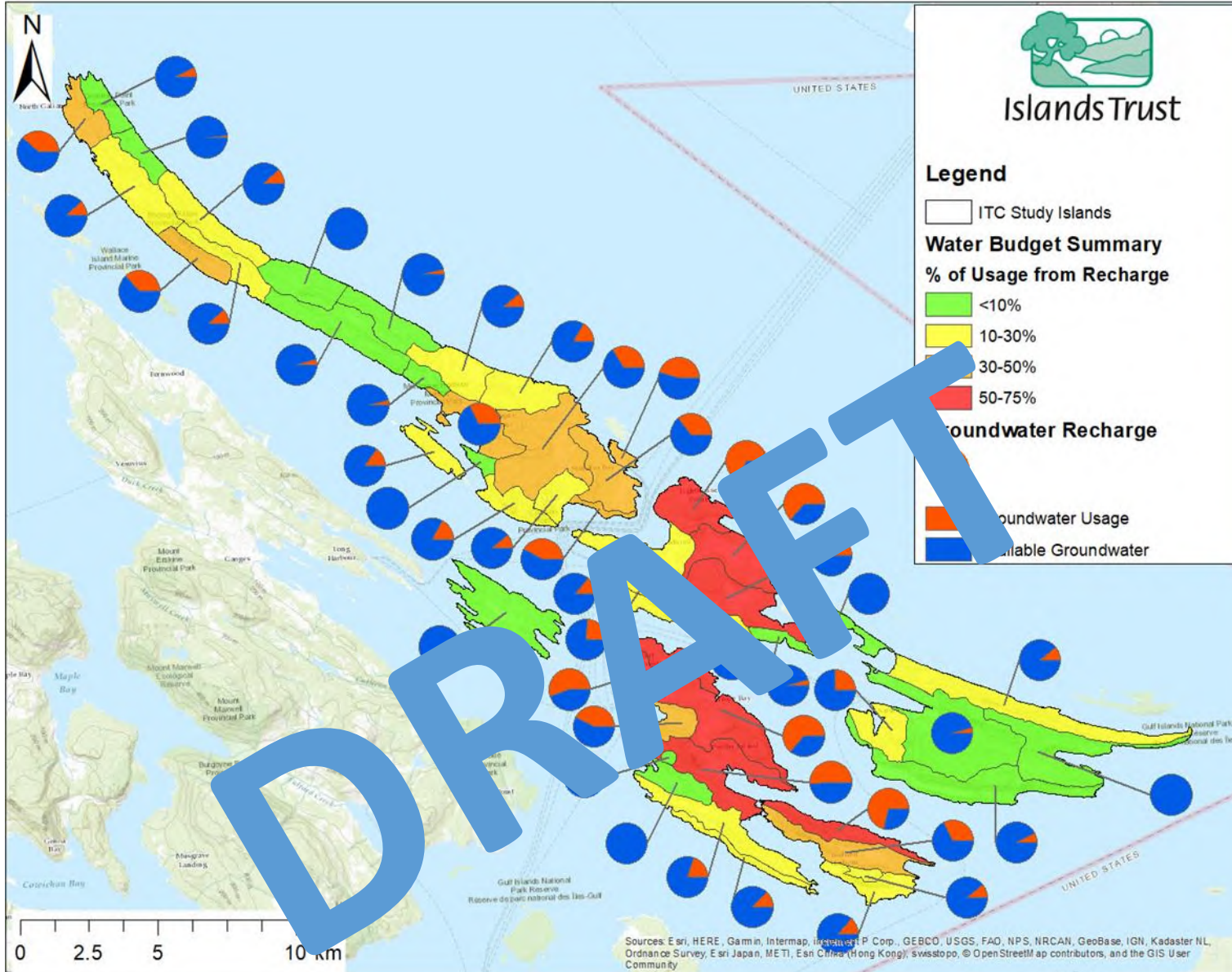
Water budget summary for North Galiano_Spanish Hills watershed



Water demand by type of use in dm3



Groundwater Region Monthly Groundwater Availability DATA DASHBOARD

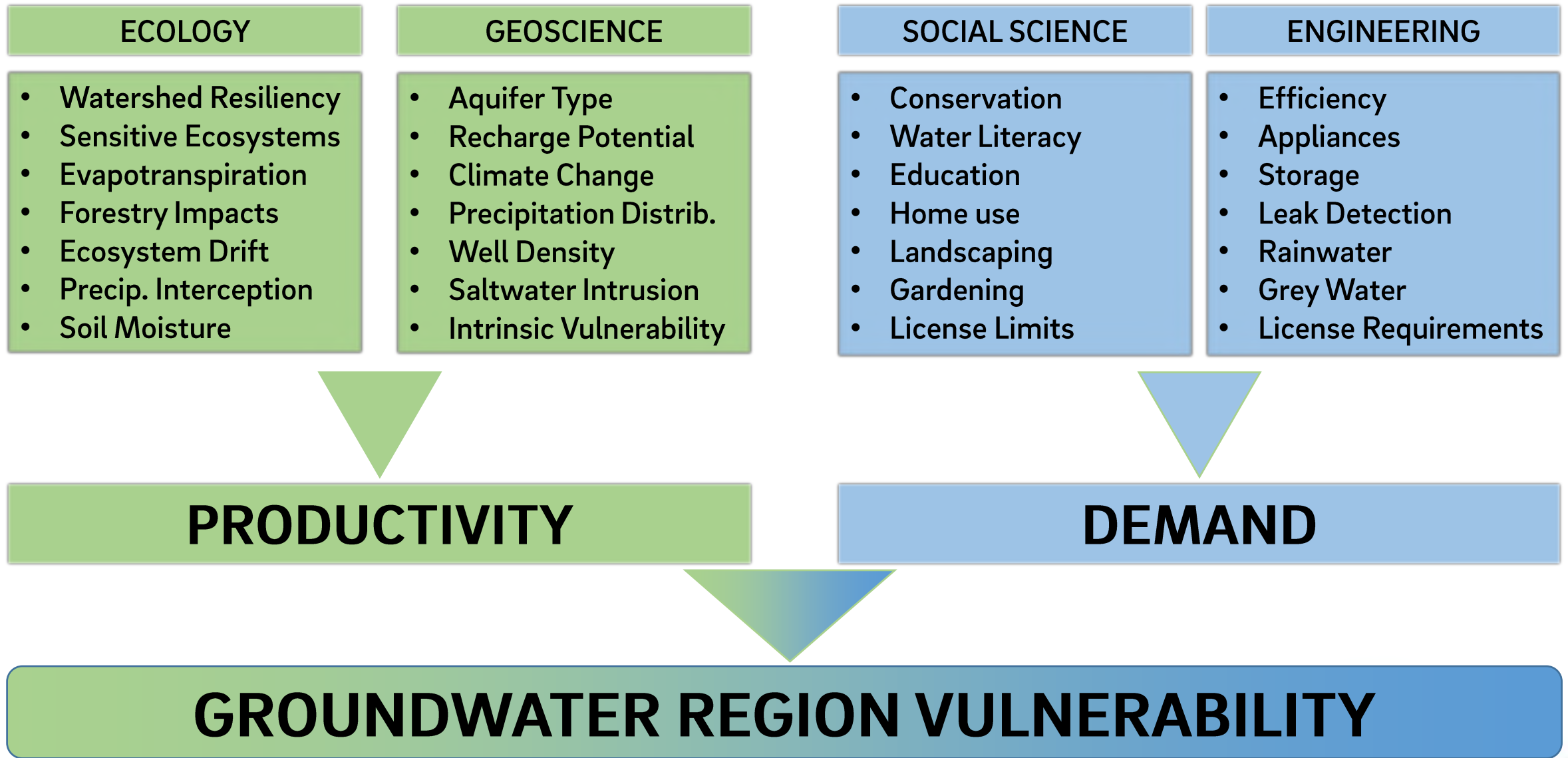


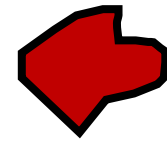
Regional Groundwater Availability

*Only the science and model
Does not consider vulnerability
Does not consider "Safe Yield"*

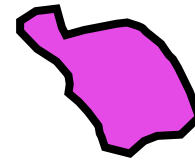


GW SOLUTIONS
ASSESSMENT & PROTECTION OF GROUNDWATER

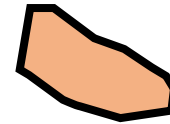


**CLASS I: HIGH VULNERABILITY**

Areas that are in critical need of attention where there is high confidence in existing data

**CLASS II: CRITICAL ASSESSMENT**

Areas where there is a potential for critical attention but some data uncertainty

**CLASS III: SUSTAINING**

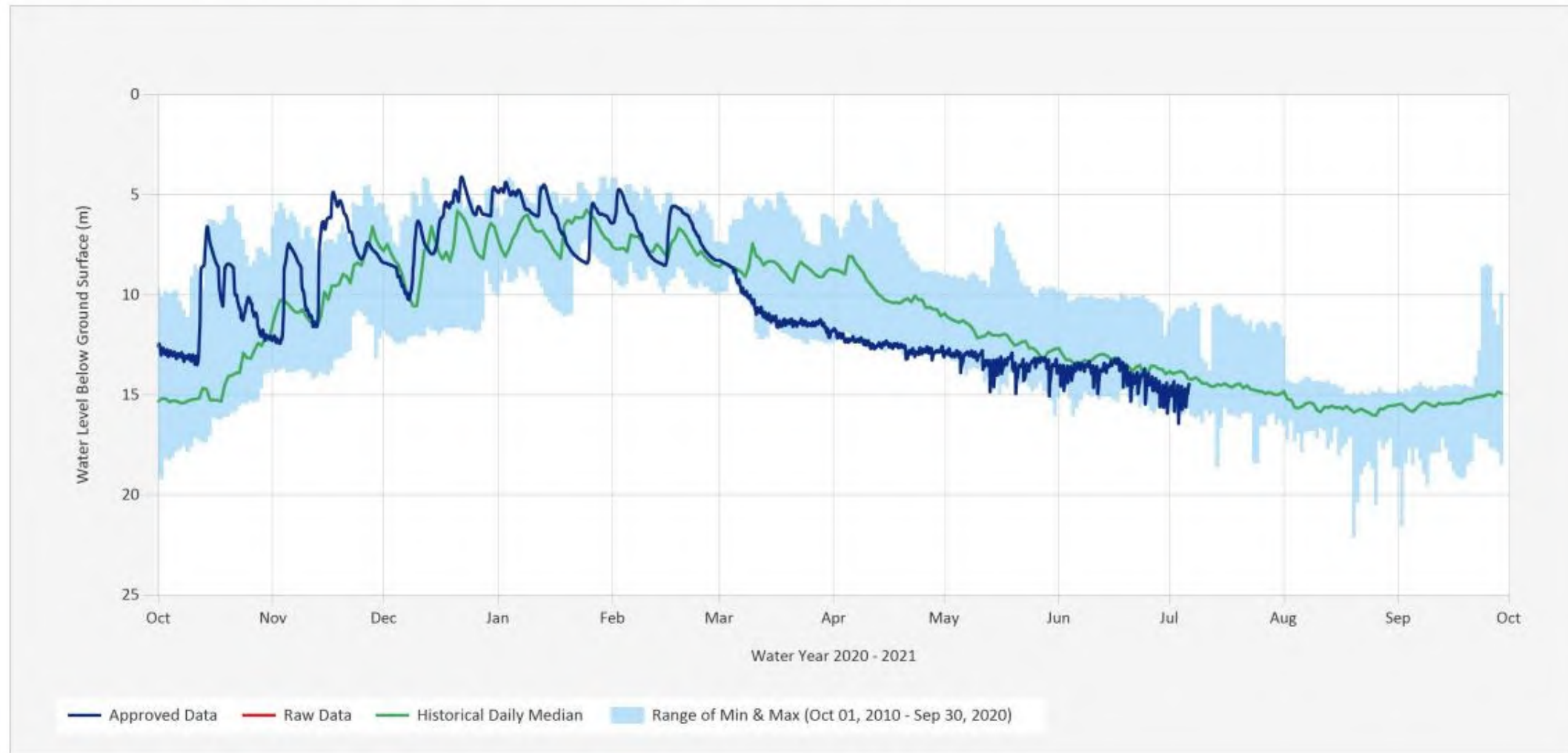
The level of attention needed is moderate based on existing use but could become critical if buildout or licensed potential is maximized.

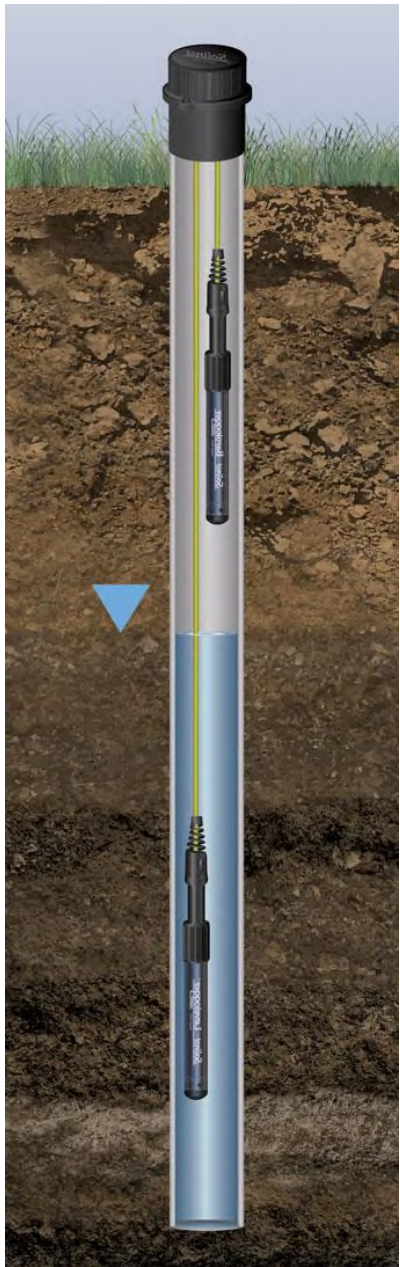
**CLASS IV: NOT CRITICAL // UNDERDEVELOPED**

The level of attention needed is not critical. This includes protected areas and forest lots, or areas with limited development potential.

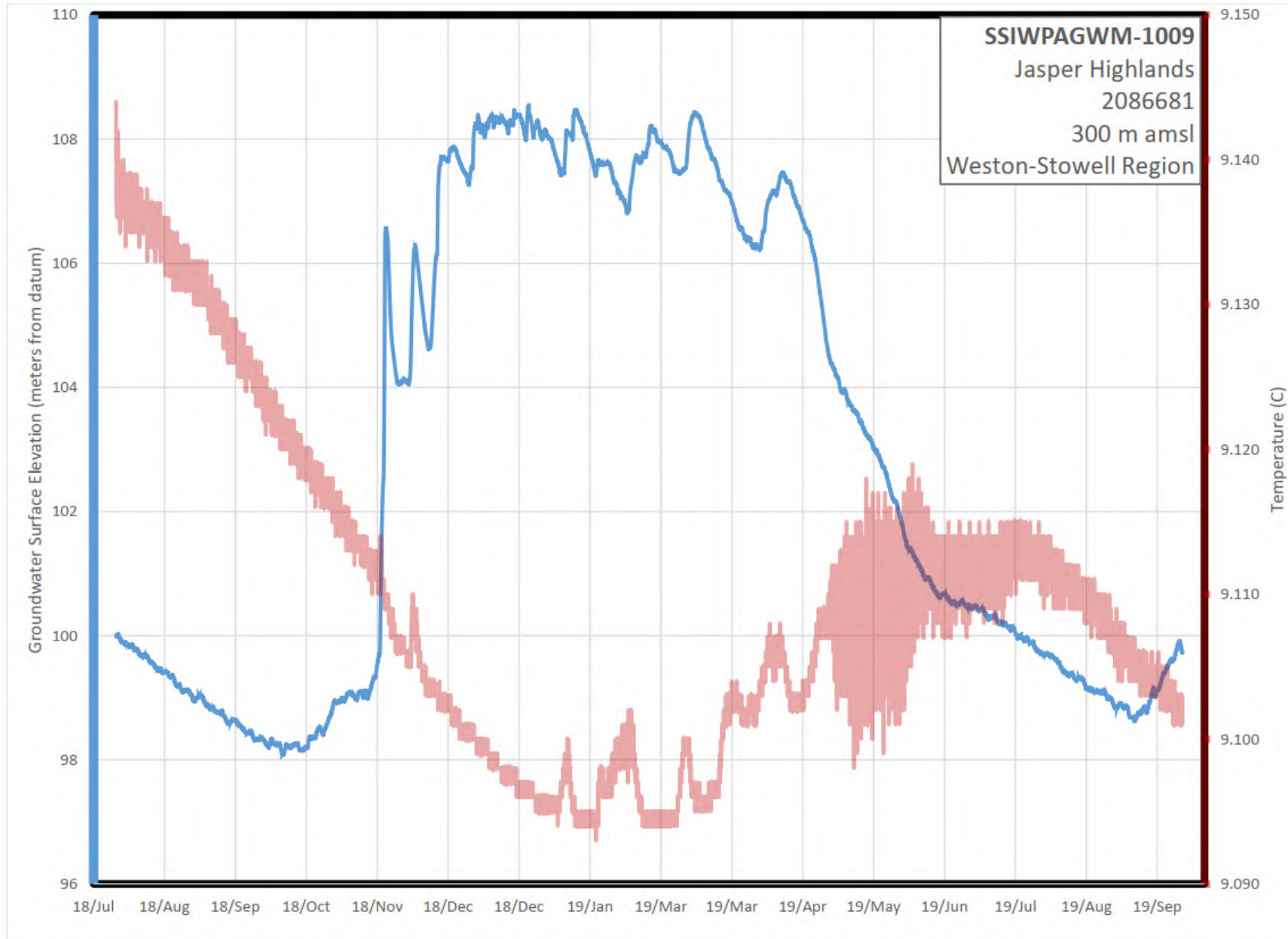
Source Data: SGWL.Working@OW258

Location: OBS WELL 258 - GALIANO ISLAND (SHOPLAND RD.), Latitude: 48.873862, Longitude: -123.3256046, Elevation: : 0 m



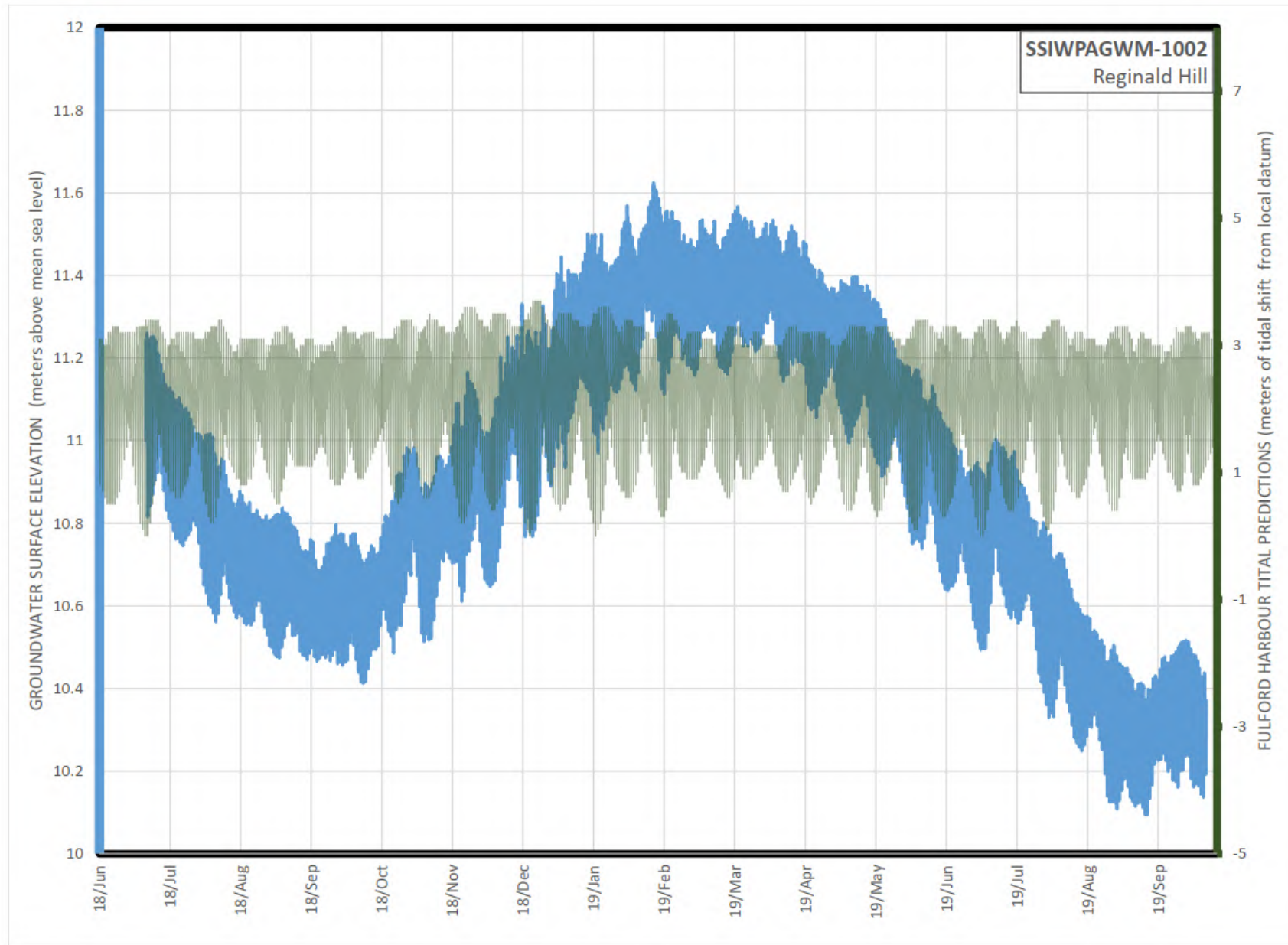






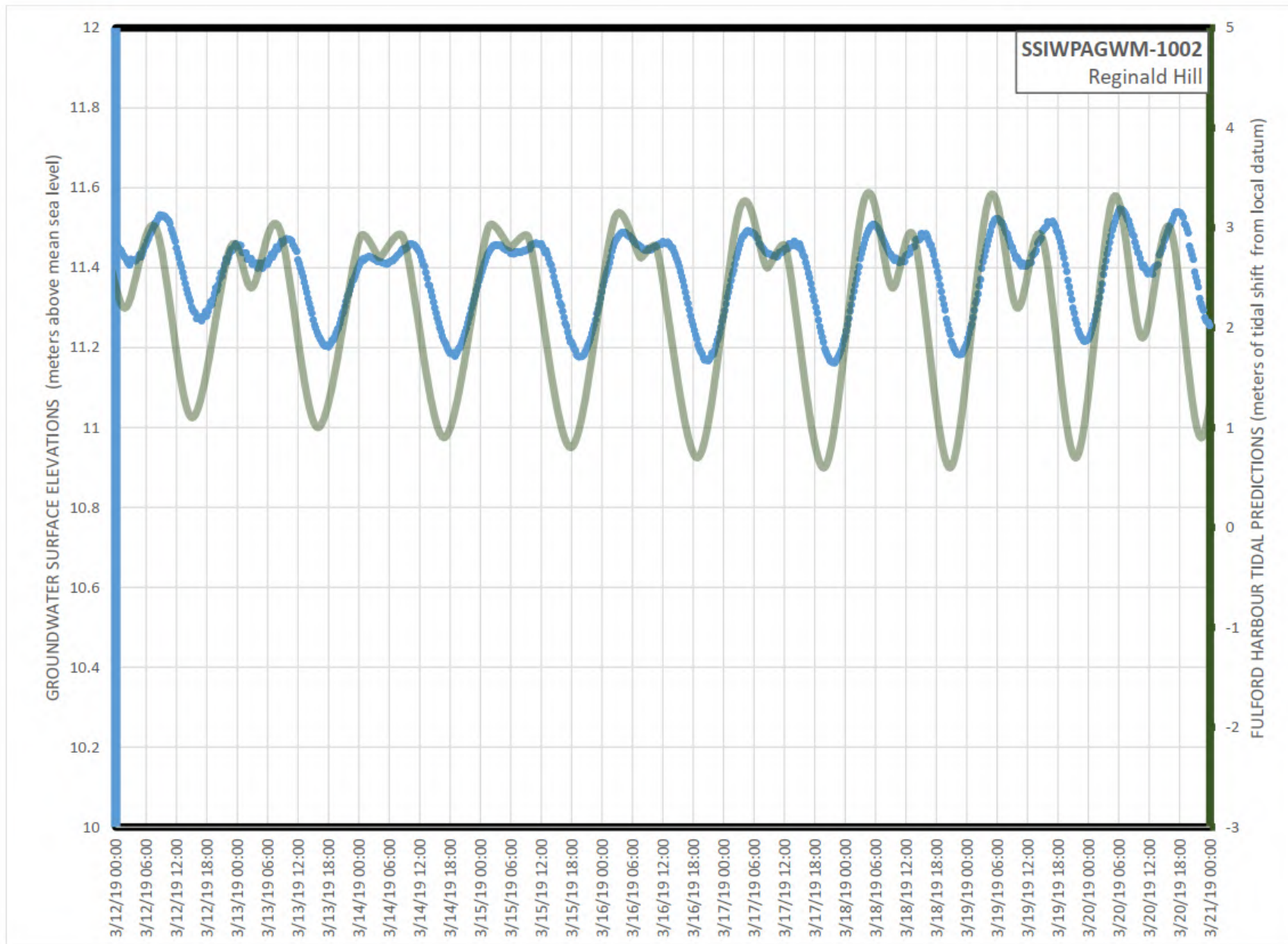
Well Monitoring Example

Provides a long term view of seasonal groundwater recharge



Well Monitoring Example

Provides homeowners, farmers, well operators, consultants, and community groups access to information about the health of their water well



Well Monitoring Example

Can provide early warning of risk of saltwater intrusion

GALIANO ISLAND GROUNDWATER SUSTAINABILITY IMPLEMENTATION PROJECT

Groundwater Sustainability Science Program

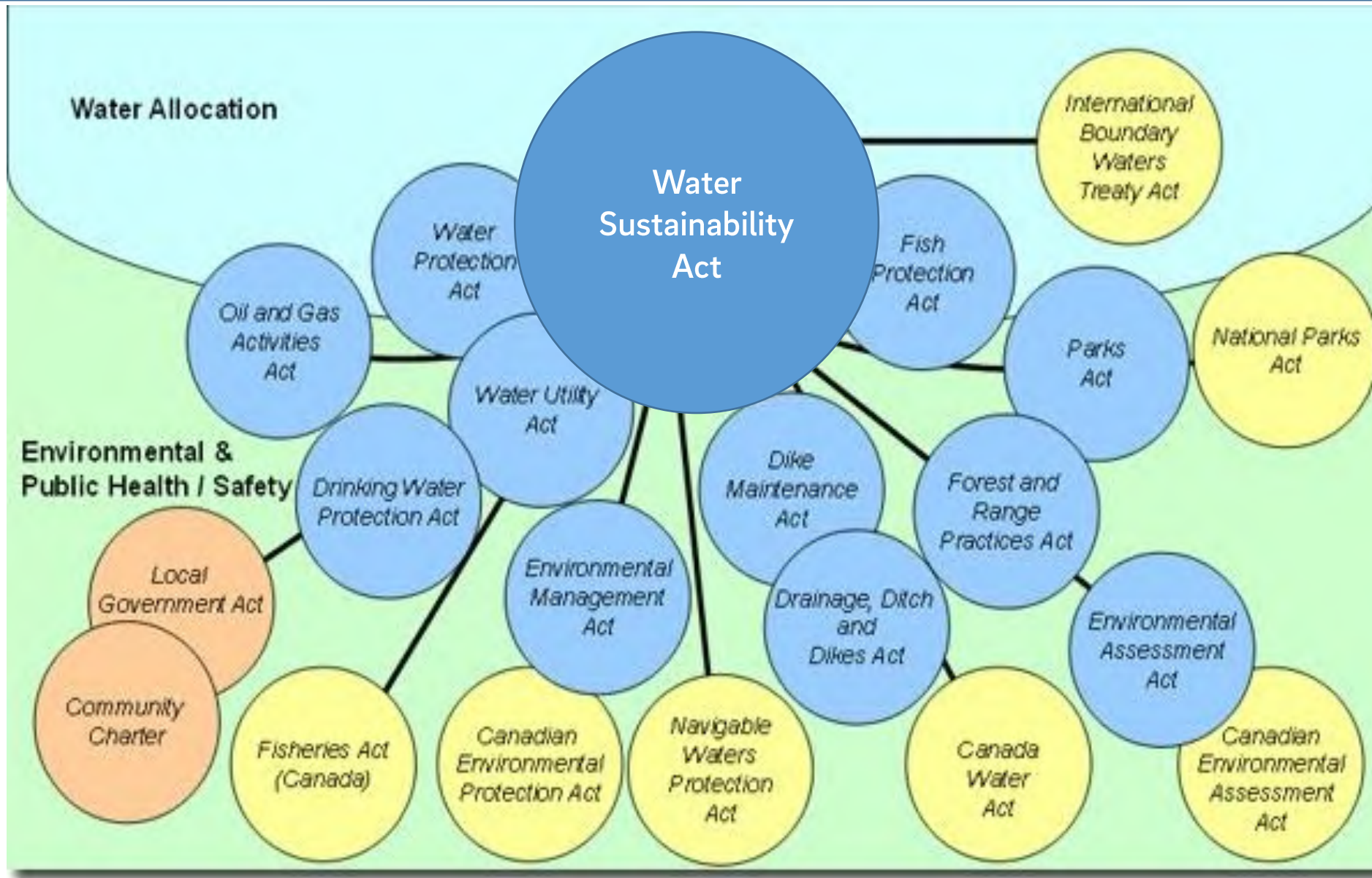


FRESHWATER SUSTAINABILITY STRATEGY

Focusses on:

- Supporting the Groundwater Sustainability Science Program
- Understanding Indigenous Values
- Encouraging the connection between the science and planning
- Supporting research related to understanding ecosystem needs
- Supporting rainwater use and greywater recycling
- Development of a communication and outreach program
- Development of a monitoring and reporting program







As of February 29, 2016
Non-domestic groundwater use
requires licensed authorization
from the Province.

Existing groundwater users have
until March 2022 to secure their
First in Time, First in Right (FITFIR)
water rights.

Register your water right.

Water Sustainability Act

Seven Policy Areas

Protect stream health and aquatic environments

Regulate and protect groundwater use

Consider water in land use decisions

Regulate during scarcity

Improve security, water use efficiency, and conservation

Measure and report

Enable a range of governance approaches

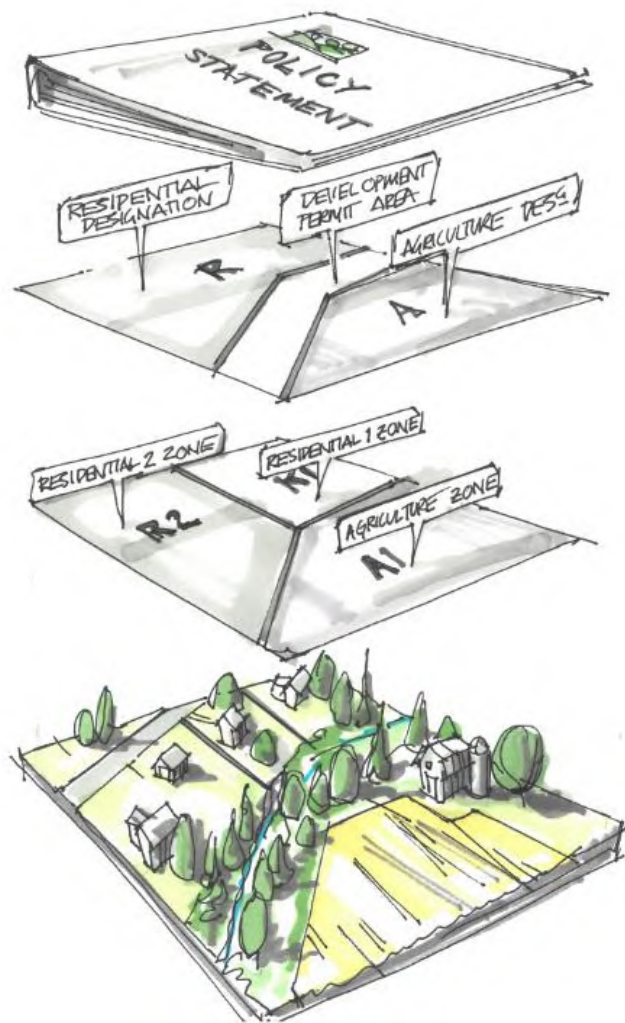
Water Objectives

Protection of water quality, water quantity and aquatic ecosystem health through provincial and area-based objectives

Water Sustainability Plans

Protection of water quality, water quantity and aquatic ecosystem health through watershed level planning

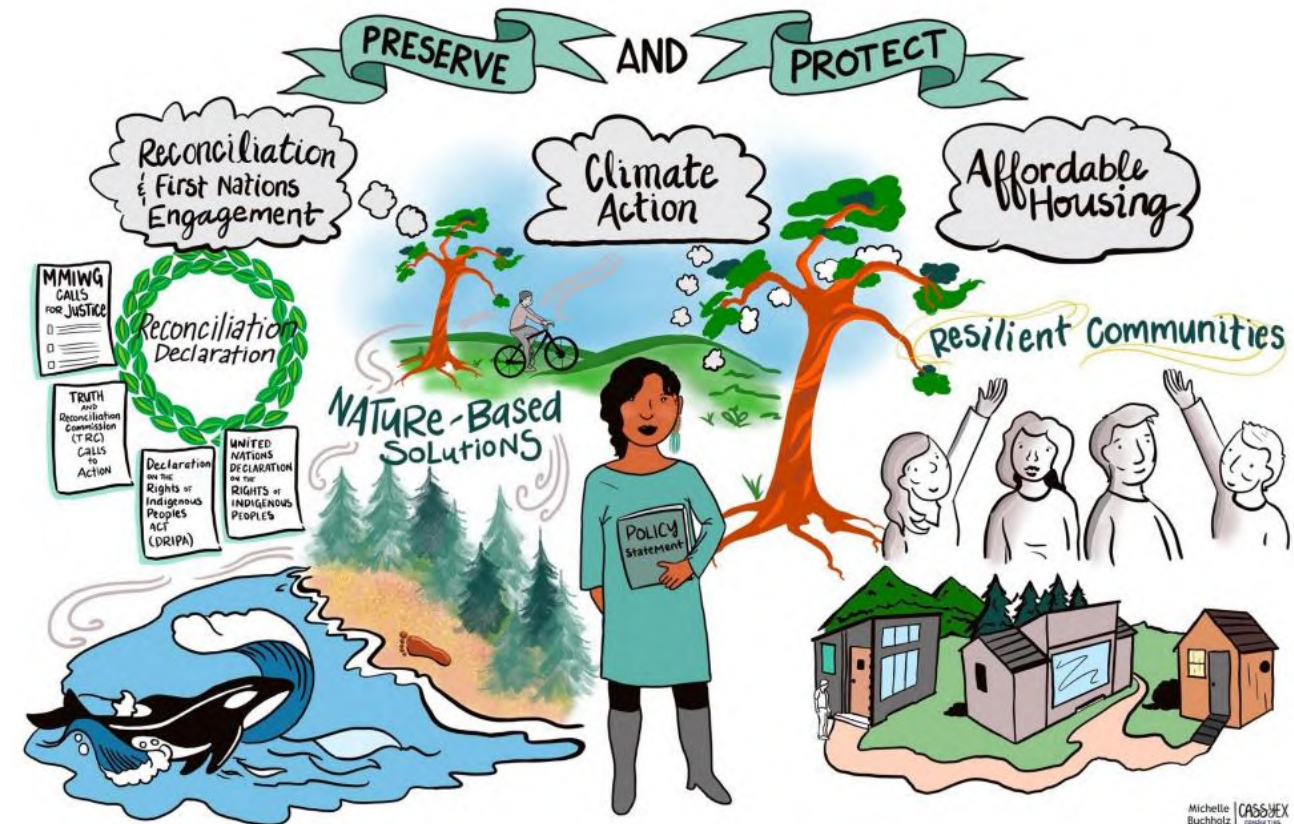
ISLANDS TRUST TOOLS AND PROCESSES



- Islands Trust Object
- Policy Statement
- Galiano Official Community Plan
- Galiano Land Use Bylaw
- Community Education
- Coordination

TRUST POLICY STATEMENT

- The Islands 2050 community engagement process identified that many island residents are concerned about freshwater resources.
- Freshwater sustainability will be supported by the Trust Policy Statement.



GALIANO ISLAND OFFICIAL COMMUNITY PLAN

Existing Policies:

- Recognizing the importance of the precautionary principle
- Encouraging groundwater protection
- Supporting watershed protection
- Identifying climate change as a factor to consider in decision making
- Development Permit Area (DPA) for Elevated Groundwater Catchment
- Identifying groundwater regions and water management areas
- Supporting alternative water supplies like rainwater catchment and greywater use

Options and Opportunities:

- Refine language related to water supply
- Recognize cultural heritage value of water
- Connect ground water sustainability to health of ecosystems
- Consider of Groundwater in Temporary Use Permits guidelines
- Update water management areas
- Clarify requirements for rezoning applications to consider groundwater impacts
- Update policies related to water management plans
- Revise DPA for Elevated Groundwater Catchment

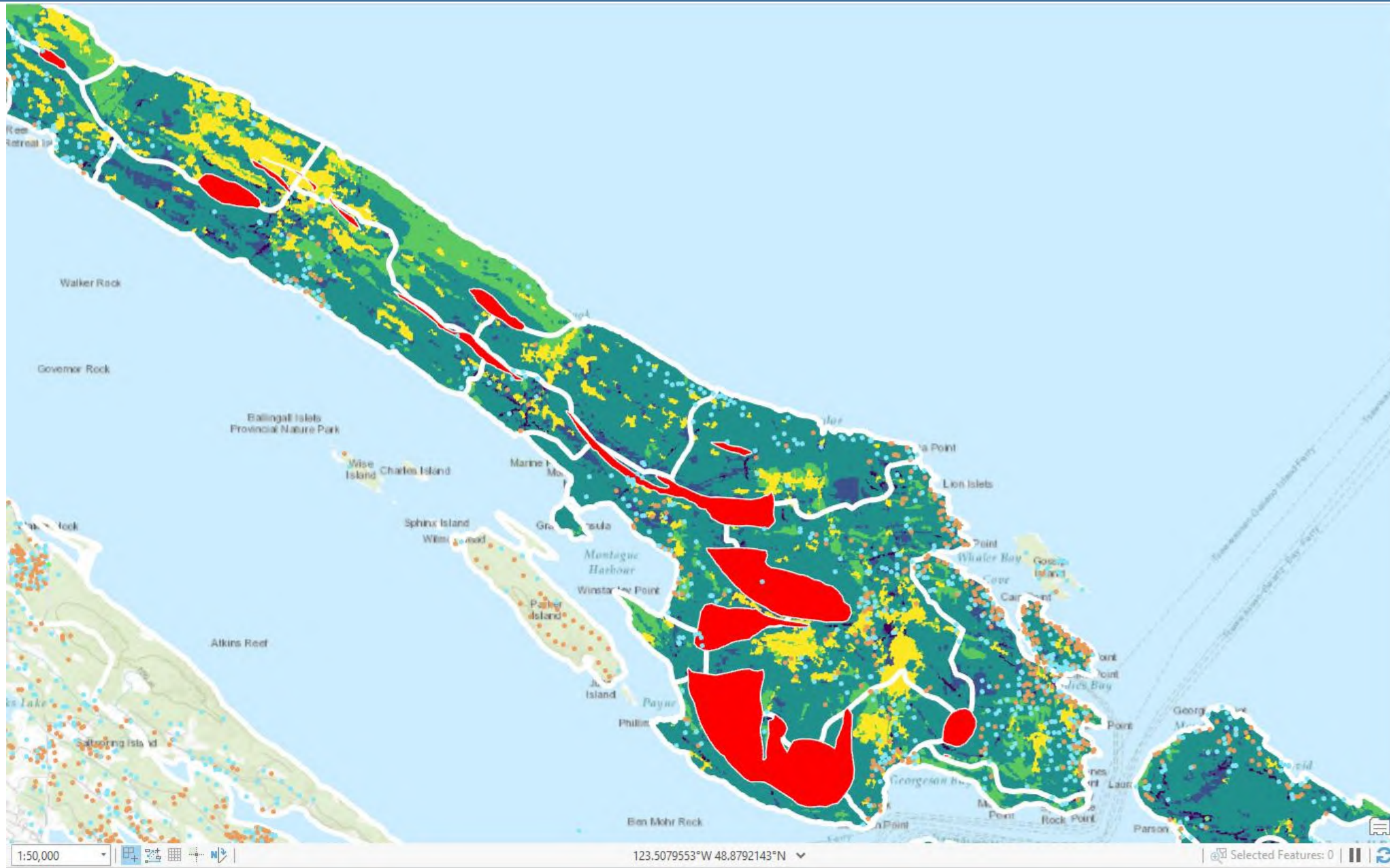
GALIANO ISLAND LAND USE BYLAW

Existing Policies:

- Rainwater capture requirements for new construction in water management areas
- Exempting cisterns from calculation of floor area of buildings and lot coverage
- Standards for potable water supply with respect to subdivision

Options and Opportunities:

- Create of groundwater protection zones
- Reduce density in critical areas through zoning
- Limit existing uses, places limits on size and siting
- Review of water management regulations
- Create impermeable surface regulations
- Engage rainwater harvesting and greywater regulations
- Update subdivision servicing regulations related to potable water, cistern and drainage requirements



Search

Templates Favorites

Click here to see templates not listed.

Galiano_DPA4_Elevated_Groundwater_Catchm

Galiano_DPA4_Elevated_Groundwater_Catch...

GALIANO_GWRRegions

Groundwater Recharge Mapping : Groundwa

0.00 - 0.20

0.21 - 0.30

0.31 - 0.55

0.56 - 0.65

0.66 - 1.00

Groundwater Wells

Closed Loop Geo

Monitoring

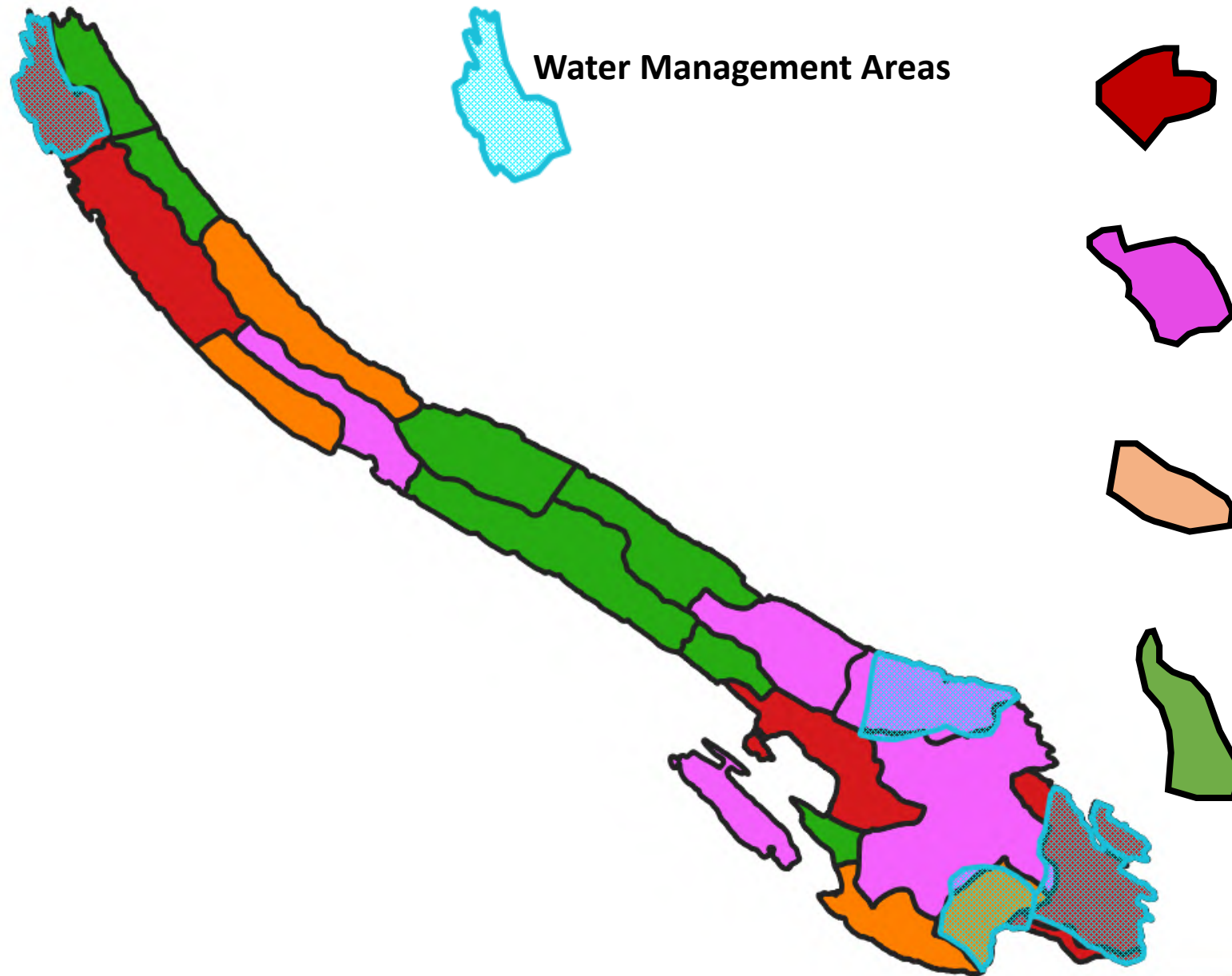
Unknown

Water Supply

1:50,000

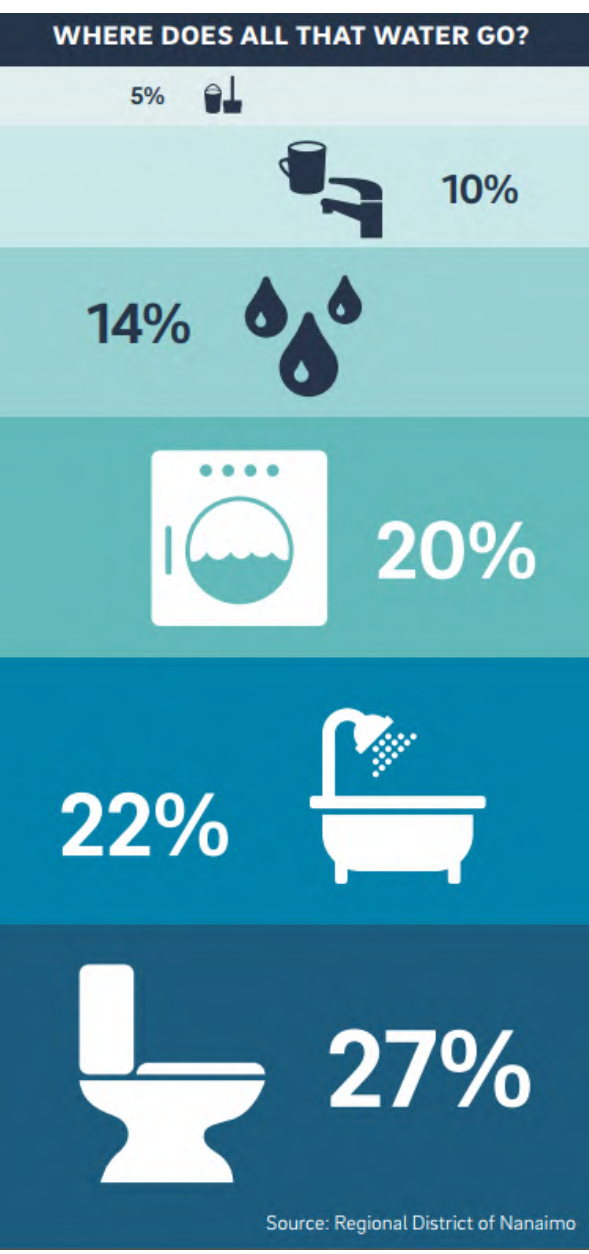
123.5079553°W 48.8792143°N

Selected Features: 0



Water Management Areas







- CLASS I: HIGH VULNERABILITY**
Areas that are in critical need of attention where there is high confidence in existing data
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Areas where there is a potential for critical attention but some data uncertainty
- CLASS III: SUSTAINING**
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- CLASS IV: NOT CRITICAL // UNDERDEVELOPED**
The level of attention needed is not critical. This includes protected areas and forest lots, or areas with limited development potential.




Be a water saver!

In the home – reduce, repair, retrofit


Our daily activities affect our groundwater.

- 
Toilets
 Use low-flush toilets.
- 
Showers and baths
 Use low-flow showerheads and take short showers.
- 
Laundry
 Use high efficiency machines – you could use up to 50% less water. Do full loads.
- 
Check for leaks
 Fix leaky faucets, showerheads, toilets and irrigation systems – you could save thousands of litres of water a month.
- 
Kitchen
 Use a basin to wash and rinse dishes and vegetables/fruit and dispose of the water on plants. Don't run the water constantly while washing dishes. Use high efficiency dishwashers.
- 
Cleaning
 Use a pail rather than running water.


Consider alternative technologies for efficient water use at home.




Well monitors tell you if you're using more water than you have by measuring the amount and rate of flow of water into your well, and how much you are pumping out. Well monitors help you see the trend of how much water is in your well and how the static level changes over time. It is an early warning signal of critical low water levels.




Well pump timers, when used with a cistern, let you set pump intervals to slowly draw water out of your well at pre-set times and store it in a cistern. This water stored in a cistern can be used on-demand. These devices help people with low-producing wells by maximizing the amount of water from a well, without overdrawing it.



Rainwater harvesting is a way to collect and use water for your plants, outdoor cleaning, and even for household use and drinking. Learn more about rainwater harvesting at rdn.bc.ca/events/attachments/evID6235evattID1344.pdf



Greywater recycling systems can relieve demand on your well, cistern and septic system. Use a two-pipe system to collect water from your sinks, laundry, showers and bathtubs for re-use at home. Contact your local building inspector, health authority and a qualified plumber for more information.



Composting toilets may be acceptable as an "alternative solution" in some cases if the toilet and greywater treatment comply with provincial regulations. Please contact your local health authority before considering this option.

Water

it's more than a symbol or a metaphor.

WE ARE INTERCONNECTED WITH LAND, AIR & WATER.

WE HEAR IT IN THE WORDS AND STORIES OF OUR GRANDPARENTS

IT IS OUR GROCERY STORE, OUR PHARMACY, OUR SCHOOLS AND OUR TRANSPORT AND OUR SACRED PLACES.

THIS IS 10,000 YEARS OF KNOWING.

OUR CREEKS AND RIVERS ALLOW US TO HAVE SPIRITUAL BATHS...

TO HEAL OURSELVES.

WE COME FROM THE WATER...

WE NEED A BRIDGE OF UNDERSTANDING THAT INCLUDES OUR SACRED RELATIONSHIP.

WE GET TO REST, BUT THE WATER IS ALWAYS AT WORK.

IT'S NOT A RESOURCE... IT IS A RELATIONSHIP.



IT TEACHES ABOUT PATIENCE, RESPECT, DEATH AND BIRTH

RIVERS ARE THE VEINS OF MOTHER EARTH.

EDUCATING ABOUT THE PAST AND PRESENT... FOR THE FUTURE!
IT IS ALIVE. & HAS A SPIRIT.



THERE ARE IMPACTS AT EVERY SCALE.

CORINNA KEELING-ILLIUM FOR EVERBODY

NEXT STEPS

- **Community engagement on groundwater science projects**
- **Analysis and reporting on options for bylaw amendments**
- **Community, First Nations, and agency consultation**
- **Recommendations on potential amendments**
- **Legislative process to amend bylaws**

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WE COME FROM THE WATER...

WE NEED A BRIDGE OF UNDERSTANDING THAT INCLUDES OUR SACRED RELATIONSHIP.

WE GET TO REST, BUT THE WATER IS ALWAYS AT WORK.

IT'S NOT A RESOURCE... IT IS A RELATIONSHIP.



IT TEACHES ABOUT PATIENCE, RESPECT, DEATH AND BIRTH

RIVERS ARE THE VEINS OF MOTHER EARTH.

EDUCATING ABOUT THE PAST AND PRESENT... FOR THE FUTURE!
IT IS ALIVE. & HAS A SPIRIT.



THERE ARE IMPACTS AT EVERY SCALE.