Columbia River Direct Pump

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November 9, 2009

- Columbia River
- Columbia River Instream Flow Requirements
- Selah Creek Direct Pump and Reservoir

Columbia River—New Water Supplies

RCW 90.90.005

(1) The legislature finds that a key priority of water resource management in the Columbia river basin is the **development of new water supplies that includes storage and conservation** in order to meet the economic and community development needs of people and the instream flow needs of fish.

(2) The legislature therefore declares that a Columbia river basin water supply development program is needed, and directs the department of ecology to **aggressively pursue the development of water supplies** to benefit both instream and out-of-stream uses.


BRITISH COLUMBIA
ALBERTA
WASHINGTON
OREGON
IDAHO
MONTANA
WYOMING
NEVADA
UTAH
Pacific Ocean
Canoe
Kinbasket Lake
Columbia
Golden
Revelstoke
Invermere
Okanagan Lake
Nakusp
Kelowna
Duncan
Elk
Kettle
Nelson
Cranbrook
Okanagan
Castlegar
Trail
Kootenay
Methow
Pend Oreille
Flathead
Flathead Lake
Banks Lake
Spokane
Wenatchee
Yakima
Crab
Snake
Clearwater
Missoula
Cowlitz
Longview
Yakima
Kennewick
Lewiston
Clark Fork
Astoria
Lewis
Richland
St. Helens
Vancouver
Pendleton
Portland
The Dalles
Umatilla
Grande Ronde
Salem
Deschutes
John Day
Salmon
Willamette
Corvallis
Eugene
Bend
Malheur
Payette
Henrys Fork
Boise
Idaho Falls
Boise
Pocatello
Snake
Owyhee
Portneuf
Twin Falls
Bruneau


Big Bend
Revelstoke
Columbia Lake
Castlegar
Vancouver
Seattle
Grand Coulee Dam
Wenatchee
Tri-Cities
Astoria
Portland

Columbia River

- Annual Flow: 192-198 million acre feet (mouth)
- International Treaties with Canada:
  - 1909 Boundary Treaty
  - 1961 Storage Treaty
  - 1985 Salmon Treaty
  - No water use allocation treaty
- Interstate Compacts
  - 1918 Salmon Compact
  - 1970 Fisheries Compact
  - 1980 Power Compact
  - No water use allocation compact

Columbia River Instream Flows
July , August

- RCW 90.22.010,.030, .060.
- WAC 173-563-040(2) and (3).
  - July: 80,000 cfs, 110,000 cfs
  - August: 95,000 cfs
- These levels equal 52.5 MAF for April through September at the Dalles. WAC 173-563-100 (1)
- Ecology may reduce these numbers up to 25% in "low flow" years. WAC 173-153-020 (6)
- Applies to pre-July 1997 permits.

Post 1997 Applications—Instream Flows

- WAC 173.563.020
- Water right applications considered for approval or denial after [1997] will be evaluated for possible impacts on fish and existing water rights.
- Ecology will consult with appropriate local, state, and federal agencies and Indian tribes in making this evaluation.
- Any permit which is then approved for the use of such waters will be, if deemed necessary, subjected to instream flow protection or mitigation conditions determined on a case-by-case basis through the evaluation conducted with the agencies and tribes.

RCW 90.90.030

(1) The department of ecology may enter into voluntary regional agreements for the purpose of providing new water for out-of-stream use, streamlining the application process, and protecting instream flow.

(2) Such agreements shall ensure that:

(a) For water rights issued from the Columbia river mainstem, there is **no negative impact on Columbia river mainstem instream flows in the months of July and August as a result of the new appropriations issued under the agreement;**

(2006, expires 2012)

Advantages

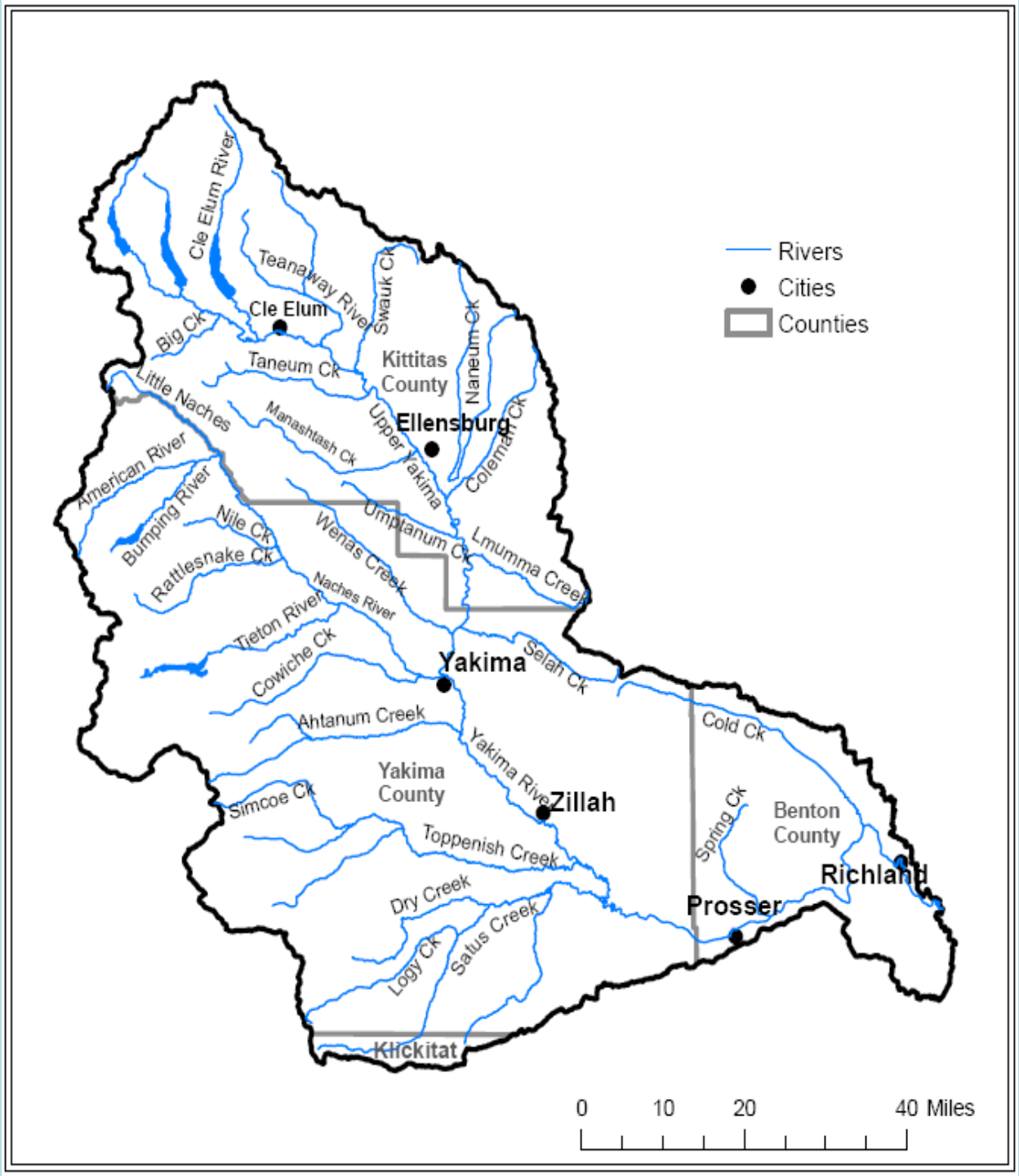
- Substitute Water Supply
- Environmental and Fishery Benefits
- Resilience to Climate Change
- Regional Plumbing Enhances Market Exchange Potential

Selah Creek

Pipeline and Reservoir

Delivery to Roza Canal

“Concept Level Analysis”


Rivers
Cities
Counties
Cle Elum River
Teanaway River
Swauk Ck
Naneum Ck
Cle Elum
Big Ck
Taneum Ck
Kittitas County
Little Naches
Manashtash Ck
Upper Yakima
Ellensburg
Coleman Ck
American River
Bumping River
Nile Ck
Umtanum Ck
Lmumma Creek
Rattlesnake Ck
Wenas Creek
Naches River
Tieton River
Cowiche Ck
Yakima
Selah Ck
Ahtanum Creek
Cold Ck
Yakima River
Yakima County
Zillah
Simcoe Ck
Spring Ck
Benton County
Toppenish Creek
Richland
Dry Creek
Prosser
Satus Creek
Logy Ck
Klickitat
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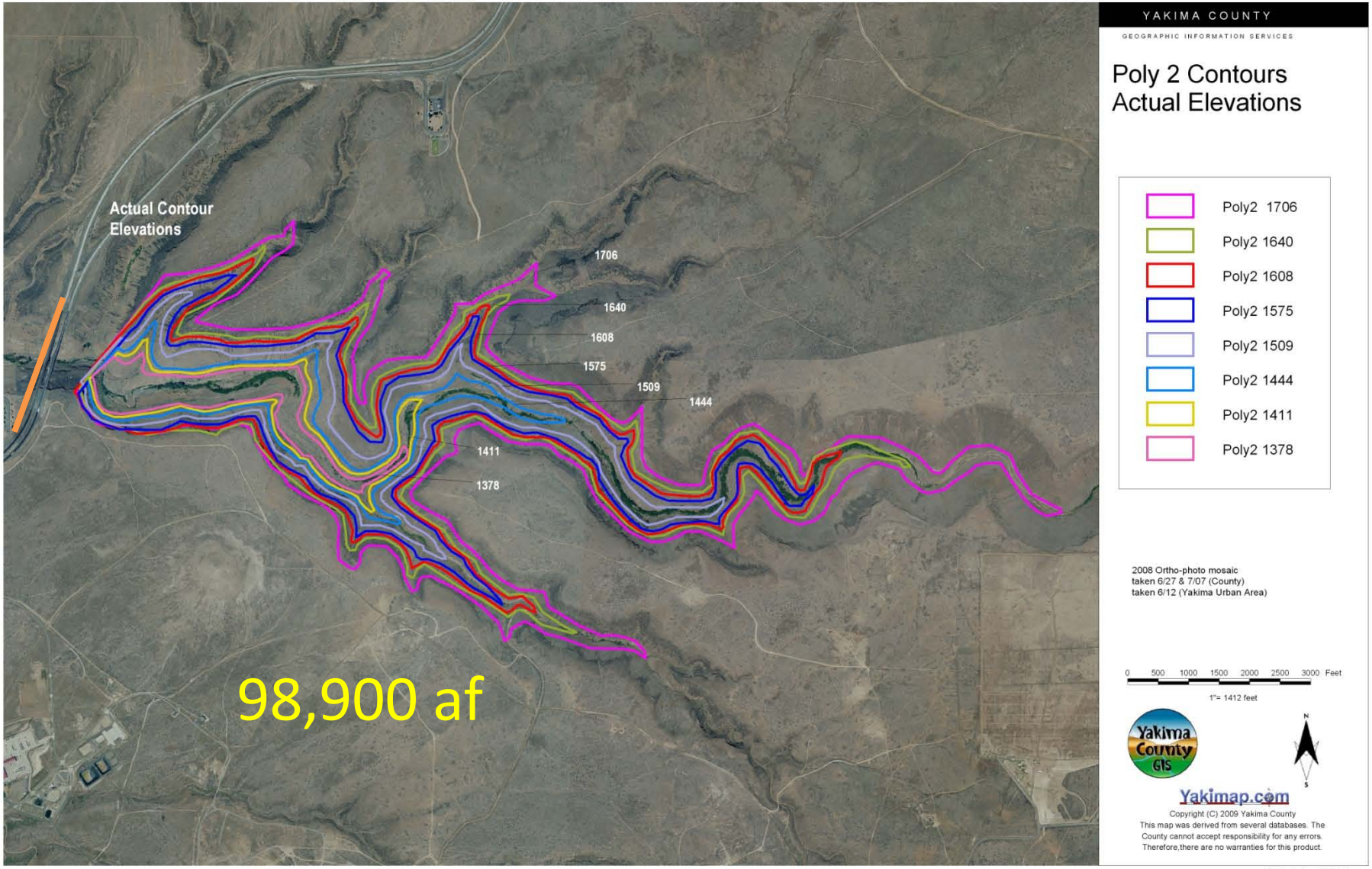
10
20
40 Miles


YAKIMA COUNTY
GEOGRAPHIC INFORMATION SERVICES
Poly 2 Contours
Actual Elevations
Actual Contour Elevations
1706
1640
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Poly2 1706
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Poly2 1411
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2008 Ortho-photo mosaic
taken 6/27 & 7/07 (County)
taken 6/12 (Yakima Urban Area)
0 500 1000 1500 2000 2500 3000 Feet
1"= 1412 feet
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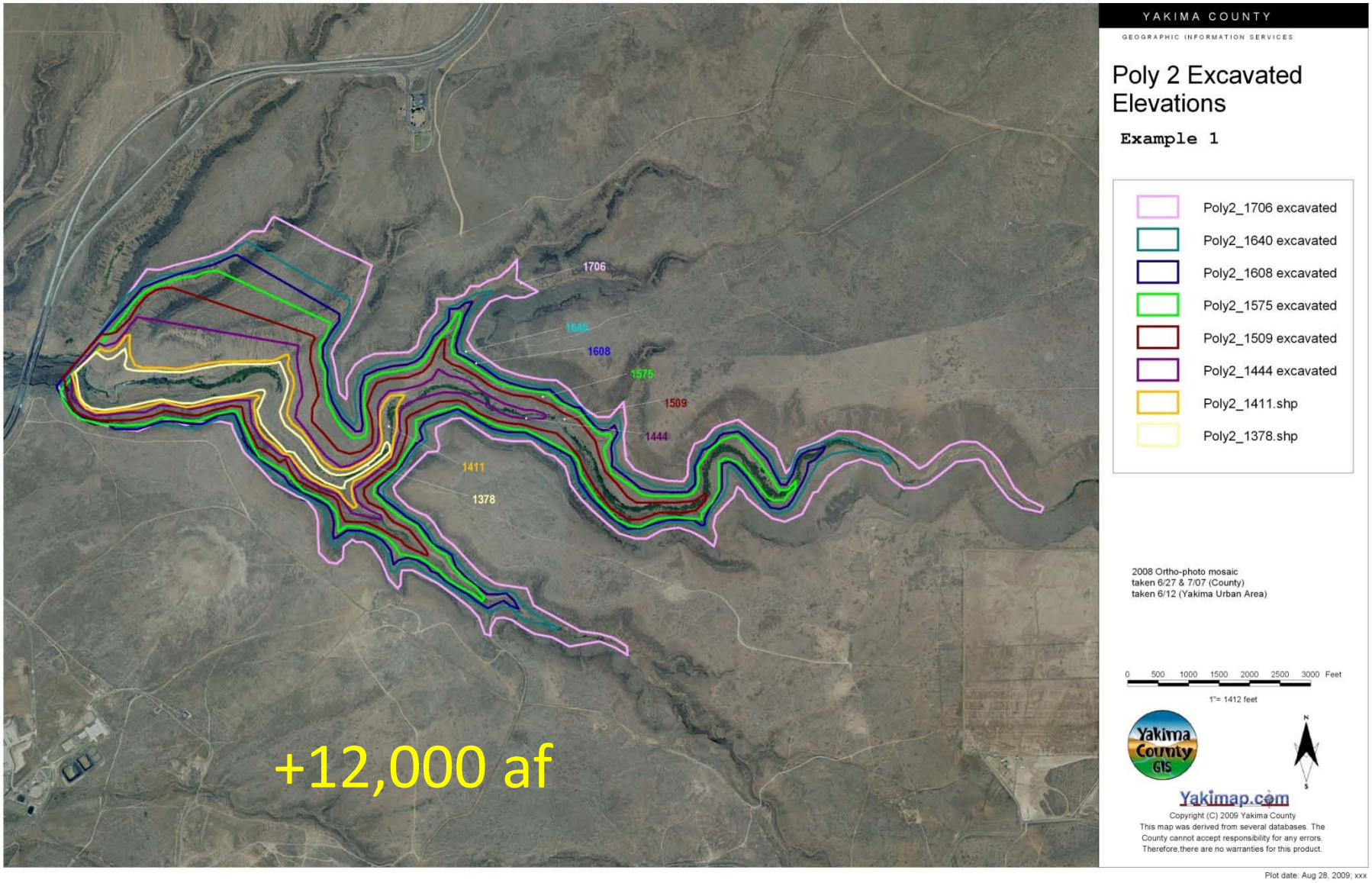
YAKIMA COUNTY
GEOGRAPHIC INFORMATION SERVICES
Poly 2 Excavated Elevations
Example 1
Poly2_1706 excavated
Poly2_1640 excavated
Poly2_1608 excavated
Poly2_1575 excavated
Poly2_1509 excavated
Poly2_1444 excavated
Poly2_1411.shp
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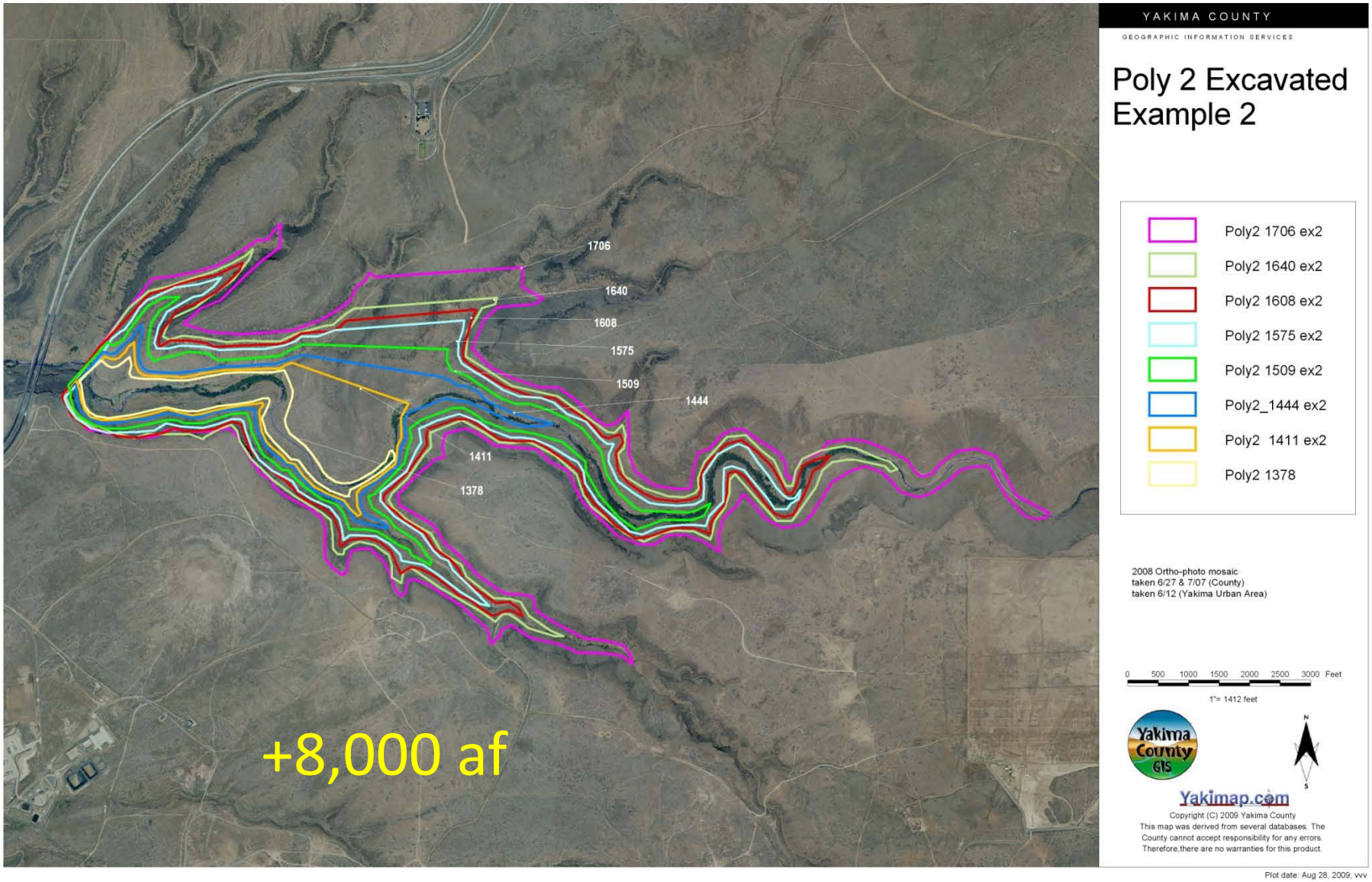
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GEOGRAPHIC INFORMATION SERVICES
Poly 2 Excavated Example 2
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Poly2 1575 ex2
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2008 Ortho-photo mosaic
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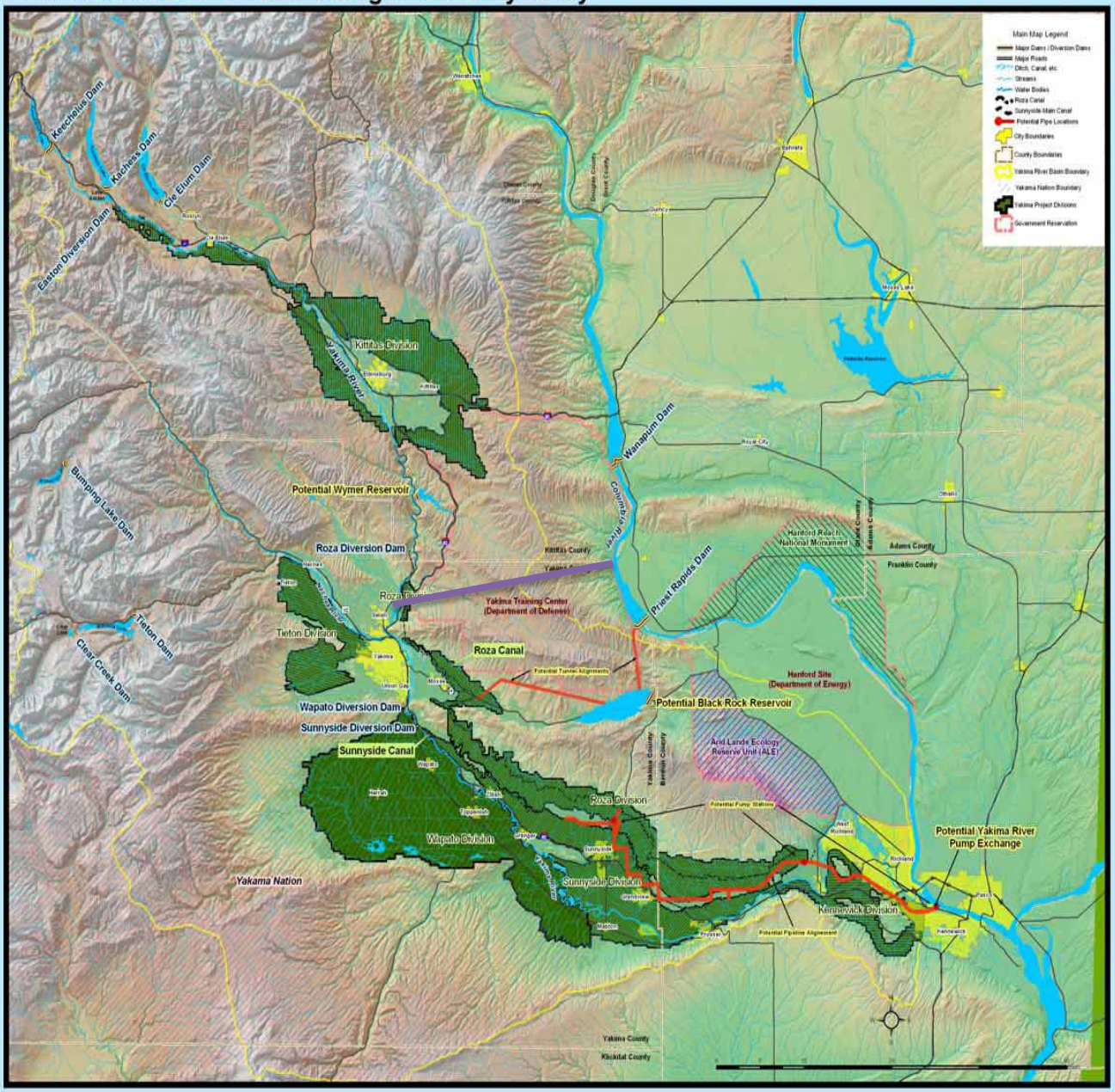
Selah Creek Reservoir

- Capacity 120,000 af
- Operating Paradigm Fill in winter with sufficient volume to meet summer deliveries when pumping from Columbia is limited in order to protect instream flows. Back up with Cle Elum Reservoir when required.

Yakima River Basin Water Storage Feasibility Study



This reference graphic is intended for informational purposes only. It is meant to assist in feature location relative to other landmarks. Geographic features have been intentionally simplified in an attempt to provide a more readable product. No representation is made as to accuracy of this document. Current as of January 2006.

RECLAMATION
Managing Water in the West

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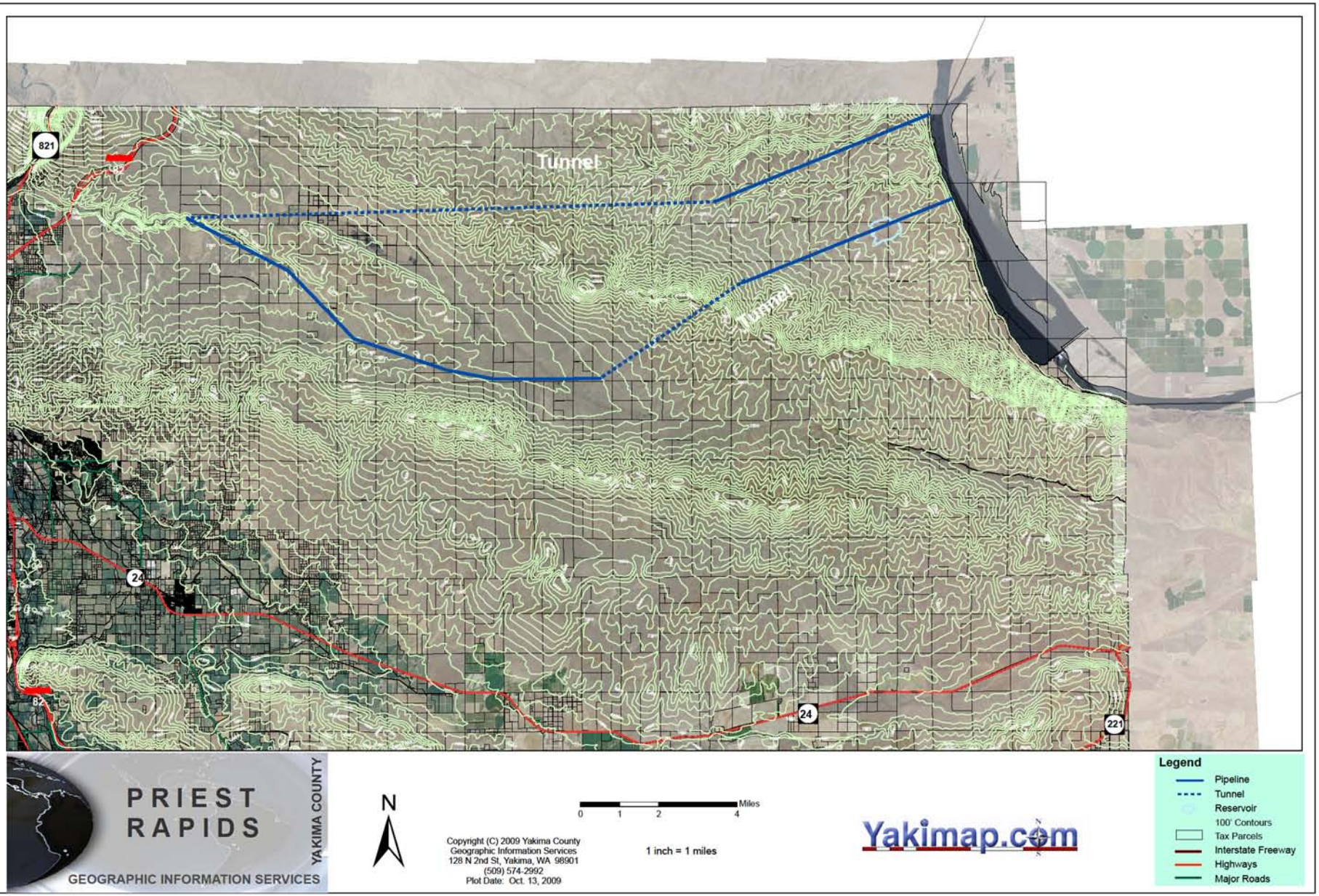
Tunnel
821
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PRIEST RAPIDS
YAKIMA COUNTY
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N
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1 inch = 1 miles
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(509) 574-2992
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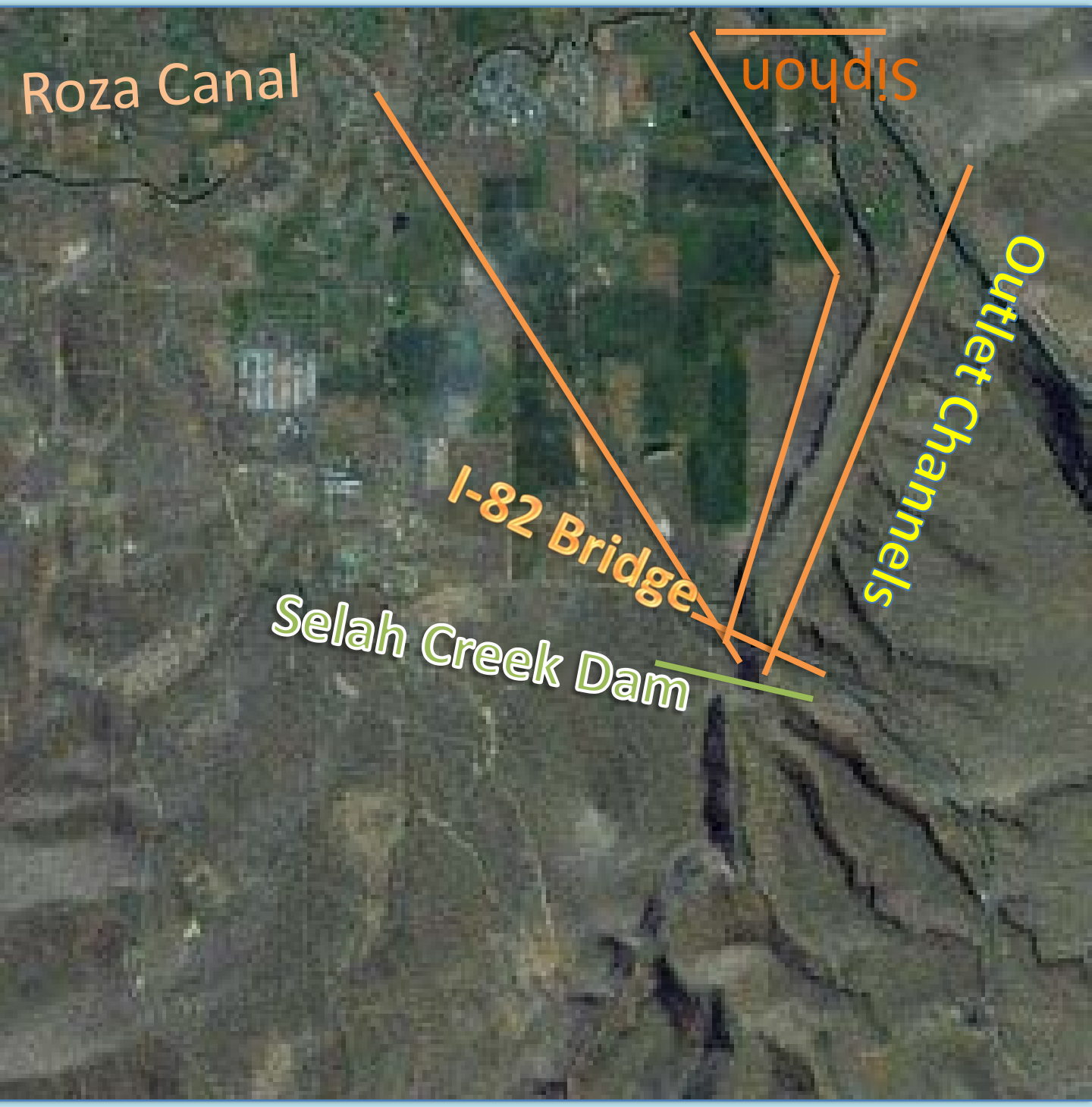
Legend
Pipeline
Tunnel
Reservoir
100' Contours
Tax Parcels
Interstate Freeway
Highways
Major Roads

Delivery Alternative 1

- 6 miles of 12’ diameter pipeline rising from Priest Rapids Reservoir (500’ elevation) to eastern portal of tunnel (2,000’ elevation)
- 13.5 miles of 12’ diameter tunnel descending from eastern portal of tunnel (2,000 ‘ elevation) to Selah Creek Reservoir (1,700’ elevation)

Pipeline/Tunnel Diameter/Capacity

- Pipeline 12 ft
  - 1740 cfs
  - 525 kafy (10 months)
  - No friction coefficient
- Tunnel 13 ft ?
- 525,000/195,000,000 = 0.27 %


Roza Canal
Siphon
Outlet Channels
I-82 Bridge
Selah Creek Dam

Roza delivery rights under 1945 Consent Decree

• April	37,500	10 %
• May	56,250	15 %
• June	71,250	19 %
• July	71,250	19 %
• August	71,250	19 %
• September	45,000	12 %
• October	22,500	6 %
• Total	375,000	100 %

Prospective Selah Creek operation

	days	rate (cfs)	vol/day	total
• Nov-March	151	477.27	945	142,695
– (Deliver into reservoir)				
• Apr	30	631.31	1250	37,500
– (Direct Pump to Roza)				
• May	31	915.66	1813	56,203
– (Direct Pump to Roza)				
• June	30	1,199.49	2375	71,250
– (Direct Pump to Roza)				
• July August	62	1,162.00	2300	142,600
– (Deliver from reservoir)				
• Sept	30	757.58	1500	45,000
– (Direct Pump to Roza)				
• Oct	31	366.16	725	22,475
– (Direct Pump to Roza)				
• Total Deliveries (af)				375,028

Upscaling opportunities

- Deliver water from Roza Canal into:
  - Moxee Ditch
  - Union Gap Canal
  - Sunnyside Canal
- Deliver Columbia River water directly into Yakima River
  - Fish impacts?

Advantages

- Creates at least 375,000 afy of water for fisheries or proratable water users in the Yakima Basin
- Hydropower production opportunity at Selah Creek Dam
- Addresses July/August Columbia River instream flow protection requirements (375,000/195,000,000 =0.19 %)
- Resilience to Climate Change

Resilience to Climate Change

- Rocky Mountain headwaters of Columbia River are more resilient to climate change
  - Higher elevations of snowpack
  - Better formed glaciers
  - Western aspect
  - More northern latitude
- Taps existing Columbia River storage (Lake Roosevelt)


Big Bend
Revelstoke
Columbia Lake
Castlegar
Vancouver
Seattle
Grand Coulee Dam
Wenatchee
Tri-Cities
Astoria
Portland

Black Rock Comparison

- Central core rockfill dam
  - 755 feet high (525 feet high above original ground height)
  - 6,695 feet long
- Reservoir:
  - active storage 1.3 maf
  - full pool 10 miles long at 1,775 feet elevation

Black Rock Comparison

- Priest Rapids Pumping Plant:
  - Elevation 495 feet
  - 3 500 cfs pumps
  - 2 1,000 cfs pumps
  - Total capacity 3,500 cfs
- Delivery to reservoir through 17 –ft. diameter tunnel (3.500 cfs)
  - 6.5 miles long
- Delivery system
  - 17-ft. diameter tunnel (2,500 cfs), 14 miles long
  - 17-ft. diameter pipeline, 3,000 ft long
  - 12-ft diameter pipeline, to power plant and Roza canal
  - 12-ft. diameter pipeline, to Sunnyside canal

USACE Seattle Division Jurisdiction

- Upper Columbia River, north from the mouth of the Snake river
- Includes Yakima River

US Army Corps of Engineers Areas of Authority

- Military construction and engineering support to military installations
- Reimbursable support to other federal agencies (such as the Environmental Protection Agency's "Superfund" program to clean up hazardous and toxic waste sites)
- Civil Works, centered around navigation, flood control and a growing role in environmental restoration under the Water Resources Development Acts of 1986, 1988, 1990, 1992 and 1996

Corps of Engineers History

- The Corps of Engineers is the nation's premier and largest water resources development agency. In its civil role, the Corps' ongoing responsibility for federal river and harbor improvements dates from 1824, when Congress passed two acts authorizing the Corps to survey roads and canals, and remove obstacles on the Ohio and Mississippi rivers. Over the years, the expertise gained by the Corps in navigation projects led succeeding administrations and congresses to assign new water-related missions to the Corps in such areas as flood control, shore and hurricane protection, hydropower, recreation, water supply and quality, and wetland protection.

Corps of Engineers Repairs Naches & Yakima River Levees

- **Army Corps of Engineers repairing levees protecting Yakima water and sewage treatment plants**
  Contact: Dave Harris, 206-764-3750
- SEATTLE—The U.S. Army Corps of Engineers has begun work to repair two levees; one protects the water treatment plant on the Naches River and the other protects the sewage treatment plant on the Yakima River.
- The work is expected to be complete by Sept. 15.
- The levees were damaged during the November 2008 storm. Workers will set back the sewage treatment plant levee on the Yakima River. On the Naches River water treatment plant levee, workers will replace in kind the damaged sections.
- Storm damage resulted in toe losses on both levees, and any riprap lost will be replaced with new riprap.
- September 2, 2009

USACE Seattle Division

- State, Local, Tribal water resource planning
  - Section 22, Water Resource Development Act, 1974
- Planning Assistance to States
  - Section 22, WRDA 1974
- water supply, water quality, water conservation, hydropower development, flood control, environmental restoration, erosion, and navigation

USACE Seattle Division General Investigations Program

- The traditional and a common way for the U.S. Army Corps of Engineers to help a community solve a water resource problem
- The Corps jointly conducts a study with a non-federal sponsor and, if shown by the study to be feasible, constructs the project. This approach requires that Congress provide the Corps with authority and funds to first accomplish a feasibility study and secondly, to construct the project. Local sponsors share the study and construction costs with the Corps, and usually pay for all operation and maintenance costs.
- water resource problems, including navigation, flood damage reduction, and ecosystem restoration.

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