RCW 90.94 Water Offset Projects (not including water right acquisitions) May 2019

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RCW 90.94 Requirements

Consumptive Water Use

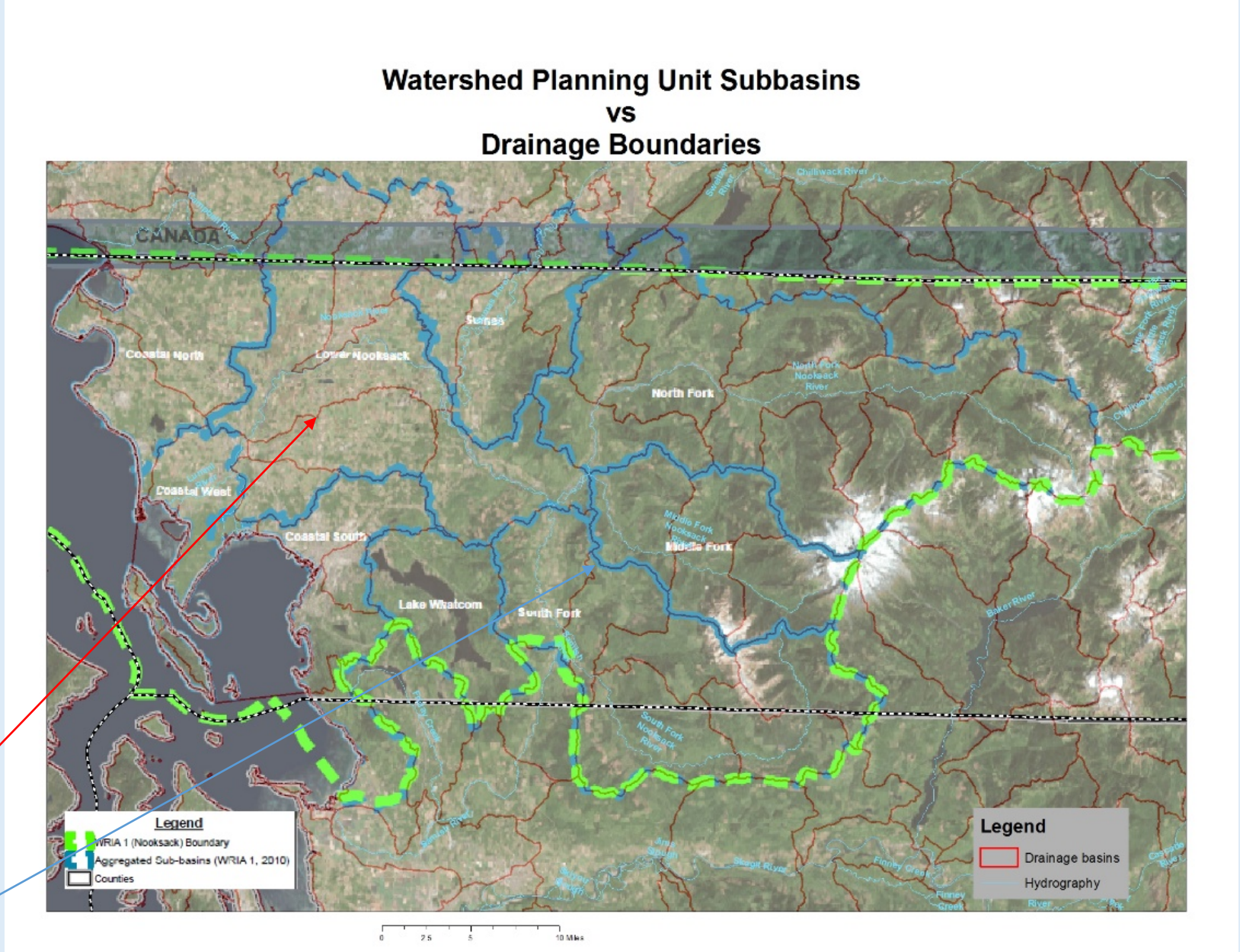
- Under RCW 90.94 permit-exempt domestic well water use must be estimated to establish amount of water use that watershed restoration plans and plan updates must address.
- Plans must estimate consumptive use associated with permit-exempt, domestic well use initiated between January 19, 2018 and January 18, 2038.
- Ultimately, watershed plans will be judged by two tests:
  - total potential impacts of new, domestic, permit-exempt well consumptive use are offset
  - “net ecological benefit” (NEB) is provided by plan.

Subbasins

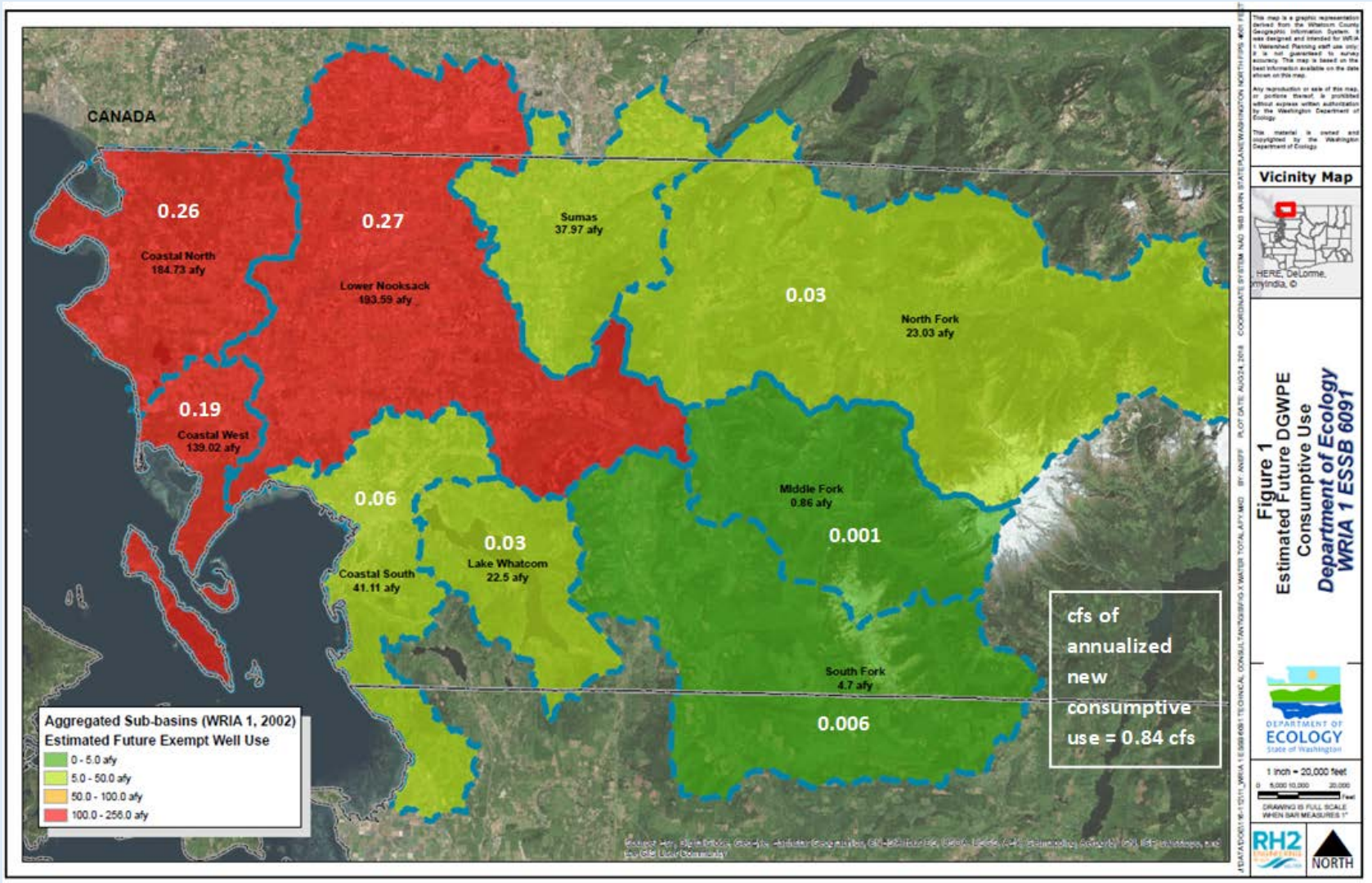
Planning groups must delineate suitably-sized subbasins within WRIAs.

Subbasins will not necessarily correspond with watershed divides.

WRIA 01 has 49 USGS HUC12 subwatersheds and 9 Planning Unit subbasins



Example: WRIA 1 concluded consumptive use from new domestic uses initiated over 20-year horizon will likely be about 647 AF/year (equal to about 0.9 cfs), apportioned out by subbasin based on expected well locations.



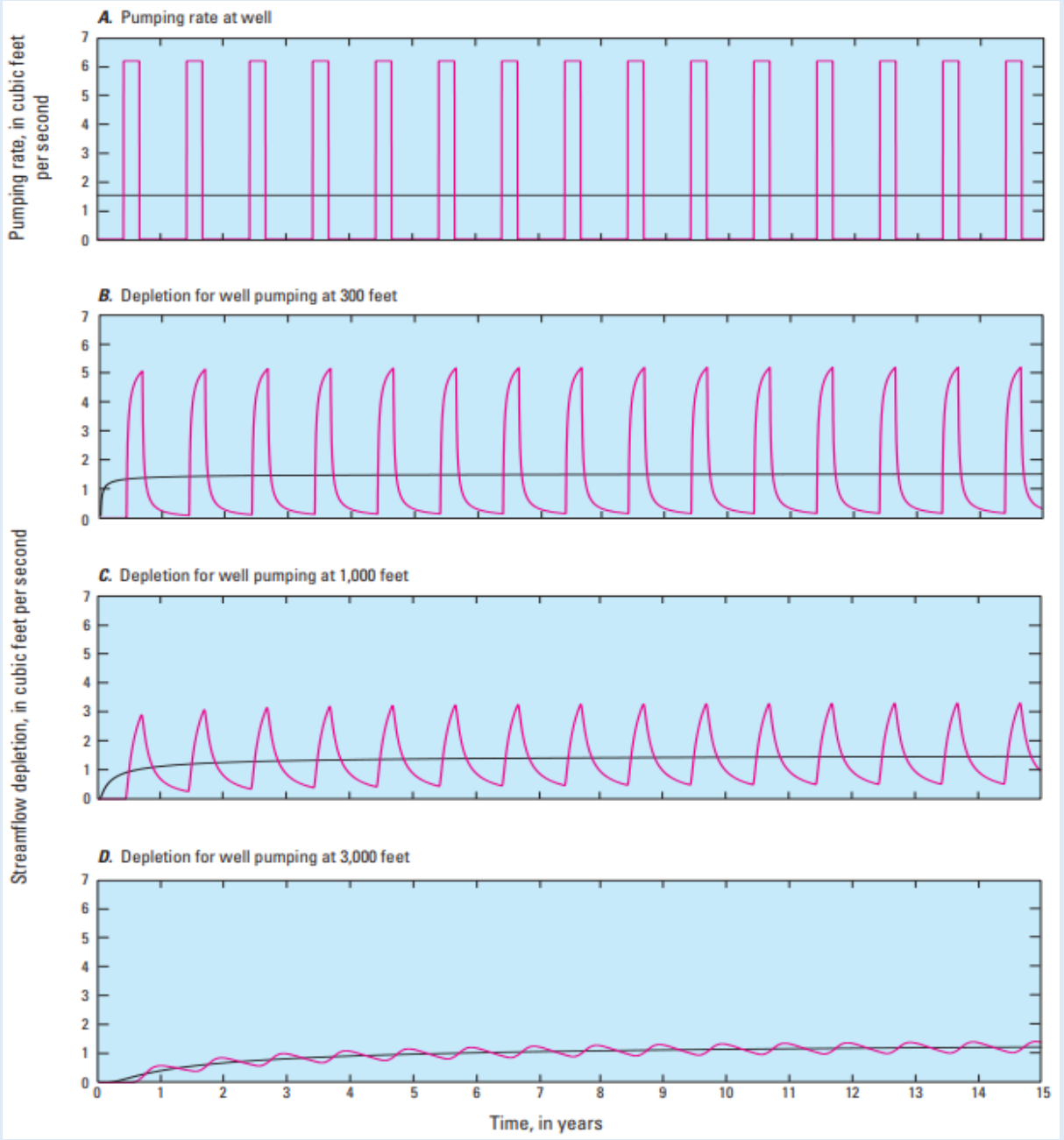
Higher and Lower Priority Offset Projects

- ESSB 6091 requires high priority offset projects to replace anticipated new water use in-time and in same subbasin.
- Law also indicates that projects are lower priority if they are not in same subbasin or they replace consumptive water supply impacts only during critical flow periods.

Note: *Distinction between higher priority and lower priority projects may not be critical in determining whether plan achieves NEB. For example, a project involving acquisition of surface water irrigation right may be very beneficial to salmon and important toward achieving NEB even though it only provides water during part of year.*

Seasonal vs. Steady State

- Estimating groundwater impacts on streams precisely can be complicated due to lags between when a well is pumped and when impacts propagate to a stream.
- Magnitudes of aquifer pumping pulses decay over distance and time as effects spread out.
- In most instances it is reasonable to assume streamflow depletion will essentially be steady state - especially beyond distance of few thousand feet.



USGS Circular 1376

Spatial Considerations

- Even when planning groups assume steady state conditions, they will need to consider how pumping effects are distributed spatially.
- Conceptually, one option is to assume all or most pumping effects will remain within subbasins and be distributed evenly to all surface water bodies.
- In rare instances where most future wells are likely to be shallow and congregated near an important fish-bearing stream, other assumptions can be made, such as to conservatively assume depletion impacts are attributed to streams closest to pumping.

Overall Context of RCW 90.94

Structure of mitigation under RCW 90.94 is fundamentally different then mitigation for groundwater permits.

RCW 90.94 allows compensation for permit-exempt domestic wells to occur anywhere within a WRIA, provided watershed plans achieve a Net Ecological Benefit (NEB).

This means placing offset projects in places that are most beneficial to fish will be more important than understanding specific impacts from permit-exempt domestic well pumping.

Water Offset Projects

Two Basic Types of Water Offset Projects

Offset projects aimed at replacing quantity of consumptive water use by permit-exempt wells anticipated over the next twenty years can be divided into two basic types:

- Water right acquisitions
- Other projects that provide stream flow benefits

In addition to Water Offset Projects, plans may also include projects aimed at improving non-flow related aspects of aquatic habitat (e.g vegetation).

Examples of Water Offset Projects (other than acquisitions)

- Managed aquifer recharge
- Surface water off-channel storage
- Switching source of withdrawal from surface to groundwater, or other beneficial source exchange
- Floodplain restoration/levee removal
- Restoration of incised stream channels

Evaluation of Benefits Associated with Water Offset Projects

Flow benefits associated with surface water right acquisitions may be straightforward to analyze, since water rights include attributes such as period of use, withdrawal limits, and source location(s).

Generally it will be harder to estimate flow benefits associated with other types of water offset projects.

Groundwater Water Right Acquisitions Benefits

It can also be challenging estimating benefits associated with groundwater water right acquisitions - where wells are being retired. This is due to lags between when pumping occurs and when diffuse effects of pumping reach a stream.

Water Offset Project Information Needed

- Descriptions of water offset quantity, location, and timing are needed to accurately compare benefits of water offset projects with amounts and locations of projected impacts from new consumptive water use.
- To determine whether benefits from lower priority water offset projects provide water at critical flow periods, plans need to identify periods critical for fish.

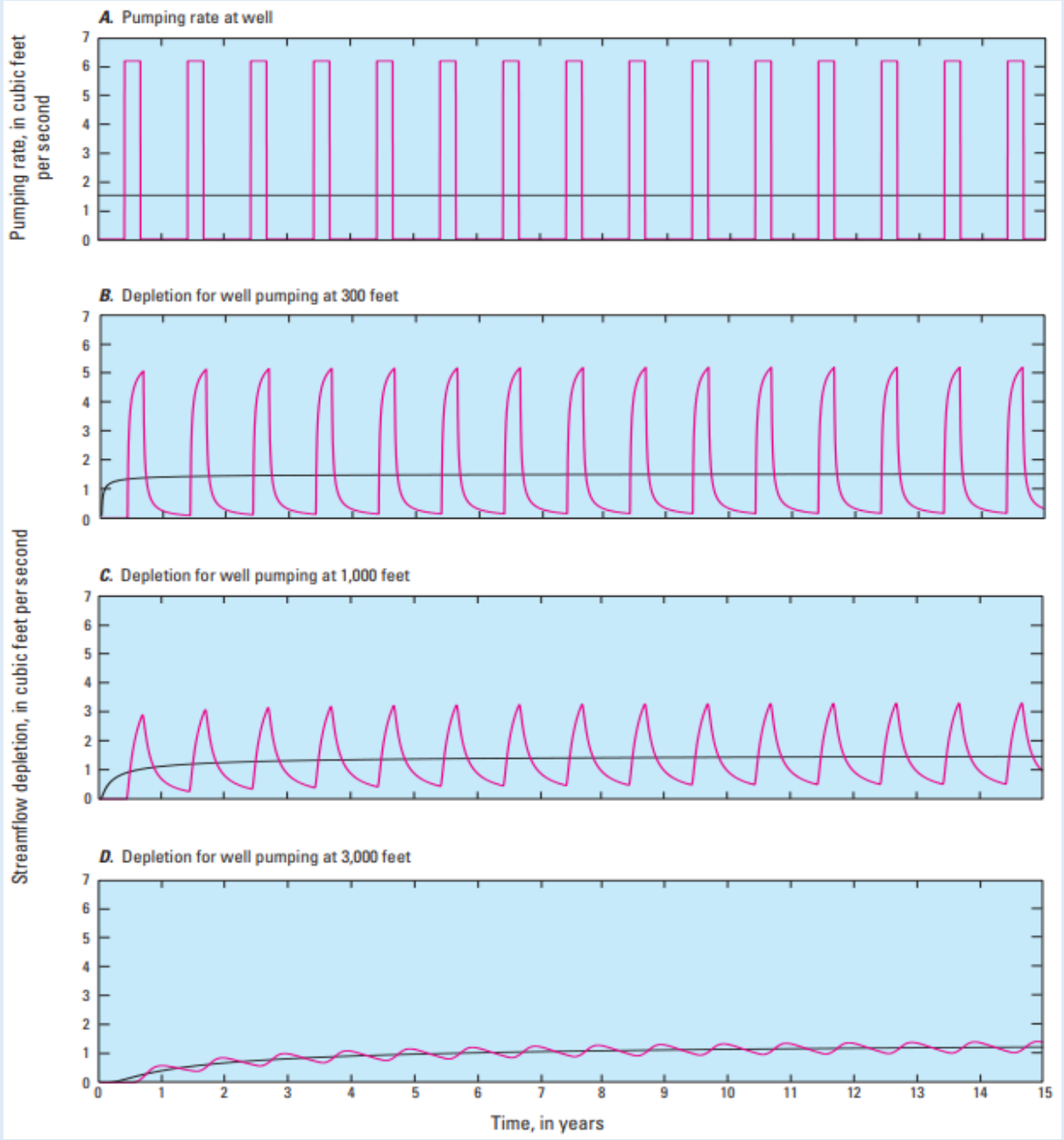
Examples of Water Offset Projects (other than acquisitions)

Managed Aquifer Recharge (MAR) Projects

- MAR projects typically involve diverting a small fraction of high-flow-season streamflow into spreading basins or other infiltration facilities in adjacent floodplain or uplands.
- Diverted surface water infiltrates into the shallow aquifer, then migrates through the aquifer, and ultimately discharges back to surface water as re-timed groundwater baseflow.
- MAR projects can increase shallow aquifer discharges to streams at times of year that matter most to salmon.

MAR benefits in Time and Space

- Within aquifers MAR projects can provide similar responses to streams as groundwater pumping – only in reverse.
- If a pulse of water is added to an aquifer directly adjacent to a stream, benefits are almost instantaneous.
- If, however, a pulse of water is added to an aquifer 3,000 feet from a stream, benefits to stream can be nearly steady state.



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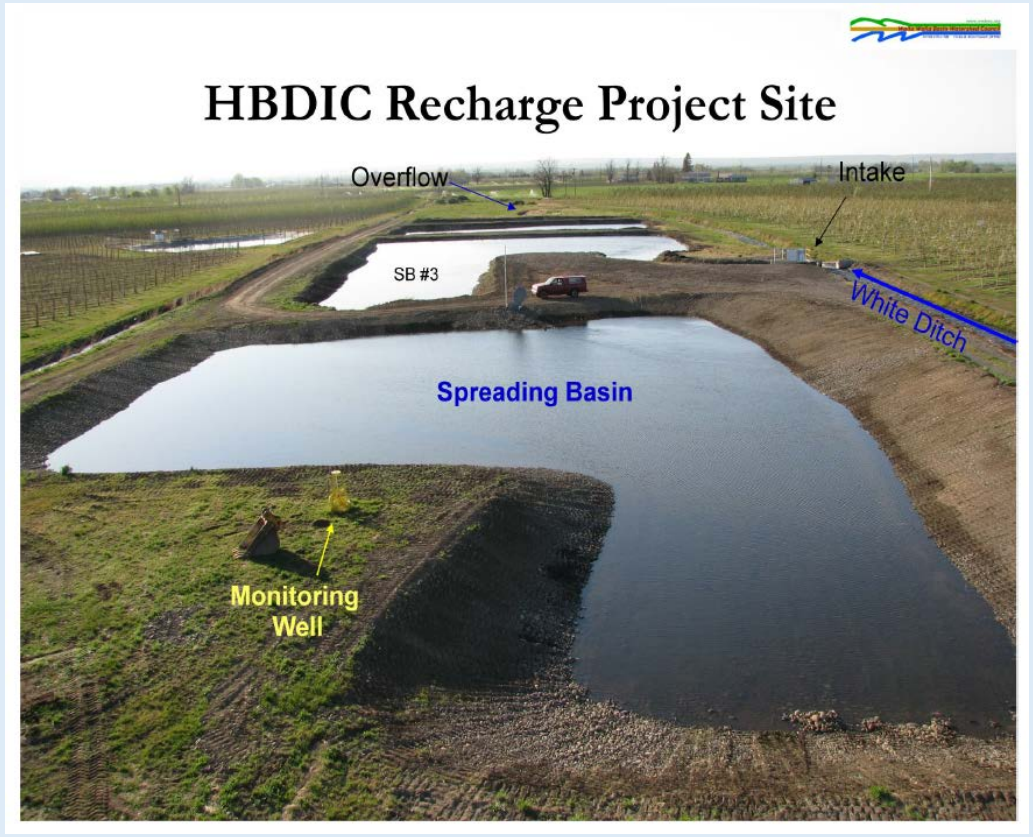
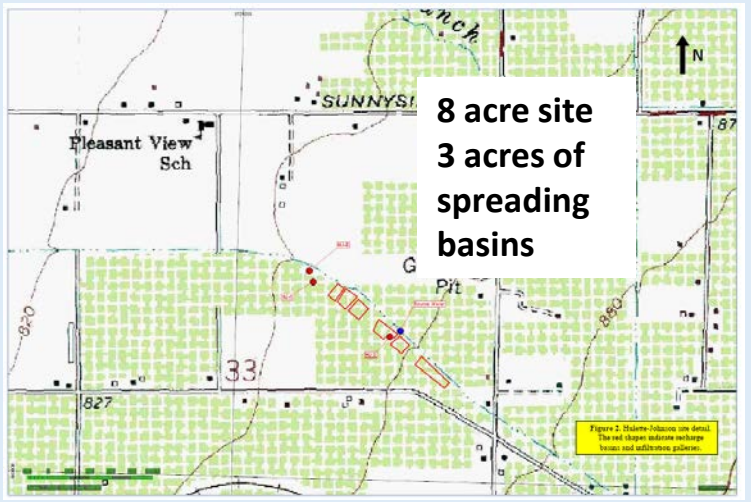
Walla Walla Basin Watershed Council
Oregon Johnson AR site (formerly Hudson Bay site)



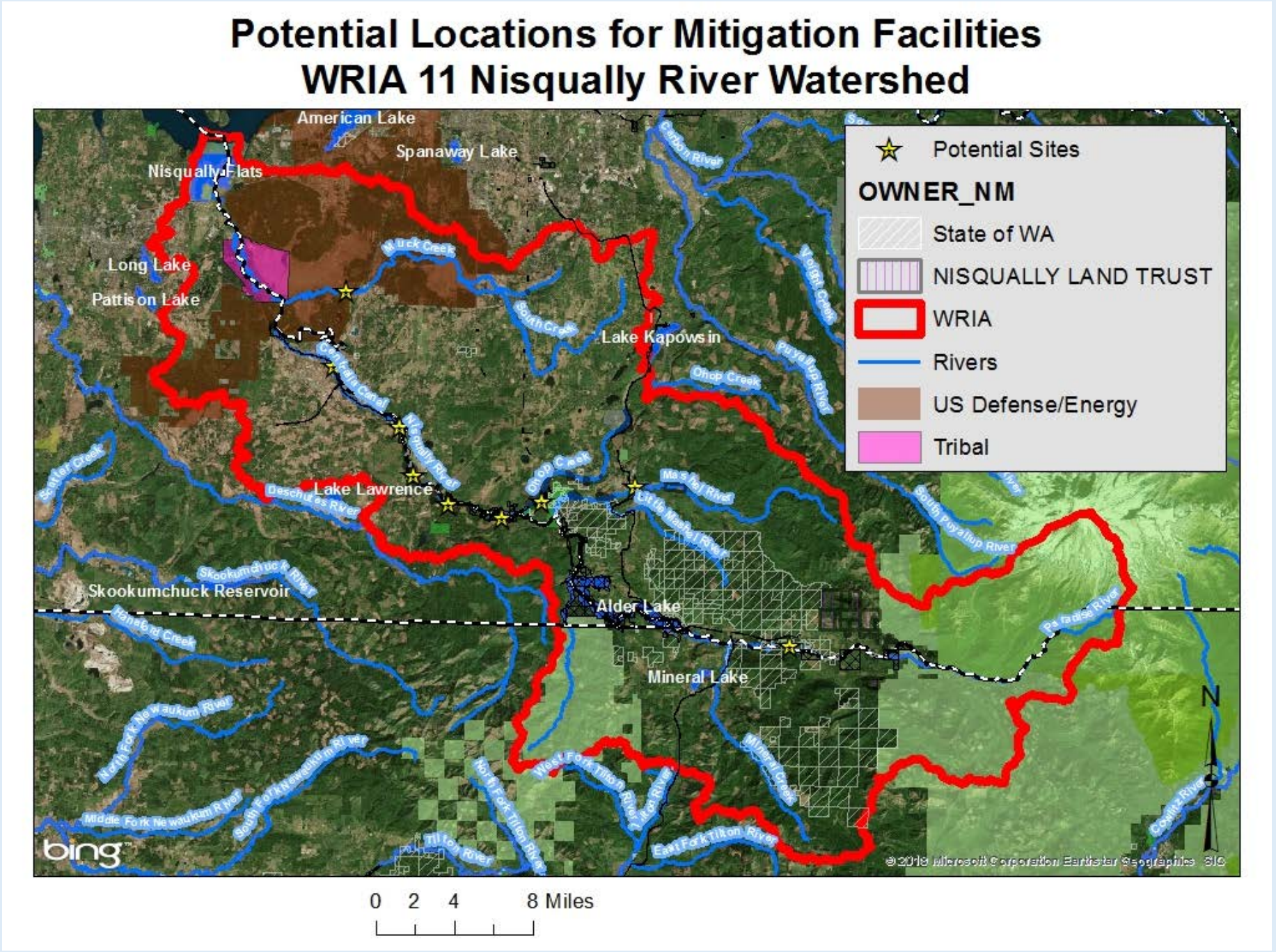


Recharge Season								
Spring 2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
~410 Acre Feet	~1870 Acre Feet	~ 2810 Acre Feet	~3230 Acre Feet	~2740 Acre Feet	~2840 Acre Feet	~3750 Acre Feet	~ 3700 Acre Feet *	~3970 Acre Feet

* Data collected for the first two months of the 2010-2011 recharge season were erroneous and/or missing. Water volumes for the first two months have been estimated based upon the 2009-2010 & 2011-2012 seasons.

Recharge project in Dungeness Watershed

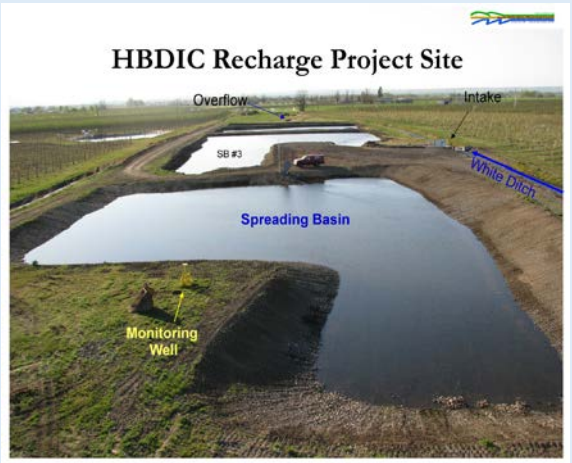
Ecology has done some exploration of potential MAR sites in the Chapter 90.94 RCW watersheds.



Surface Water Off-Channel Storage

- Involves storing surface water in impoundments, then releasing water back into streams at times more beneficial to fish.
- Requires more active water management than MAR projects, so additional concerns regarding project longevity.
- Benefits can be somewhat straight forward to quantify.

Different, but still may look like…



Walla Walla Basin Watershed Council

Switching Surface Water Withdrawals to Groundwater (continued)

Benefits can be difficult to quantify due to time lags between when groundwater pumping occurs and when pumping effects reach stream (more significant with confined aquifers).

Floodplain Restoration/Levee Removal Projects

- Involves removing existing levees to re-establish floodplain inundation.
- Water offset quantities estimates should be provided over entire water year for range of average and low precipitation conditions.
- Flow benefits are likely, however, estimates will be very uncertain, so may be appropriate to assume only a portion of anticipated benefits.

Chehalis River Watershed

Restoration of Incised Stream Channels

Concept is to implement multiple channel-spanning barriers constructed from natural materials to slow and impound streamflow, re-aggrade channel beds, and improve hydrologic connectivity between channel and floodplain.

Photo credits: Chris Perra

Restoration of Incised Stream Channels (continued)

- Habitat benefits are fairly well defined (improved fish habitat, water quality, and aesthetics)
- Aggradation of incised streams increase baseflow, however, amounts of streamflow benefits are less clear (particularly timing)
- Seven case studies, mainly in California, evaluated late summer baseflow
  - Three indicated an increase
  - Five indicated a decrease

Photo credit: Chris Perra

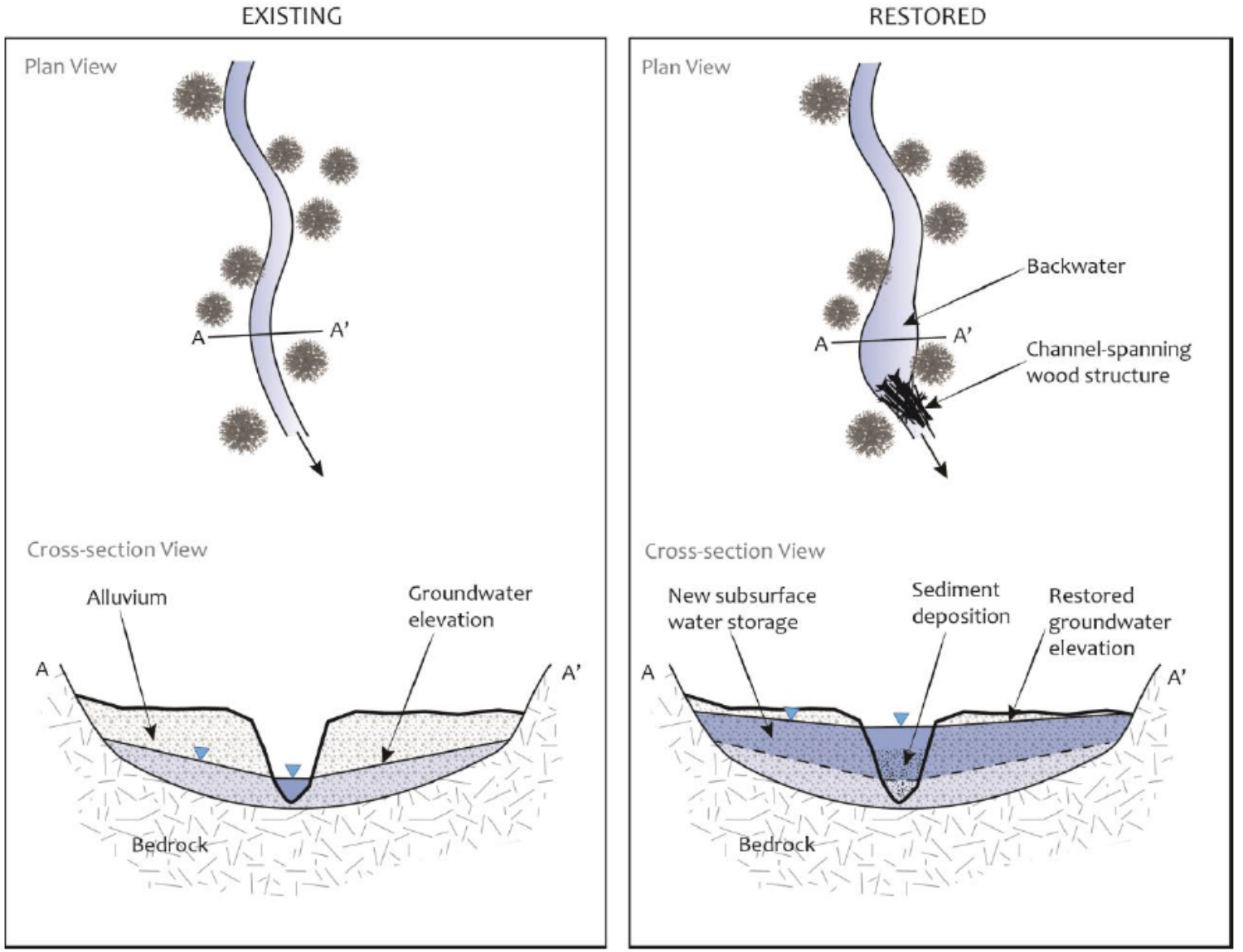
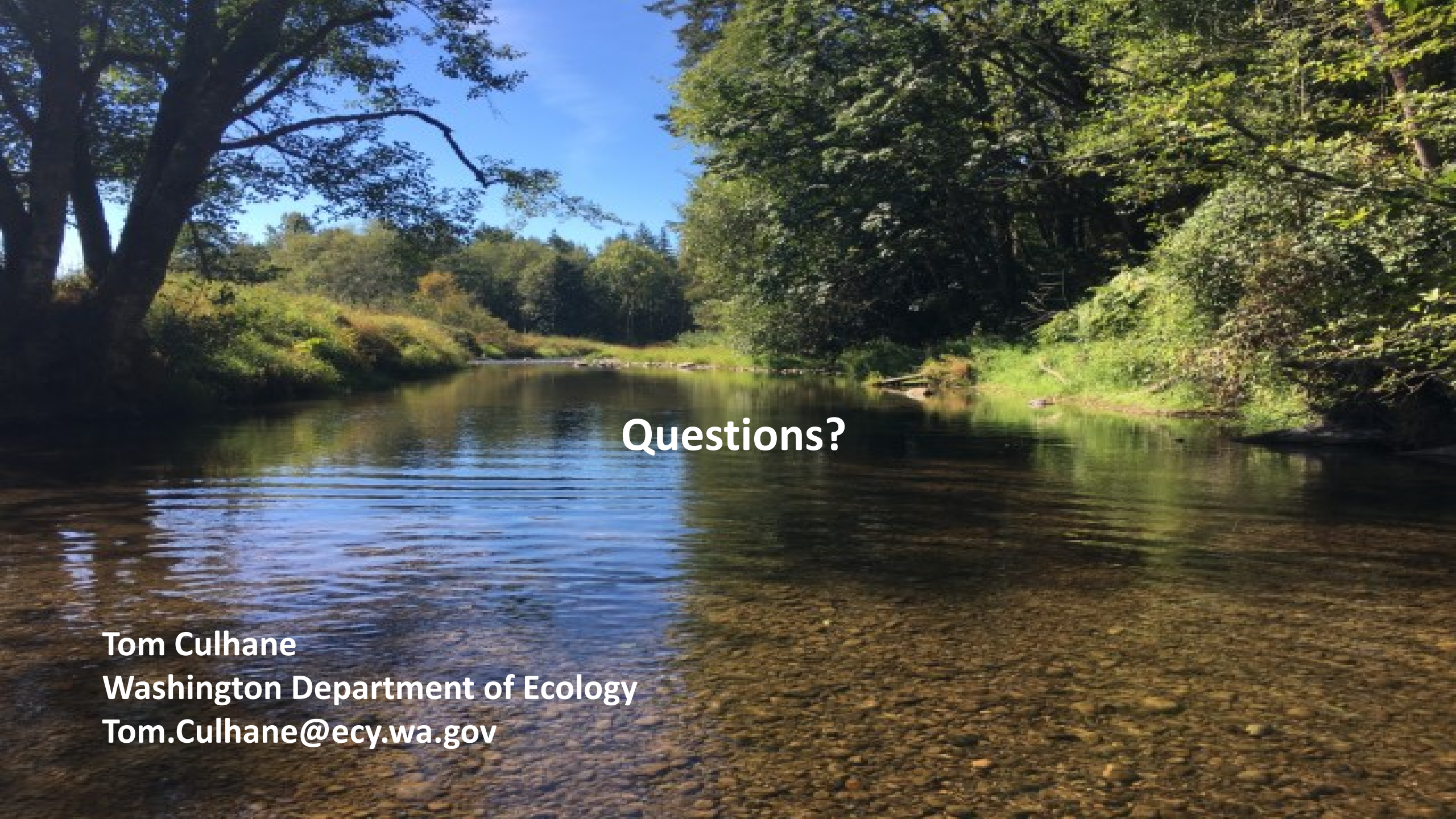


Figure 1. Conceptual diagram of the effect of stream restoration on in situ water storage: a channel-spanning wood structure slows local flow velocity and creates a backwatered reach, resulting in sediment deposition and increased surface and subsurface water storage.

Source:
Natural Systems Design



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