

Open Loop Surface Water Heat Pumps

Considering installing an open loop surface water heat pump?

Open loop surface water heat pumps (SWHPs) are systems that use the temperature differences in a pond, lake, or other water body to heat or cool a structure. They withdraw water from a surface water body, pass it through a heat exchanger, and discharge the water back to the water body, land, or an underground injection well.

While SWHPs have been around for years, they have increased in popularity due to their environmental benefits, such as energy efficiency and affordability.

There are environmental impacts to consider when planning and constructing a surface water heat pump. Following the four steps below will help you identify the permits, requirements, and conditions that apply to your project. The term "permit" also includes environmental review processes, authorizations, certifications, licenses, and approvals.

For free assistance with identifying environmental permits, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at <http://www.oria.wa.gov>.

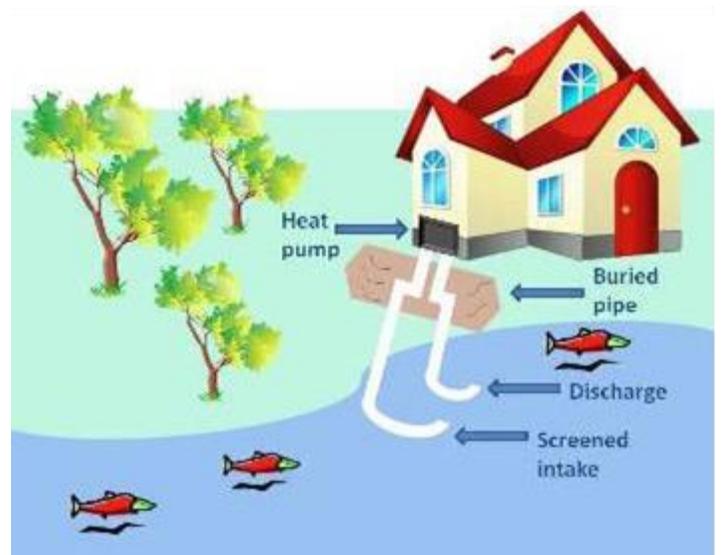
Financial Incentives There may be rebates and tax credits available for heat pump installation. Check with your local electric utility and state and federal agencies.

Step 1:

Consider Environmental Factors.

When designing a heat pump system, there may be a number of environmental impacts depending on where and how the system is installed. Cumulative effects associated with multiple systems in shallow, near shore zones are of particular concern. Consider options for minimizing or avoiding impacts.

The design of SWHPs typically results in heat being added to the water body in summer and removed in winter. In a number of lakes and streams, increasing surface water temperatures during summer is a major concern. Higher temperatures may cause adverse effects on spawning and migrating fish, and can also impact juvenile out-migrants and returning adult fish before they reach their spawning grounds.



The design and installation of a system can create a physical barrier for fish migration or otherwise interfere with aquatic habitat. The Washington State Department of Fish and Wildlife (WDFW) require screens, ideally self-cleaning ones, installed at water intakes to protect fish.

Step 2:

Complete a draft State Environmental Policy Act (SEPA) Checklist and draft Joint Aquatic Resources Permit Application (JARPA).

Answering common SEPA and JARPA questions will give you an idea of what questions agency staff will ask and what information you will need for your application. JARPA is a single application that can be used to apply for several permits from different agencies, such as WDFW, the Washington State Department of Ecology, and the U.S. Army Corps of Engineers. For SEPA and JARPA documents visit <http://www.oria.wa.gov/resources/permitting.asp>.

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Step 3:

Determine requirements for each permit and modify your proposal accordingly

Agencies often have requirements and conditions that must be followed and guidelines that are recommended. If you have questions, contact the agency staff who will review your application. For help identifying your regional contacts, contact the ORIA Information Center.

Department of Ecology (Ecology) or Water Conservancy Board – Water Right Permit

Ecology or Board Contact: _____

Phone: _____

Email: _____

The circulation of lake, pond, or river water through the SWHP will require a Water Right Permit from Ecology or a Water Conservancy Board. The use may be considered non-consumptive and beneficial: <http://www.ecy.wa.gov/programs/wr/rights/water-right-home.html>

Local Jurisdictions (City or County) – SEPA, Shoreline Master Program, Critical Areas Ordinance, Grading, Building, Plumbing, and Mechanical

City or County Contact: _____

Phone: _____

Email: _____

The city or county provides information about requirements that must be met during the planning and construction of the system. These may vary by jurisdiction.

Permits under the local Critical Areas Ordinance (CAO) may be required. Some local CAOs may prohibit the installation of SWHPs.

Use of the SEPA Checklist supports analysis of the environmental impacts of the project. SEPA must be completed before local, state, and federal permits can be issued.

The local Shoreline Master Program (SMP) may require shoreline permits.

The city or county also issues building, grading, plumbing, and mechanical permits.

REMINDER The permitting process takes time. Depending on the complexity of the project, it may take 6 to 12 months or longer to obtain most of the applicable permits.

Water Right A water right is legal authorization to use a set amount of public water of designated purpose: <http://www.ecy.wa.gov/programs/wr/rights/water-right-home.html>

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Department of Natural Resources (DNR) – Aquatic Use Authorization

DNR Contact: _____

Phone: _____

Email: _____

For many water bodies, the land beneath the water (bed lands) and along the shore is aquatic land, managed for the public by DNR. Check with your local DNR district to determine if it manages the aquatic lands where you intend to place the heat pump system. If it does, you may be required to obtain an Aquatic Use Authorization:

http://www.dnr.wa.gov/BusinessPermits/Topics/ShellfishAquaticLeasing/Pages/aqr_aquatic_land_leasing.aspx.

Department of Fish and Wildlife (WDFW) – Hydraulic Project Approval (HPA)

WDFW Contact: _____

Phone: _____

Email: _____

WDFW is tasked with protecting fish and shellfish. SWHPs require an HPA, which includes requirements on installing fish protection screens: <http://wdfw.wa.gov/licensing/hpa/>.

Construction can only occur during designated timeframes or work windows. Contact your WDFW Area Habitat Biologist for more information: <http://www.wdfw.wa.gov/conservation/habitat/ahb/>

Ecology – National Pollution Discharge Elimination System (NPDES) Permit or Underground Injection Control (UIC) Registration or State Wastewater Discharge Permit

Ecology Contact: _____

Phone: _____

Email: _____

NPDES Permit

Any discharge to surface water trigger a review under Section 402 of the Clean Water Act. Open loop SWHP discharge to ponds, lakes, other water bodies, storm sewers, or sanitary sewers need this permit. The **permit requires an annual fee** and compliance with Washington State water quality standards, including temperature: <http://www.ecy.wa.gov/programs/wq/permits/paris/index.html>

UIC Registration

Discharge to an injection well, dry well, or other method of underground disposal requires registration with Ecology's Underground Injection Control (UIC) Program. Contact the Ecology UIC Program at (360) 407-6143 or <http://www.ecy.wa.gov/programs/wq/grndwtr/uic/index.html>.

FACT The US Department of Energy estimates that heat pumps use 25-50% less electricity than conventional heating and cooling systems.

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State Wastewater Discharge Permit

Discharge from the heat pump to land may require a State Wastewater Discharge Permit:

<http://www.ecy.wa.gov/programs/wq/permits/index.html>

U.S Army Corps of Engineers (Corps) – Section 10 and Section 404

Corps Contact: _____

Phone: _____

Email: _____

The Corps regulates work in the water, which may include the installation of a SWHP. The Corps has two permit authorities: a Section 10 review for work in navigable waters under the Rivers and Harbors Act; and a Section 404 review for fill under the Clean Water Act. Depending on the heat pump system design and installation, one or both of these reviews may be triggered:

<http://www.nws.usace.army.mil/Missions/CivilWorks/Regulatory.aspx>

The Corps permits require compliance with the Endangered Species Act (ESA). If a species of concern is present in the water body, additional review and requirements may apply to the project planning and construction phases.

Ecology – 401 Water Qualifications and Coastal Zone Management Certification (CZM)

Ecology Contact: _____

Phone: _____

Email: _____

The Corps permits may or may not trigger coordination with Ecology's 401 Water Quality and Coastal Zone Management (CZM) Certifications. While some situations require additional review, many cases will not trigger Ecology review:

<http://www.ecy.wa.gov/programs/sea/fed-permit/index.html>

Tip The Washington State Department of Health does not allow waste water from SWHPs to go through the septic systems or associated drain fields. Work with Ecology to determine water discharge options; with permits, it may go to a water body or the ground.

Underground Injection (UIC) Control Well

Ecology regulated UIC wells and defines them as a manmade structure used to discharge fluids into the subsurface:

www.ecy.wa.gov/programs/wq/grndwtr/uic/index.html

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Step 4:

Submit Applications

- Verify that a water right is available by contacting Ecology's Water Resources Program:
<http://www.ecy.wa.gov/programs/wr/rights/water-right-home.html#contacts>.
- Confirm you have permission to use the land under the water. DNR will issue an Aquatic Use Authorization after all other local, state, and federal permits are issued.
- Submit applications for local permits. Use JARPA where accepted. Usually, the local jurisdiction serves as the SEPA lead agency. Before receiving state and federal permits, you must submit a completed SEPA process, shoreline permits, and other local permits
- Submit a copy of the JARPA to WDFW after completing the SEPA process. WDFW will not begin review until SEPA compliance is complete.
- Apply for Ecology's NPDES, UIC, or State Wastewater Discharge Permit, whichever is applicable.
- Submit a copy of the JARPA to both the Corps and Ecology. Even though a separate review by Ecology may not be required, submitting to both agencies at the same time is recommended. It will streamline the process if an Ecology 401/CZM review is required.
- Submit a copy of the JARPA to DNR for the Aquatic Use Authorization after local, WDFW, Corps and Ecology permits are issued.
- Submit an application for local building permits, if needed. In some cases, local building permits are issued after state and federal permits. In other cases, they are issued earlier.

If you require this document in another format, contact Office for Regulatory Innovation and Assistance. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call (877) 833-6341.