Lake Kahlotus Alluvial Aquifer Pilot Recharge Project

Here is a copy of the Franklin County conservation district plan for the Kahlotus lake project. That I want to present to the commissioners.

This project has been approved for several years but lacked funding to be completed.

It would allow pumping out of the Palouse River during the winter months from October to May.
To fill the aquifer and lake Kahlotus.

The entire project can be completed on one landowner.

Some of the steps are already in place.
There is monitoring wells, there is already a pump station in the river so no need for extra permitting.
We would just upside it.

I have applied for a grant through NRCS to fund it.

The wildlife Department had a different plan to fill the lake and fund pumping costs. They wrre also going to stock it with fish. As well as pay for the sewer system for Kahlotus.

People complained about the added cost every month dor sewer and paying to hook up so the people running the city didn't fill out the paperwork to get done.

There is so much pee in the water it changes the PH of the water of my irrigation water next to town.

The county should make Kahlotus put in the sewer.

Washtucna has one.

This Kahlotus lake project dove tails with the Department of Energy hydroelectric battery.

It has the possibility of creating power at washtucna, Kahlotus and If we dump the water above lower monumental Dam it could create power three times.

I've attached a link to the Department of Energy websites https://www.energy.gov/eere/water/pumped-storage-hydropower

This is available for federal grants.

Eventually we should put in a dam in the Palouse by washtucna before the water goes over the falls and create a reservoir there. Then you could have irrigation water for all of North Franklin county.

Please let me know if you need anything else before the meeting.

Thank you for your time

Jon Andrewjeski

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Lake Kahlotus Alluvial Aquifer Pilot Recharge Project

Problem Statement: Lake Kahlotus, formerly found in upper Kahlotus Coulee near the Town of Kahlotus, Washington has been completely dry most years since the mid 1990's. At its fullest, prior to and during the 1960's, the Lake covered approximately 380 acres and was several tens of feet deep. Historically the Lake was part of an active, vibrant surface water hydrology that included springs, lakes, wetlands, and associated habitat and a recreational fishery. In addition, this hydrology supported range ground for livestock grazing and row crop production for local growers.

This surface water hydrology also was part of a much larger, interconnected alluvial and shallow basalt groundwater system that existed in the southeastern portion of what is now the Odessa Ground Water Management Subarea. This groundwater system generally flows from areas to the north and east of Lake Kahlotus such as the Palouse River and Cow Creek valleys. The Kahlotus Coulee hydrologic system probably receives discharge from the alluvial and shallow basalt aquifer system and provides recharge to other portions of that groundwater system. Groundwater in Kahlotus coulee historically is thought to have discharged towards the Snake River via springs in the canyons up-stream of Lower Monumental Dam. This flow system may also have contributed to a groundwater system that flowed down Kahlotus Coulee towards Sulfur Lake and the City of Connell, Washington.

Following its drying, Lake Kahlotus has only been intermittently and partially filled with water during the wettest spring seasons. Since the drying of the Lake, anecdotal reports indicate springs feeding the Lake system have progressively discharged less water, municipal water supply wells for Kahlotus and Washtucna have seen some evidence of slowly diminished production, and lakes and wetlands in the area have vanished. Elevated nitrate-N also has been measured in some shallow cased wells on the coulee floor. Although none of these can be directly related to the drying of Lake Kahlotus, the contemporaneous loss of surface water, springs, and groundwater production coupled with reduced water quality are all indicative of a hydrologic system in the Lake Kahlotus area experiencing potentially related losses of storage and recharge.

Solution/Goals: Franklin Conservation District proposes to conduct a pilot-scale alluvial aquifer recharge project (Pilot Project). The ***goals*** of the Pilot Project are to: (1) attempt to identify the hydrologic linkages that exist in the Kahlotus Coulee area, (2) determine how to revitalize the lost surface water hydrology and associated habitat, and (3) if successful evaluate ways a Lake Kahlotus recharge project could contribute to sustaining base flows on the Snake River and recharging portions of the groundwater system to the west, in the area of the southern Odessa Ground Water Management Subarea.

To conduct the proposed Pilot Project FCD proposes to use as source water approximately 10 to 20 cfs from the Palouse River above Palouse Falls during winter and spring high flows. This water would be delivered via a low pressure pipeline into an existing, but currently unused, irrigation canal refurbished for the Pilot Project. Water would flow down the canal west towards Washtucna and Kahlotus Coulee, infiltrating into coulee fill sands and gravels. Pilot Project water would be routed beneath Washtucna through the alluvial aquifer and if any water is at the surface, it will be routed through town via existing stream ways used to control ephemeral flood water. South of Washtucna, Pilot Project groundwater would flow south towards Lake Kahlotus. If Pilot Project water reaches this area on the surface in the canal, it would be allowed to spread across the coulee floor, recharging the hydrologic system which is the focus of the proposed Pilot Project. The Pilot Project would operate under an operations and monitoring plan approved by Franklin Conservation District, Office of Columbia River, and other entities as appropriate.

Based on field reconnaissance the lift from the Palouse River into the canal is less than 100 feet, the delivery pipe would be less than approximately 1-mile long, 3-phase power already exists in the vicinity of the potential diversion site, and much of the land along the proposed route is under the control of a single land owner who has expressed a strong interest in supporting the project. The proposed Pilot Project would include the following basic project elements: (1) securing land owner permission and cooperation, (2) characterization of baseline hydrologic conditions against which to measure Pilot Project performance, (3) design of the delivery system, monitoring program, and operations plan, (4) compilation of SEPA, Pilot Project water rights application, and/or other necessary documentation to permit the Pilot Project, (5) construction of the water distribution system and implementation of monitoring to measure Pilot Project performance, and (6) operation of, and reporting for, a 3-year Pilot Project. Parts 1 through 4 would be completed within the first 8 to 12 months of the Project. Parts 5 and 6 would occur over the following 3.5 years.

Pilot Project Summary

The **basic footprint** of the proposed Pilot Project is shown on Figure 1. Infrastructure elements for the project include the following:

- Point of Diversion (POD) on the Palouse River located somewhere in the vicinity of river mile 13 to 14, downstream of Hooper, Washington. The POD will be on private property.
- From the POD water would be piped approximately 0.75 miles to an old canal located south of Highway 25. The pipeline will not cross public lands or rights-of-way.
- Once in the canal, water will flow down it to the west. The canal will be refurbished to the extent necessary to facilitate Pilot Project operation, and not interfere with land owner use of their property. Refurbishment likely could include such things as cleaning, rebuilding berms, and local piping. The total distance between the entry point into the canal and the train trestle just east of Washtucna is approximately 3.5 miles.
    - It is currently anticipated that there will be significant seepage loss along this canal and into the underlying alluvial system.
    - This recharge water likely will flow west beneath Washtucna and into Kahlotus Coulee.
- If water reaches the area of the train trestle on the east side of Washtucna in the canal, it likely will be piped approximately 0.5 miles to the south flowing ephemeral stream that is routed through Washtucna. This pipe could follow an existing road right-of-way.
- The ephemeral stream channel extends through town for a distance of approximately 0.8 miles. The channel would be used to route Pilot Project surface water through town to a point of delivery for recharge south of town.
- From the south edge of town, for a distance of at least 2 miles, the old canal would be used (if surface water reaches that point) to convey water to multiple points of potential aquifer recharge. Recharge points could range from lateral ditches, to flooded fields, to infiltration basins and galleries, depending on local land owner requirements.

Pilot Project **monitoring** likely would occur in several areas. Monitoring would collect information on project performance which would be used as needed to measure Pilot Project success and operate it so it does not degrade area groundwater quality. Generally, the monitoring would include the following basic elements:

- Source water monitoring at the point of diversion.

- A 3 to 4 well alluvial aquifer water level and water quality monitoring well network east of Washtucna. This part of the monitoring system would be used to evaluate groundwater conditions potentially influenced by canal leakage, and to assess the nature of groundwater moving towards Washtucna from the east.
- A 3 to 5 well alluvial aquifer water level and water quality monitoring well network between Washtucna and Lake Kahlotus. This part of the monitoring system would be used to evaluate groundwater conditions influenced by recharge operations south of Washtucna, and to assess the nature of groundwater moving towards Lake Kahlotus.
- Using existing shallow basalt water wells, monitor water level and water quality conditions in the portions of the shallow basalt aquifer system adjacent to and underlying the recharge area that the alluvial aquifer may have a high degree of hydraulic connection with. This monitoring would be looking at potential impacts of the project on the larger, more regional shallow basalt aquifer system.
- Flow gauging in the canal system designed to measure seepage loss; an important component of any potential future recharge system.
- Level monitoring in Lake Kahlotus, and in springs in the surrounding area.

The Pilot Project would focus on seasonally delivering 10 to 20 cfs of alluvial aquifer recharge water to specific points along the old canal system south of Washtucna. Recharge seasons would typically be in the November to May time frame, depending on stream flows in the Palouse River.

Task, Schedule, Deliverables, and Budget Summary

Task 1 – Easements and Land Access

The ***objective*** of Task 1 is to acquire all temporary easements and land access agreements needed for conducting the Pilot Project, including baseline characterization, construction, monitoring and operation. These will be needed form the primary land owner (Bill Harder), City of Washtucna, and other yet to be identified land owners.

Task 2 – Baseline Characterization

The ***objective*** of baseline characterization is to understand environmental conditions prior to the start of the Pilot Project so that data collected during the Pilot Project can be used to evaluate Pilot Project performance, both from the perspective of anti-degradation and to measure success in restoring the hydrologic system. Primary data collection activities will focus on:

1. Palouse River source water quality. Source water quality has an impact on both operational issues, such as plugging of pore space, and target aquifer degradation via the introduction of contaminants. This portion of the Pilot Project will focus on understanding source water quality so that other project activities can be planned to minimize unwanted effects. This is especially important in light of historical PCB and chlorinated pesticides detected in the Palouse River.
2. Alluvial aquifer characteristics. Since the goal of the Pilot Project is to recharge the historical alluvial aquifer system to get water into Lake Kahlotus, the thickness, extent, water table, and water quality of this system will need to be characterized so that project impacts can be measured. This effort will include fieldwork in the form of reconnaissance mapping, well drilling, geophysical surveys, and well sampling that builds on previously completed regional studies, including those by the Columbia Basin GWMA, the USGS, Washington DNR, and others

as available. The alluvial system filling the coulee east of Washtucna, and south down Kahlotus Coulee to Lake Kahlotus would be the focus of this effort.

3. Shallow basalt aquifer characteristics. There is a degree of hydrologic connection between the alluvial aquifer system which is the focus of the Pilot Project and the shallow basalt aquifer system cut into by the coulees the alluvial system occurs in. Since this shallow basalt system is part of a much larger regional basalt aquifer system, this portion of the characterization effort will evaluate the interconnection between the alluvial and shallow basalt systems so that the potential impacts of Pilot Project aquifer recharge can be assessed. This effort will include fieldwork in the form of reconnaissance mapping and well sampling that builds on previously completed regional studies, including those by the Columbia Basin GWMA, the USGS, Washington DNR, and others as available.
4. Groundwater geochemistry, groundwater level data collection. Ultimately, Pilot Project success will be measured by tracking the impacts of project activities on groundwater geochemistry and water level. A baseline dataset for this information will be collected so that there is a basis for establishing the impacts of the Pilot Project.

Task 3 – Distribution/Delivery, Monitoring, and Operations Design

The ***objective*** of Task 3 is to prepare documents describing proposed:

1. Project engineering design (for the point of diversion, pipeline, canals, and recharge areas).
2. Source water and groundwater monitoring.
3. Project operations, including how river flow and groundwater conditions influence operational decisions.

This planning will include proposed quality assurance project plans as needed to describe proposed project implementation. These planning documents will build on the results of Task 2, especially if characterization reveals that there are specific times when recharge should be curtailed because of the potential for aquifer water quality degradation resulting from recharge.

Task 4 – Compilation of SEPA and/or other Necessary Permits, Including Temporary Water Right Application for the Pilot Project

The ***objective*** of Task 4 is to complete and submit for approval several permits and/or applications necessary for construction and operations. These may include the following:

1. A SEPA checklist for the proposed Pilot Project.
2. A water rights application requesting seasonal (Winter/Spring) use of 10 to 20 cfs for the Pilot Project diverted from the Palouse River.
3. County/City rights-of-way crossing/work permits as might be needed.
4. Other Utilities.
5. Permits to work on State/Federal lands, if crossed.
6. Permit to conduct work in-river (at point of diversion) if needed.

Task 5 – Construction of the Water Distribution System and Implementation of Monitoring

The ***objective*** of Task 5 is to construct the physical infrastructure needed for operating and monitoring the Pilot Project as described in the design and permitting documents prepared under Tasks 3 and 4, respectively. This work generally will include the following:

1. Construction of the point of diversion and pipeline to the old canal.
2. Modification of the old canal to facilitate Pilot Project activities.
3. Modification of dry stream bed through Washtucna to accommodate recharge water.
4. Modification of old canal system south of Washtucna to promote infiltration of recharge water into the alluvial aquifer.
5. Construction of source water and groundwater monitoring points, including new monitoring wells as may be needed. This work will include initial pre-project monitoring to complete background sampling work started under Task 2.
6. Preparation of final as-built documents and initial monitoring reports.

Task 6 – Pilot Project Operations, Monitoring, and Reporting

The ***objective*** of Task 6 is to complete a 3 year long Pilot Project. During the Pilot Project data will be collected per the monitoring plan, operations plan, QAPP, and as directed by permit. This data will be reported on annually. Once complete, the data will be compiled into a final Pilot Project report which describes project results and is used to determine if a permanent project has the potential to improve area hydrology. Based on the results described in the final report FCD and other interested project proponents will identify a path forward, including funding and administrative options if a permanent project appears to be beneficial.

Schedule and Deliverables

Basic project schedule and deliverables are summarized in the table below.

Task	Project Month	Deliverable(s)
1	1 through 3	Access agreements and easements
2	1 through 6	Characterization report
3	4 through 8	Design documents and plans
4	8 through 12	SEPA checklist, water rights permit, other permits as needed
5	12 through 18	Completed project, as-built diagrams, initial monitoring reports
6	18 through 54	Annual reports, final Pilot Project report

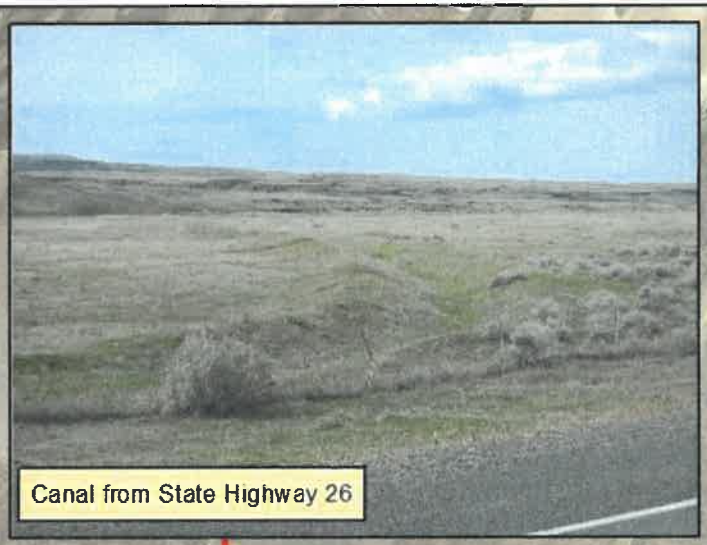
Estimated Budget

A general proposed budget is presented in the following table. This budget includes direct FCD labor and expenses, potential hydrogeologic and engineering consulting costs, and other subcontract costs which primarily include construction and analytical laboratories.

Task	Project Month	FCD	Hydrogeologist	Engineer	Other Subs	Subtotal
1	1 – 3	$25,000				$25,000
2	1 – 6	$25,000	$100,000	$25,000	$75,000 [1,2]	$225,000
3	4 – 8	$50,000	$25,000	$50,000		$125,000
4	8 – 12	$25,000	$50,000	$25,000		$100,000
5	12 – 18	$75,000	$50,000	$75,000	$750,000 [1,3]	$950,000
6	18 – 54	$200,000	$100,000	$50,000	$100,000 [2]	$450,000
subtotals		$400,000	$325,000	$225,000	$925,000	$1,875,000

1. Monitoring well drilling and construction
2. Analytical laboratory
3. Construction

Figure 1: Pilot Project Area



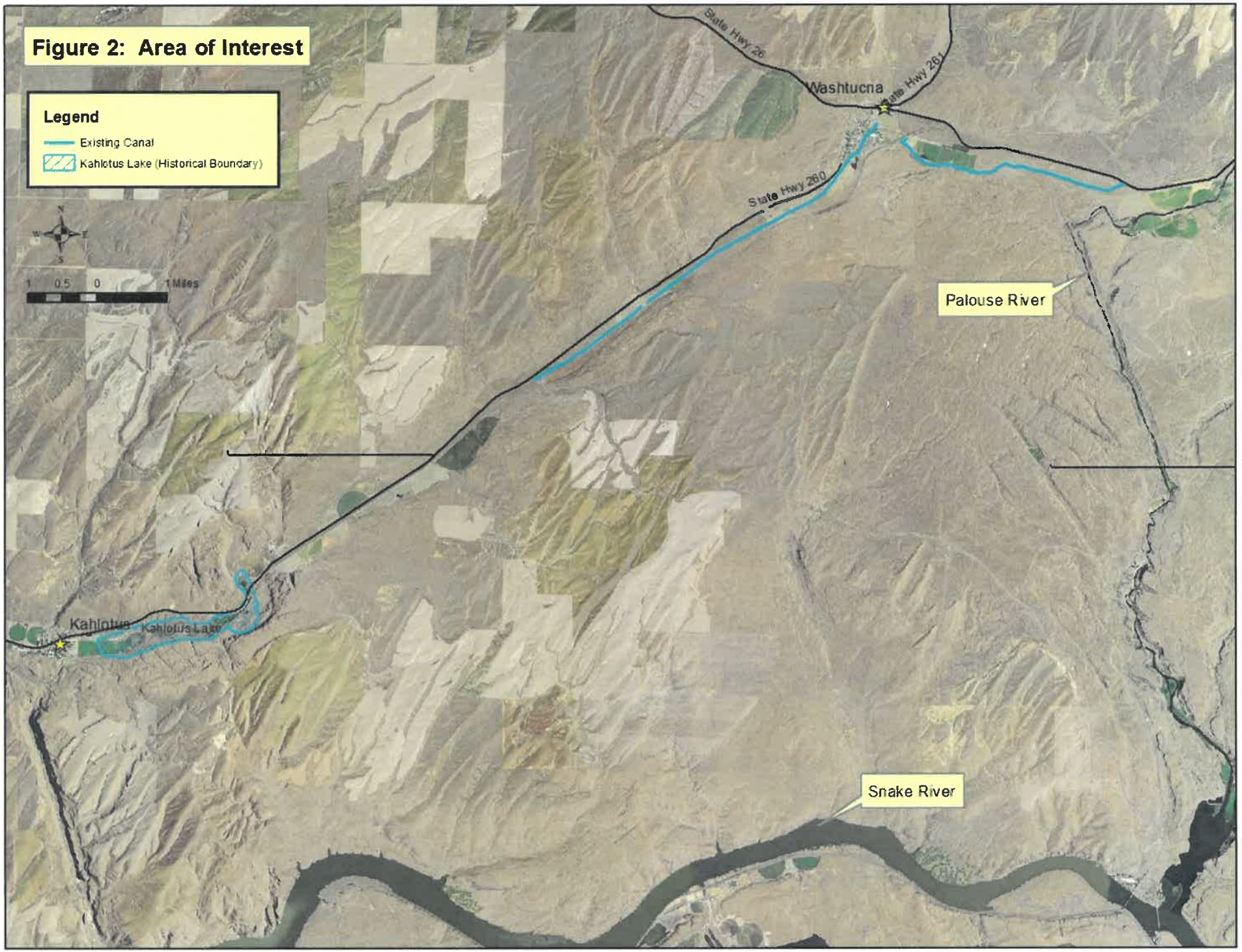


Figure 2: Area of Interest
Legend
Existing Canal
Kahlotus Lake (Historical Boundary)
N
W
E
S
1 0.5 0 1 Miles
State Hwy 26
State Hwy 261
Washtucna
State Hwy 260
Palouse River
Kahlotus
Kahlotus Lake
Snake River