Resources from June's presenters

Whidbey Island Growers Association

Hydrogeology + Water Rights

Doug Kelly

Hydrogeologist
Island County Environmental Health
(360) 678-7885

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Hydrogeologist
Washington Dept. of Ecology
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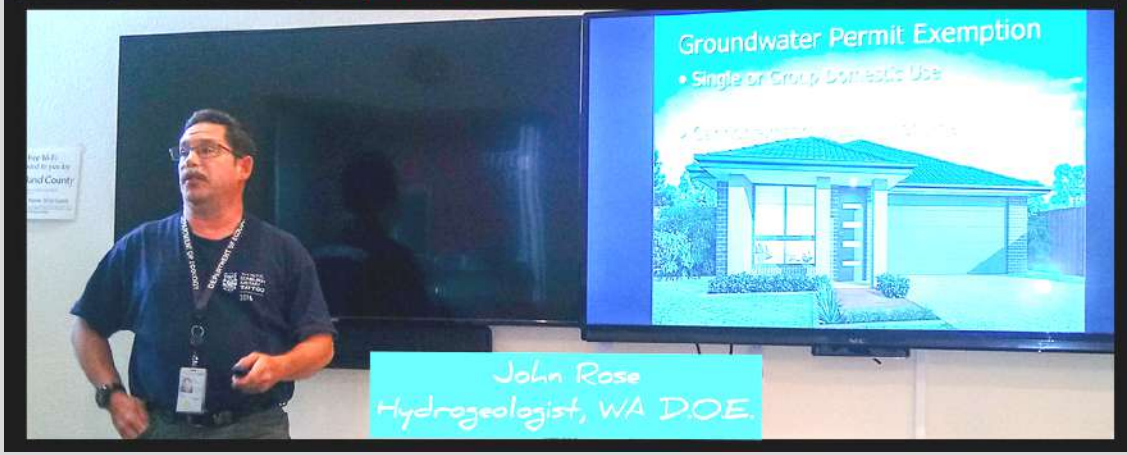


Island County Hydrogeology Homepage bit.ly/319BRfd

Island County Online Well-Viewer Map bit.ly/2FNV4Hk

Request a Groundwater Spatial Analysis bit.ly/2WdAPel

Washington Water Rights General Info bit.ly/2MFzEQA

Washington Water Rights Map bit.ly/2Xu7X3I

Learn about the Whidbey Island Growers Association & receive notice about upcoming events:

whidbeycd.org/agricultural-community/

Coordinated by:

Island County
Washington State University Extension

Whidbey Island Conservation District

Island County Hydrogeology

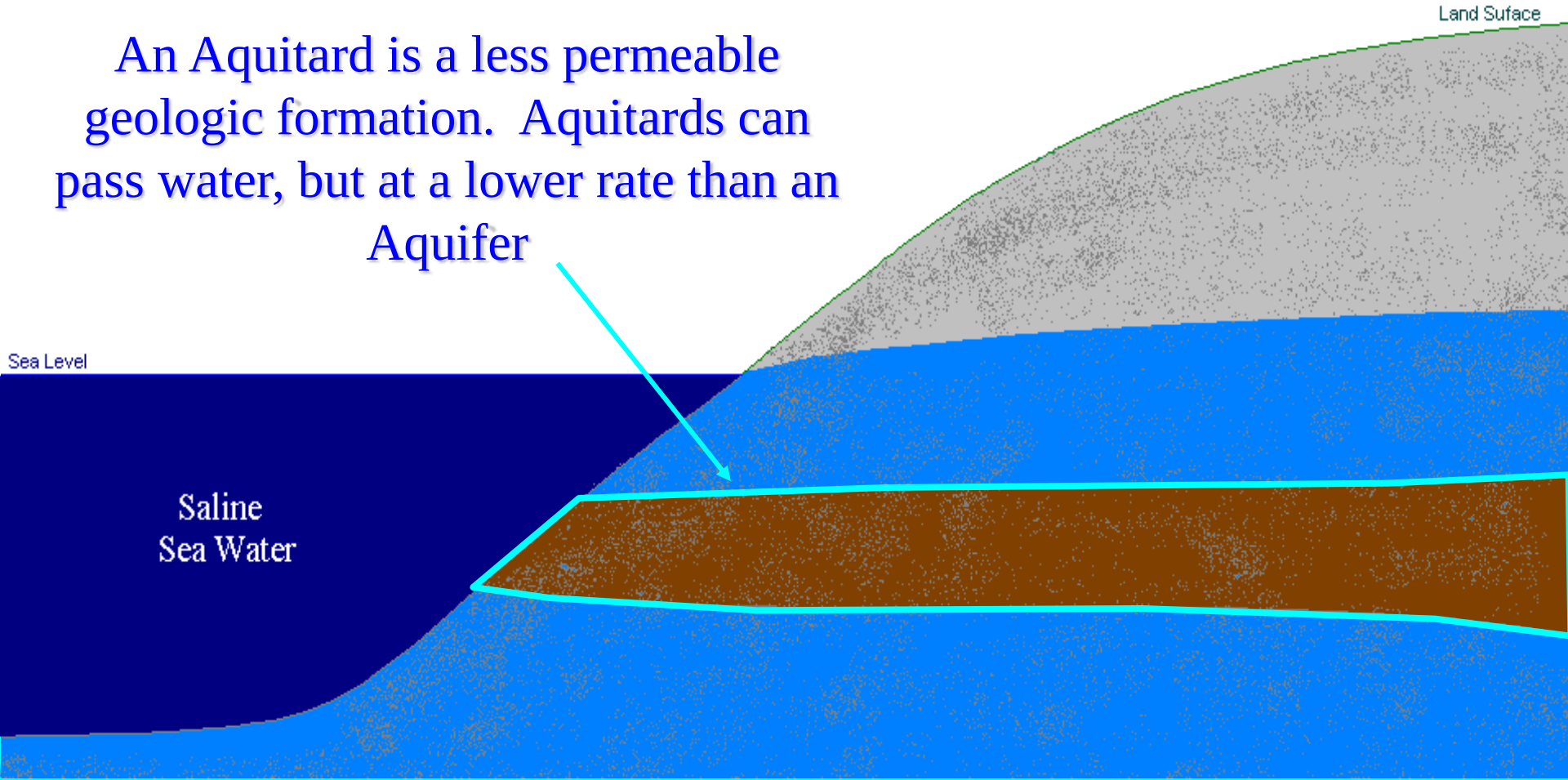
Whidbey Island
Growers Association
June 2019

Doug Kelly
Hydrogeologist
Island County Public Health

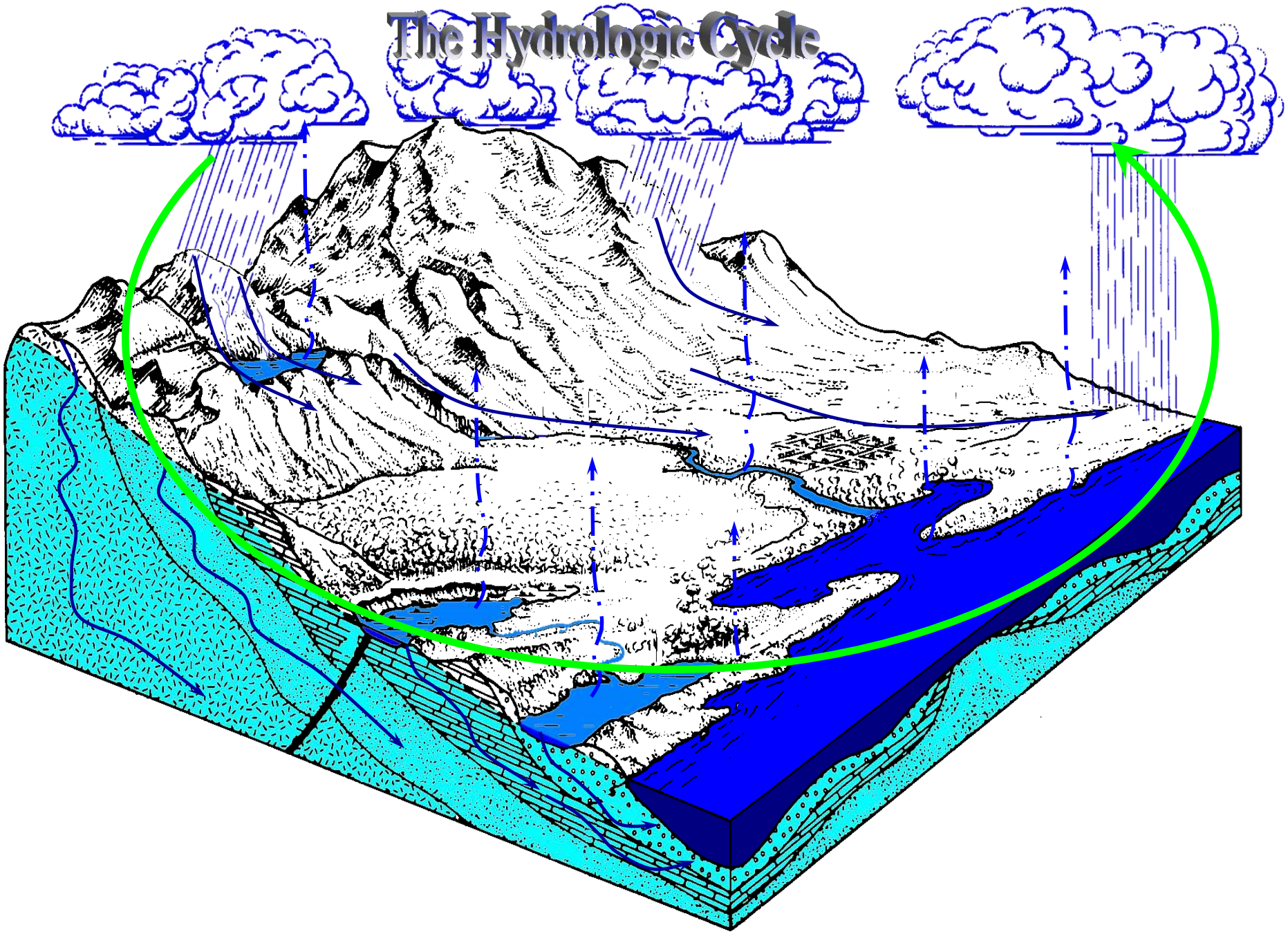
ISLAND COUNTY PUBLIC HEALTH
ALWAYS WORKING FOR SAFER AND HEALTHIER COMMUNITIES

Definitions

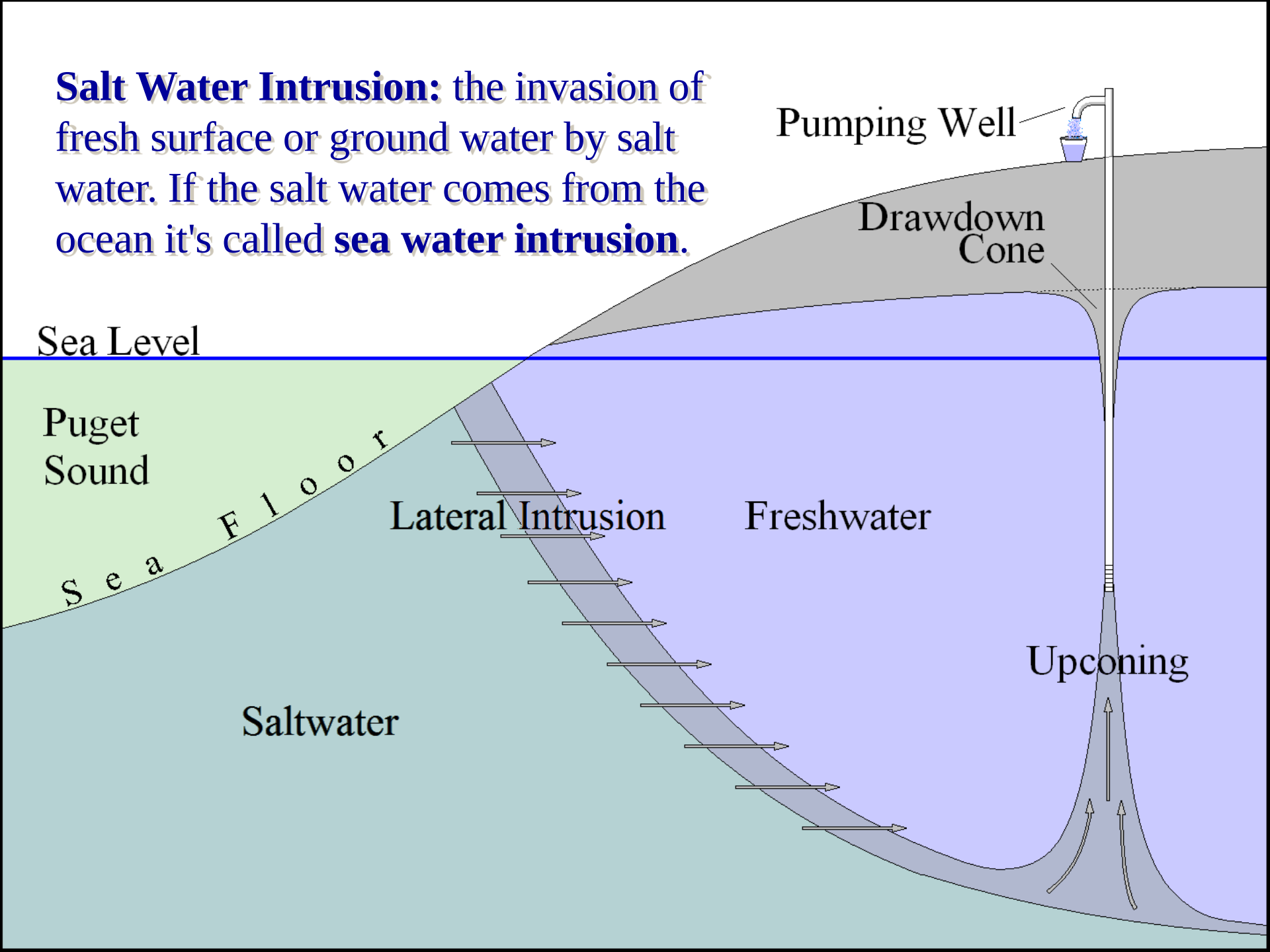
An Aquitard is a less permeable geologic formation. Aquitards can pass water, but at a lower rate than an Aquifer

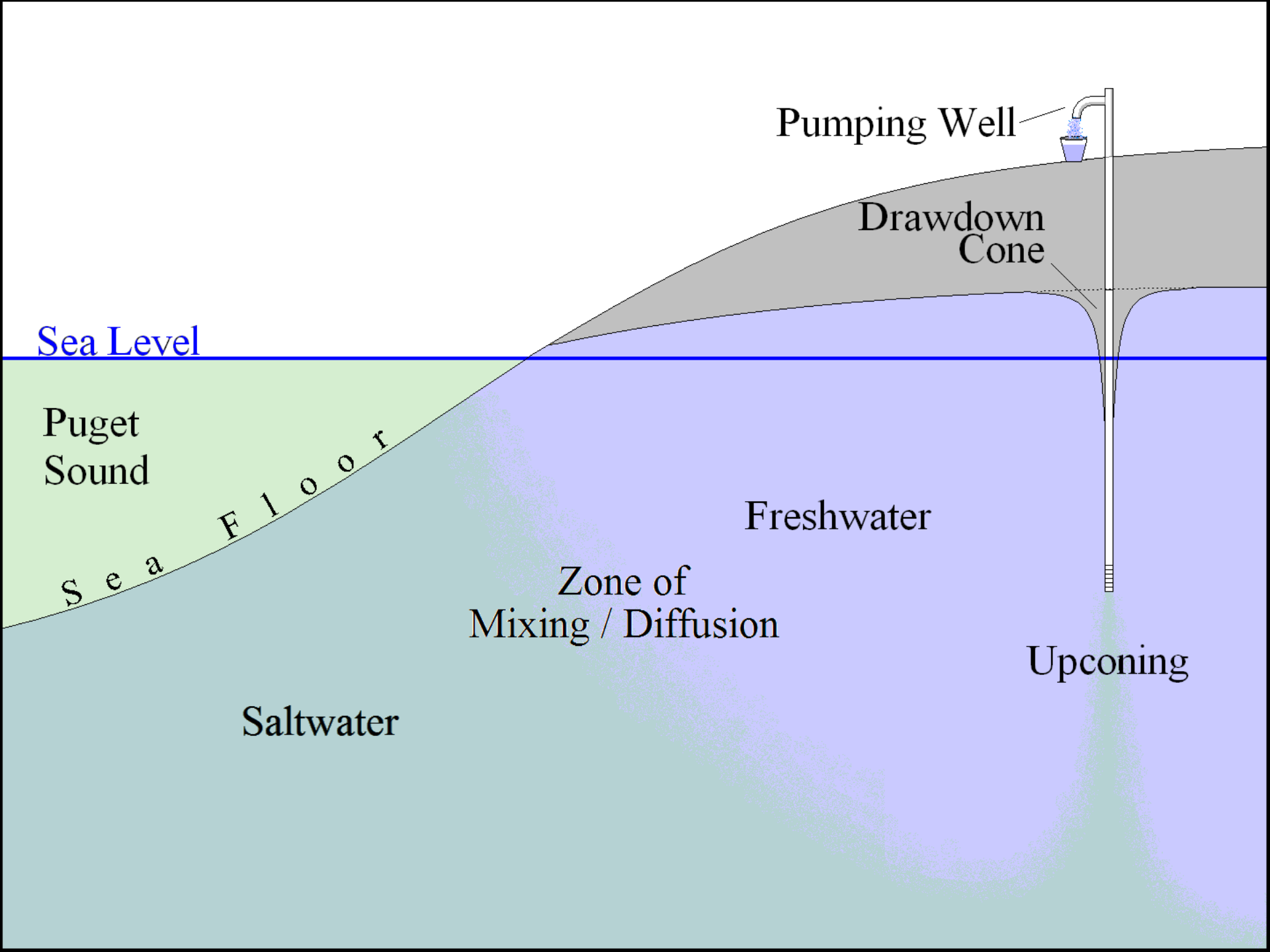


The Hydrologic Cycle

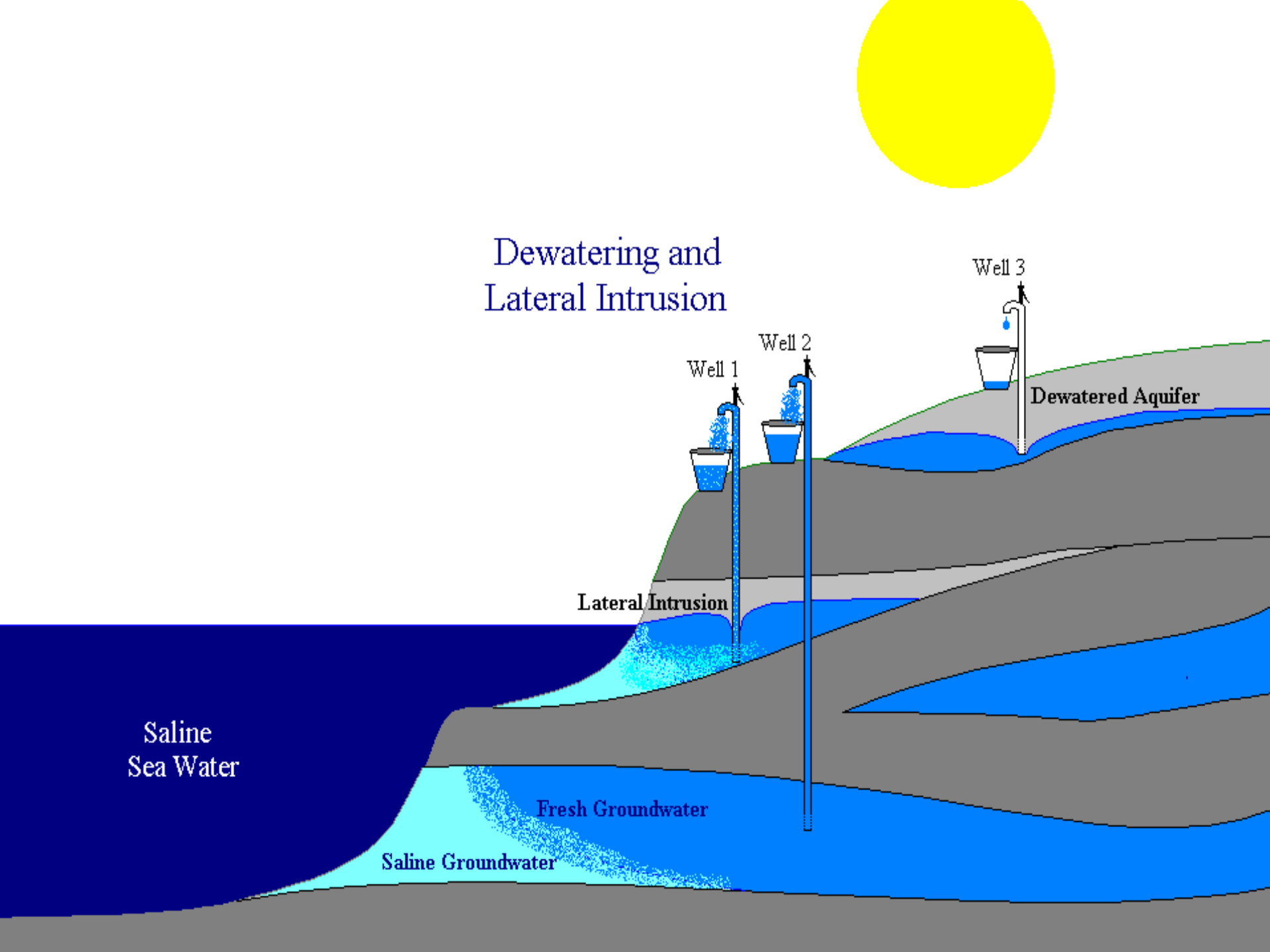


Salt Water Intrusion: the invasion of fresh surface or ground water by salt water. If the salt water comes from the ocean it's called **sea water intrusion**.




Pumping Well
Drawdown
Cone
Sea Level
Puget
Sound
Sea Floor
Freshwater
Zone of
Mixing / Diffusion
Upconing
Saltwater

In summary, the freshwater / saltwater interface is a natural phenomenon which has always been in existence. The position of this interface is not fixed, but moves in response to changes in the flow and pressure in the aquifer.


Dewatering and
Lateral Intrusion
Well 1
Well 2
Well 3
Dewatered Aquifer
Lateral Intrusion
Saline
Sea Water
Fresh Groundwater
Saline Groundwater

Modes of Glacial Deposition

Sub-glacial / Ice Contacts Deposits

- Little or no sorting
- Highly compacted by overlying ice
- Produces glacial till or hardpan

Meltwater / Outwash Deposits

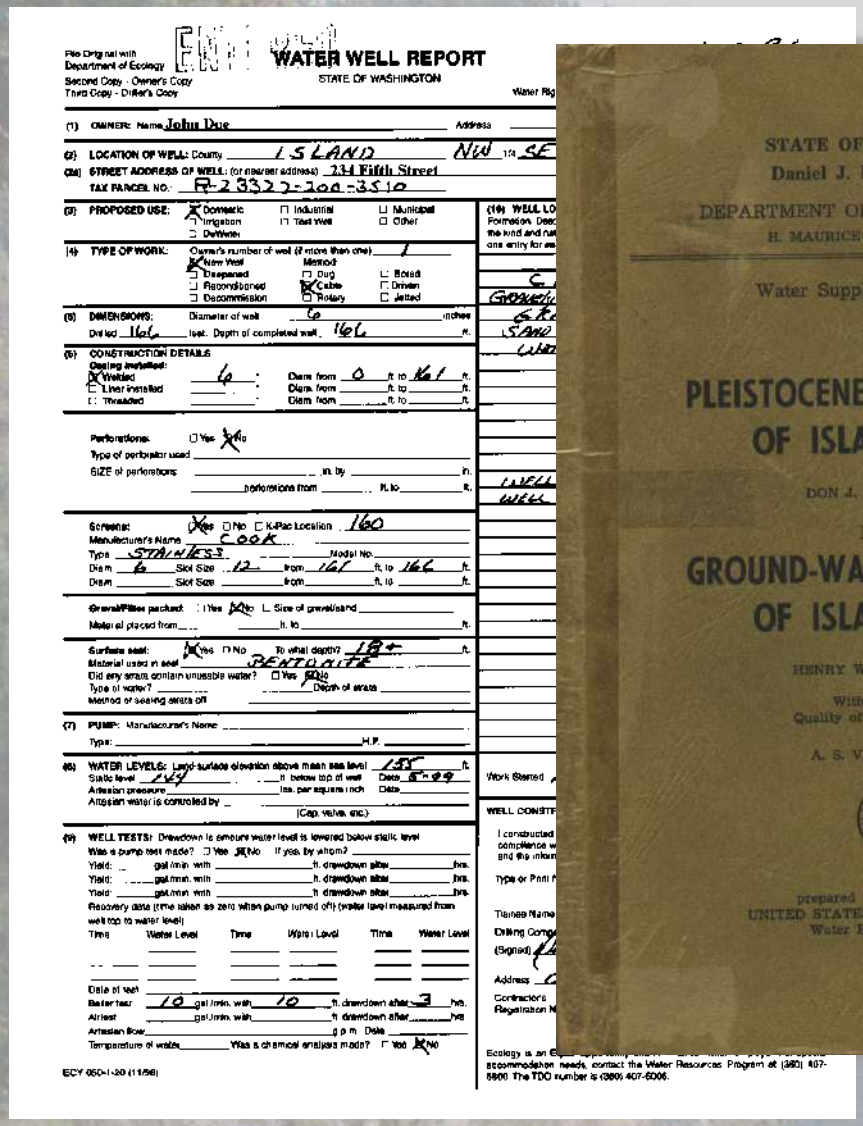
- Sorted
- Little or no compaction
- Produces Sand, Gravel, Silt and Clay

Geologic History – Island County Washington

Erathem	System	Series	GEOLOGIC CLIMATE UNITS		STRATIGRAPHIC UNITS		AQUIFERS AND CONFINING UNITS
CENOZOIC	QUATERNARY	PLEISTOCENE	Fraser Glaciation	Everson Interstade	Glaciomarine Drift of Everson Age		12,500 Years Ago
					Partridge Gravel Easterbrook (1968)		Aquifer E
				Vashon Stade	VASHON DRIFT	Till and Associated Drift of Vashon Age	Confining Unit E
						Esperance Sand Member	Aquifer D
			Olympia Interglaciation		Quadra Formation (Canadian usage)		27,000 Years Ago
			Possession Glaciation		Possession Drift		Confining Unit D
			Whidbey Interglaciation		Whidbey Formation		>40,000 Years Ago Aquifer C Confining Unit C
			Double Bluff Glaciation		Double Bluff Drift		?

Data Sources

Water Well Report



File Original with Department of Ecology
Second Copy - Owner's Copy
Third Copy - Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(1) OWNER: Name John Doe Address
(2) LOCATION OF WELL: County ISLAND NW 1/4 SE
(2a) STREET ADDRESS OF WELL: (or nearest address) 234 Fifth Street
TAX PARCEL NO: R-23322-200-3510
(3) PROPOSED USE: [X] Domestic [ ] Industrial [ ] Municipal [ ] Irrigation [ ] Test Well [ ] Other [ ] Dewater
(4) TYPE OF WORK: Owner's number of well (if more than one) 1
[X] New Well [ ] Deepened [ ] Reconditioned [ ] Decommission
Method: [ ] Dug [X] Cable [ ] Rotary [ ] Bored [ ] Driven [ ] Jetted
(5) DIMENSIONS: Diameter of well 6 inches
Drilled 166 feet. Depth of completed well 166 ft.
(6) CONSTRUCTION DETAILS
Casing installed: [X] Welded 6" Diam from 0 ft. to 166 ft. [ ] Liner installed Diam from ft. to ft. [ ] Threaded Diam from ft. to ft.
Perforations: [ ] Yes [X] No
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
Screens: [X] Yes [ ] No [ ] K-Pac Location 160
Manufacturer's Name COOK
Type STAINLESS Model No.
Diam 6 Slot Size 12 from 161 ft. to 166 ft.
Diam Slot Size from ft. to ft.
Gravel/Filter packed: [ ] Yes [X] No Size of gravel/sand
Material placed from ft. to ft.
Surface seal: [X] Yes [ ] No To what depth? 18+ ft.
Material used in seal BENTONITE
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? Depth of strata
Method of sealing strata off
(7) PUMP: Manufacturer's Name
Type: H.P.
(8) WATER LEVELS: Land-surface elevation above mean sea level 135 ft.
Static level 14.4 ft. below top of well Date 8-4-89
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)
(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? [ ] Yes [X] No If yes, by whom?
Yield: gal/min with ft. drawdown after hrs.
Yield: gal/min with ft. drawdown after hrs.
Yield: gal/min with ft. drawdown after hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level
Date of test
Bailer test 10 gal/min. with 10 ft. drawdown after 3 hrs.
Airlift gal/min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? [ ] Yes [X] No

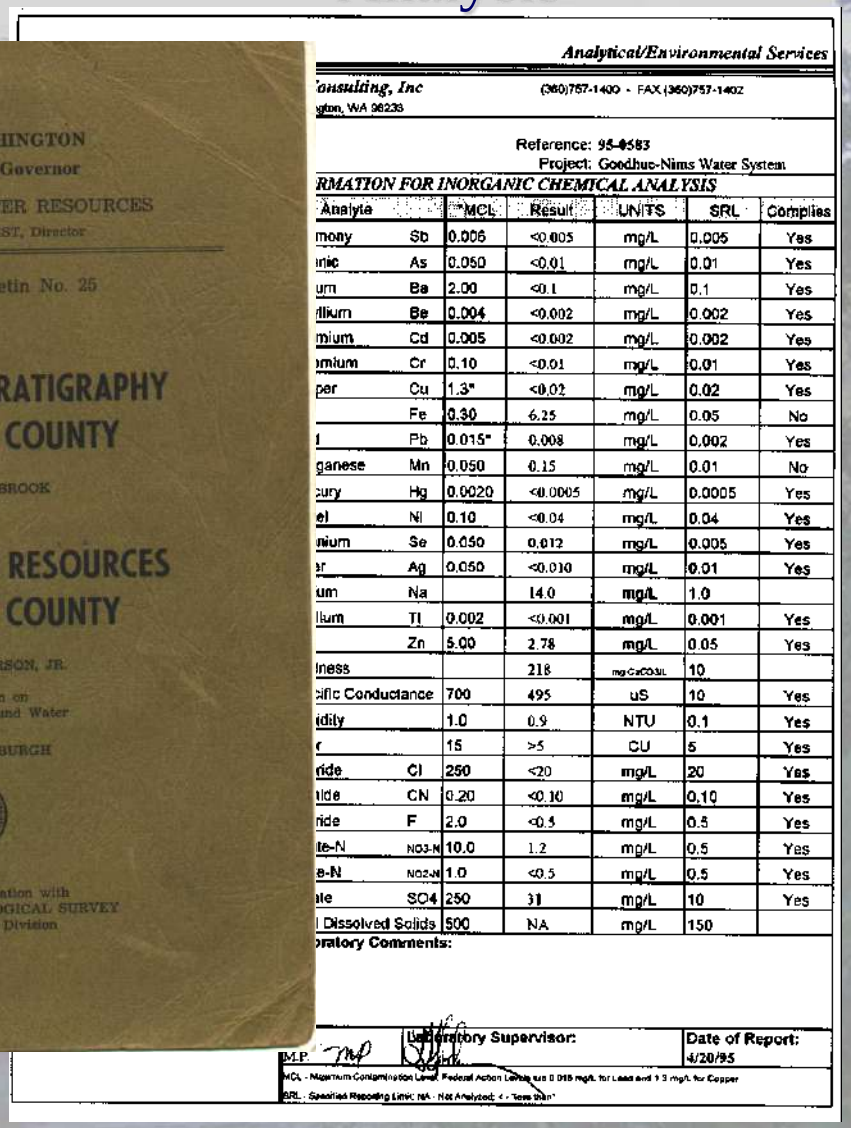
(10) WELL LO
Formation. Desc
the kind and nat
one entry for ea
Gravel/
Sand
Water
WELL
WELL

Work Started
WELL CONSTR
I constructed
compliance w
and this inform
Type or Print
Trainee Name
Drilling Comp
(Signed)
Address
Contractor's Registration N

Ecology is an E
accommodation needs, contact the Water Resources Program at (360) 407-6800. The TDD number is (360) 407-6006.

ECY 050-1-20 (11/96)

Groundwater Chemical Analysis



Analytical/Environmental Services

onsulting, Inc (360)757-1400 - FAX (360)757-1402
gton, WA 98238

Reference: 95-0583
Project: Goodhue-Nims Water System

RMATION FOR INORGANIC CHEMICAL ANALYSIS

Analyte		*MCL	Result	UNITS	SRL	Complies
mony	Sb	0.006	<0.005	mg/L	0.005	Yes
nic	As	0.050	<0.01	mg/L	0.01	Yes
um	Ba	2.00	<0.1	mg/L	0.1	Yes
llium	Be	0.004	<0.002	mg/L	0.002	Yes
mium	Cd	0.005	<0.002	mg/L	0.002	Yes
omium	Cr	0.10	<0.01	mg/L	0.01	Yes
per	Cu	1.3*	<0.02	mg/L	0.02	Yes
	Fe	0.30	6.25	mg/L	0.05	No
l	Pb	0.015*	0.008	mg/L	0.002	Yes
ganese	Mn	0.050	0.15	mg/L	0.01	No
cury	Hg	0.0020	<0.0005	mg/L	0.0005	Yes
el	Ni	0.10	<0.04	mg/L	0.04	Yes
nium	Se	0.050	0.012	mg/L	0.005	Yes
er	Ag	0.050	<0.010	mg/L	0.01	Yes
um	Na		14.0	mg/L	1.0	
llium	Tl	0.002	<0.001	mg/L	0.001	Yes
	Zn	5.00	2.78	mg/L	0.05	Yes
iness			218	mg CaCO3/L	10	
cific Conductance		700	495	uS	10	Yes
idity		1.0	0.9	NTU	0.1	Yes
r		15	>5	CU	5	Yes
ride	Cl	250	<20	mg/L	20	Yes
ide	CN	0.20	<0.10	mg/L	0.10	Yes
ride	F	2.0	<0.5	mg/L	0.5	Yes
te-N	NO3-N	10.0	1.2	mg/L	0.5	Yes
e-N	NO2-N	1.0	<0.5	mg/L	0.5	Yes
te	SO4	250	31	mg/L	10	Yes
l Dissolved Solids		500	NA	mg/L	150	

oratory Comments:

Laboratory Supervisor: Date of Report: 4/20/95

M.P.

MCL - Maximum Contamination Level, Federal Action Levels are 0.015 mg/L for Lead and 1.3 mg/L for Copper
SRL - Specified Reporting Limit; NA - Not Analyzed; < - "Less Than"

STATE OF WASHINGTON
Daniel J. Evans, Governor
DEPARTMENT OF WATER RESOURCES
H. MAURICE AHLQUIST, Director

Water Supply Bulletin No. 25

Part I

PLEISTOCENE STRATIGRAPHY OF ISLAND COUNTY

By
DON J. EASTERBROOK
and

Part II

GROUND-WATER RESOURCES OF ISLAND COUNTY

By
HENRY W. ANDERSON, JR.

With a section on
Quality of the Ground Water
By
A. S. VAN DENBURGH

Part II
prepared in cooperation with
UNITED STATES GEOLOGICAL SURVEY
Water Resources Division
1968

Data Storage and Analysis

- Microsoft Access Databases
- Graphical Analysis Tools
- OLE Link to Mapping, Geo-Statistics and Groundwater Flow Modeling
- Web Applications

Environmental Health

Serving the communities of Camano & Whidbey Islands

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Environmental Health

Environmental Health is the branch of Public Health that is concerned with all aspects of the natural and built environment that may affect human health. Natural Resources is the branch of Public Health that is concerned with protecting the natural environment for the benefit of human health and the ecosystem. The goal of Environmental Health is to protect and promote public health.

We are here to help. Contact us at any time through our **Employee Directory**.

Contact Information

Douglas J. Kelly L.G., L.HG

Island County Environmental Health

(360) 678-7885

D.Kelly@co.island.wa.us

WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Washington Water Law

June 3, 2019

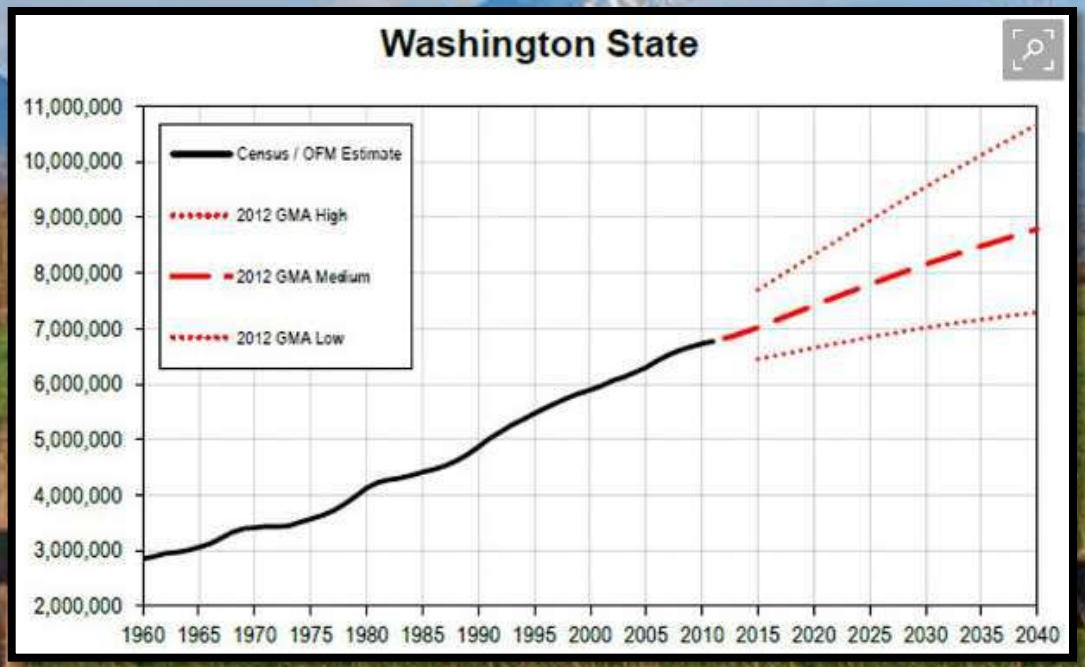
John Rose
Water Resources Program

Water Rights 101

- Historical background and overview
- Definitions – Certificates, Permits, and Claims
- Permit Exempt wells
- Instream Flow Water Rights
- Criteria for assessing applications for new water rights, and changes to existing rights
- Relinquishment and Abandonment
- Existing and Future Challenges

Increasing competition for water

Human uses including irrigation



Increasing competition for water

Fisheries

Increasing competition for water

Sustainable Environment

Why do we need water rights?

- Water rights are required by law to ensure proper allocation and management of Washington's water resources.

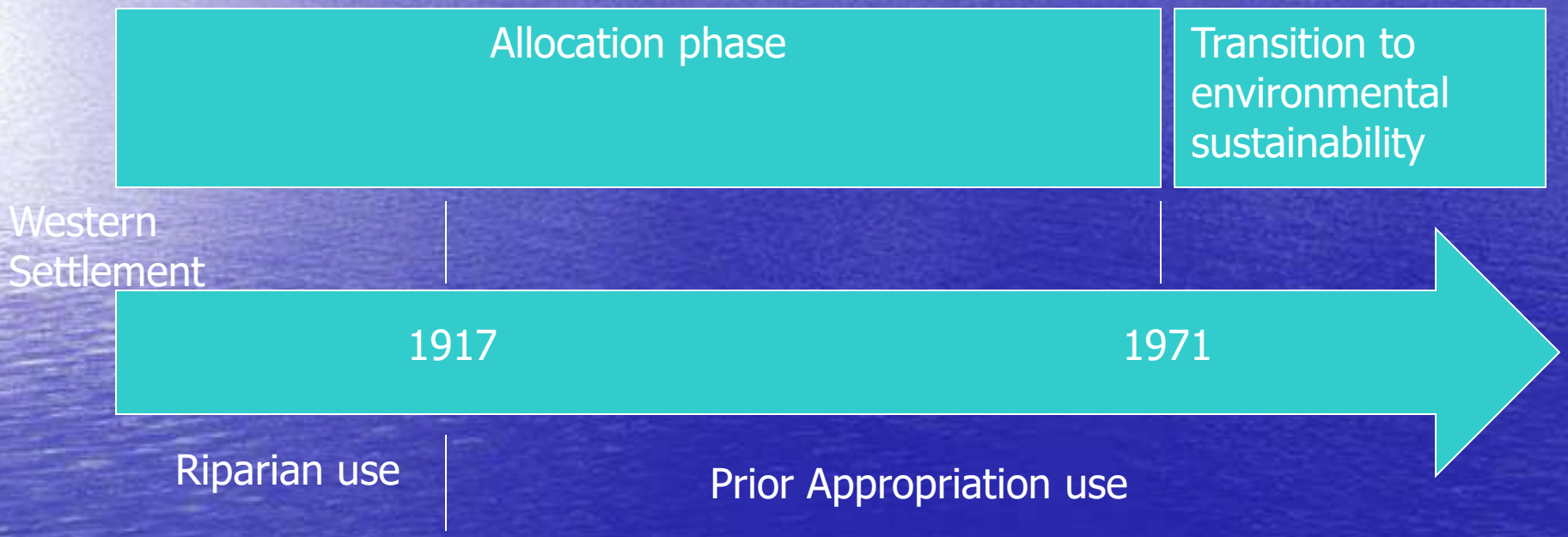
- Water rights establish priority dates which can be used to allocate water during times of drought.

Ecology's Role

- Water Resources Manager of the State
- Administrator of water rights
- Regulator of water rights, well construction, dam safety & instream flows
- A water supply developer

WASHINGTON STATE DEPARTMENT OF ECOLOGY

The Evolution of Washington Water Use



In the west, whiskey is for drinking, and water is for fighting over – Mark Twain.

A Water Right Question

- I own a piece of land that I plan to build on when I retire and had a well drilled 5 years ago. I have a legal source of water, right?

- Not necessarily.

  WA's first water code in 1917 for surface water established that a water right is only vested when water is put to beneficial use.

Historical Background

- Water owned in common since Roman times.
- Western Europe and Eastern U.S. adopts Riparian Doctrine
- Western U.S. adopts Prior Appropriation Doctrine in late 19th century.

Surface Water Code - 1917
Ch. 90.03 RCW

Principles of Western water law adopted for Washington:

- **"First in time, first in right"**
- **New uses of water need a permit**
- **Existing water rights protected**
- **Water right is appurtenant to the land**
- **A surface water right is Superior to a groundwater right**
- **Note: you cannot create a right through illegal use**

Ground Water Code - 1945
Ch. 90.44 RCW

- Supplemental to 1917 Surface Water Code
- New uses of ground water need a permit
- Small water uses exempted from permitting process (permit exempt wells). There are no exemptions for surface water.

Groundwater Permit Exemption

LIVESTOCK

Groundwater Permit Exemption

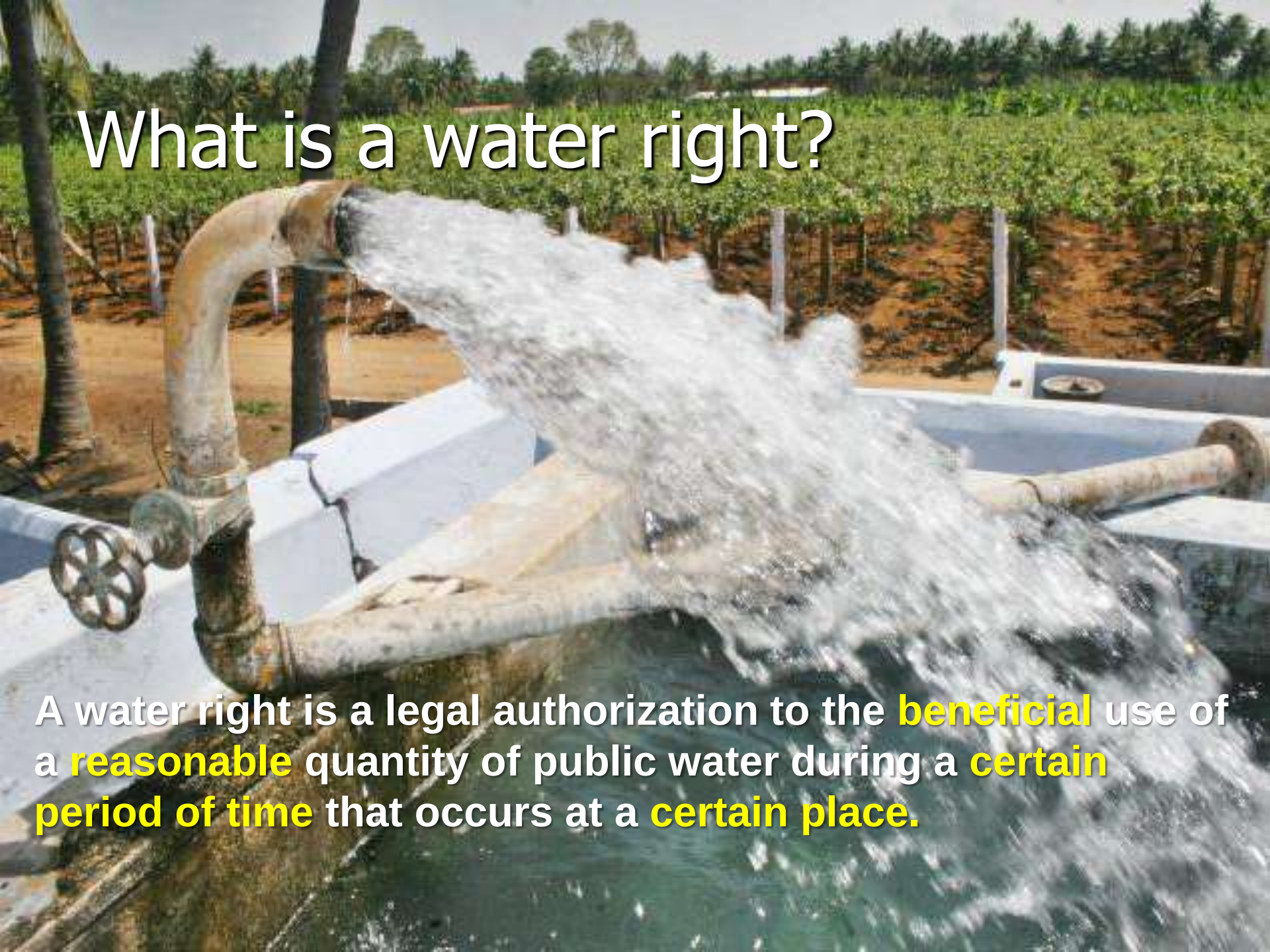
- Single or Group Domestic Use
- Cannot exceed 5,000 gallons/day

Groundwater Permit Exemption

- **Industrial uses**
- **Not to exceed 5,000 gallons/day**

Groundwater Permit Exemption

- Irrigation of a non-commercial lawn or garden
- Not to exceed ½ acre



What is a water right?

A water right is a legal authorization to the beneficial use of a reasonable quantity of public water during a certain period of time that occurs at a certain place.

Information on a water right

Designated Point of Diversion or Withdrawal

- **Point of Diversion** is for surface water

- **Point of Withdrawal** is for a groundwater well

Information on a water right

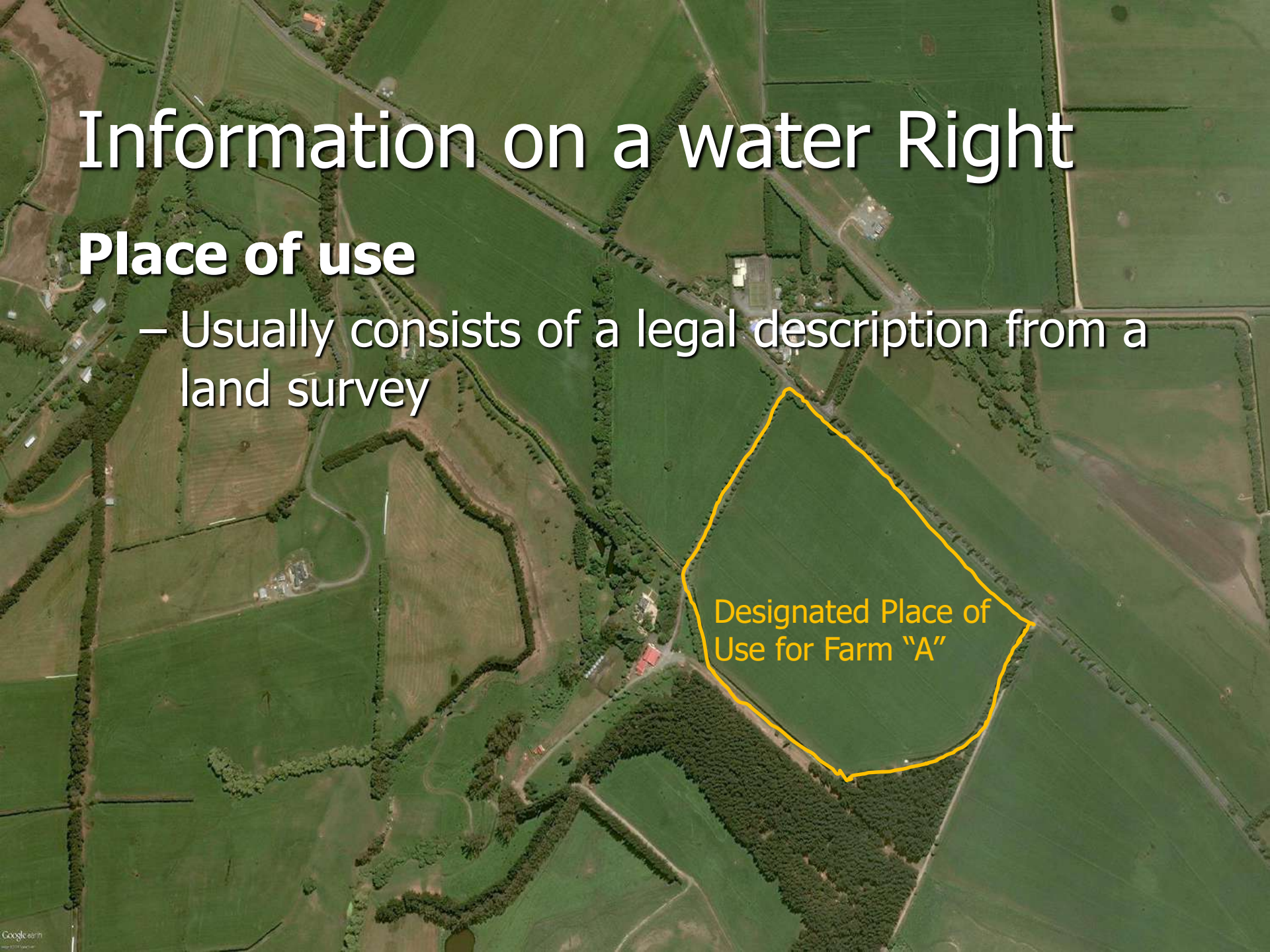
Purpose(s) of Use of the water right

- Irrigation
- Stockwatering
- Domestic (single or multiple)
- Power generation
- Commercial
- Fish propagation
- Fire suppression
- Etc.

Information on a water Right

Place of use

- Usually consists of a legal description from a land survey



Information on a Water Right

Priority Date

- Where are you in the hierarchy of water allocation

Period of use

- When can you turn on your water?

Information on a Water Right

Water Quantities

- Instantaneous Quantity (pumping rate)
- Annual Quantity (total volume)

Water Right Types

- Water Right Certificates issue to perfected rights under water code.
- Water Right Permits issue to allow development under water code.
- Water right claims were filed for rights established before the existing permit system.
- Instream Flow Water Rights issued to protect rivers and stream levels

Obtaining a new Water Right:

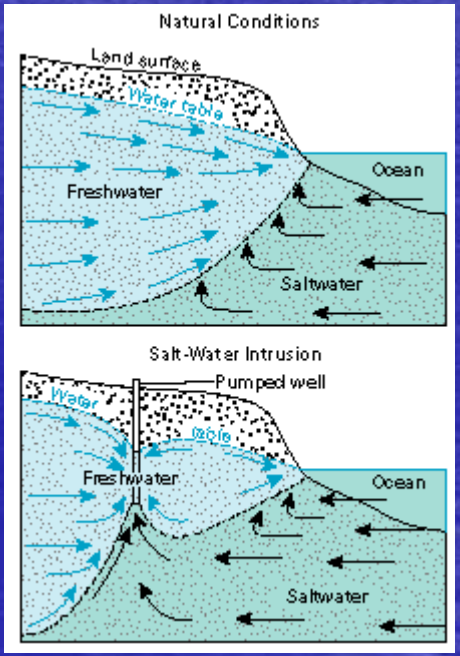
The 4 Part Test

- use is beneficial
- water is available, legally and physically
- not detrimental to public interest
- The water right would not impair existing users

anyone can appeal Ecology's decision for 30 days before permit issued.

What other things need to be considered?

- Existing Watershed Plans
- Stream Closures, instream flows
- SEPA
- Site-specific considerations
- Etc.



Instream Flow Water Right

- A water right for a river basin
- Meant to protect:
  - aquatic and wildlife habitat
  - water quality
  - recreational values and navigation
- Set by Ecology after scientific study and stakeholder agreement.
- Equal to all other water rights
- **Any water right issued after ISF rule is junior.**

Ways that a Water Right can be Lost

- Statutory forfeiture due to nonuse (Chapter 90.14 RCW). Also known as Relinquishment or "Use it or lose it".
- Abandonment of the right (Common Law).
- **You can Protect your water right from relinquishment with the Trust Water Right Program**

Changing a water right

Elements of a water right that can be changed:

- **Source** - Groundwater or Surface
- **Purpose** - Irrigation, domestic, industrial etc.
- **Period of Use** – Seasonal or year round
- **Point of Diversion/Withdrawal** - location
- **Place of Use** – Where water is being used
- **Provisions** – To avoid failing the 4 part test.

NOTE: you cannot change the quantities or the priority date on a water right!

Water law…

- 2/3 of the water law is not in statute -- it is common law (case law)
- A layer cake compiled over 120 years
- All uses are equal -- the only priority is "first in time is first in right"
- Limited/no recognition by GMA, ESA, other land use planning

Finis!

And now for the QUESTIONS!