

Surface Water Influenced Groundwater Systems and Associated Protection Areas

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- Effective **2015**, W. Va. Code § 16-1-9c requires all Public Water Systems (PWS) with surface water intakes and PWS determined to be Surface Water Influenced Groundwater (SWG) to submit a Source Water Protection Plan (Plan) by July 2016.

No SWIGS identified in 2016

- May 2018: 19 PWS were determined to be SWIG systems (PWS allowed an additional 18 months to complete a Plan).
- May 2019: DHHR notified DEP that a 5-hour Zone of Critical Concern (ZCC) had been developed for all 19 SWIGs, to be effective June of 2020.
- The SWIG 5-Hour ZCC delineations were sent to the DEP in **July of 2019**.

SWG plan submissions were due November 2019

SWG ZCCs went into effect in June 2020

W. Va. Code § 16-1-2 Source Water Protection Plan Definitions:

Public Water System:

Any water supply or system which regularly supplies or offers to supply water for human consumption through pipes or other constructed conveyances, if serving at least an average of twenty-five individuals per day for at least sixty days per year, or which has at least fifteen service connections.

Surface Water Influenced Groundwater (SWIG):

"Public surface water influenced groundwater supply source" means a source of water supply for a public water system which is directly drawn from an underground well, underground river or stream, underground reservoir or underground mine, and the quantity and quality of the water in that underground supply source is heavily influenced, directly or indirectly, by the quantity and quality of surface water in the immediate area.

Watershed:

The entire upstream drainage basin for a source. This is all the land that can possibly drain to the surface or surface influenced groundwater source.

Well Head Protection Area (WHPA):

The surface and subsurface area surrounding a water well or well field supplying a public water system through which contaminants are reasonably likely to move toward and reach such water wells or wellfields. These are designated for groundwater or surface influenced groundwater sources. The WHPA is an area from which water could flow to the source within a five-year time of travel.

W. Va. Code and Legislative Rule Define Conjunctive Delineation:

Conjunctive Delineation:

A polygon consisting of the combination of the wellhead protection area (WHPA) and the surface delineations (ZCC and ZPC) previously established by various methods.

Legislative Rule 64CSR3-14.4.c:

14.4.c. Conjunctive delineations will consist of the following for public surface water influenced groundwater supply sources:

14.4.c.1. The commissioner will determine whether a conjunctive delineation is required on a case by case basis;

14.4.c.2. The criteria that the state will use will be based on identification between selected parameters in the wells and in surface water in the nearby streams. Using this information, the commissioner will develop a statewide guidance standard for the designation; and

14.4.c.3. If a public water supply has been determined to be under the influence of surface water and its WHPA intersects the surface water body, then this system will be required to do a modified (full or partial) surface delineation in addition to the ground water delineation.

W. Va. Code § 16-1-2 SWPP Definitions:

Zone of Critical Concern (ZCC):

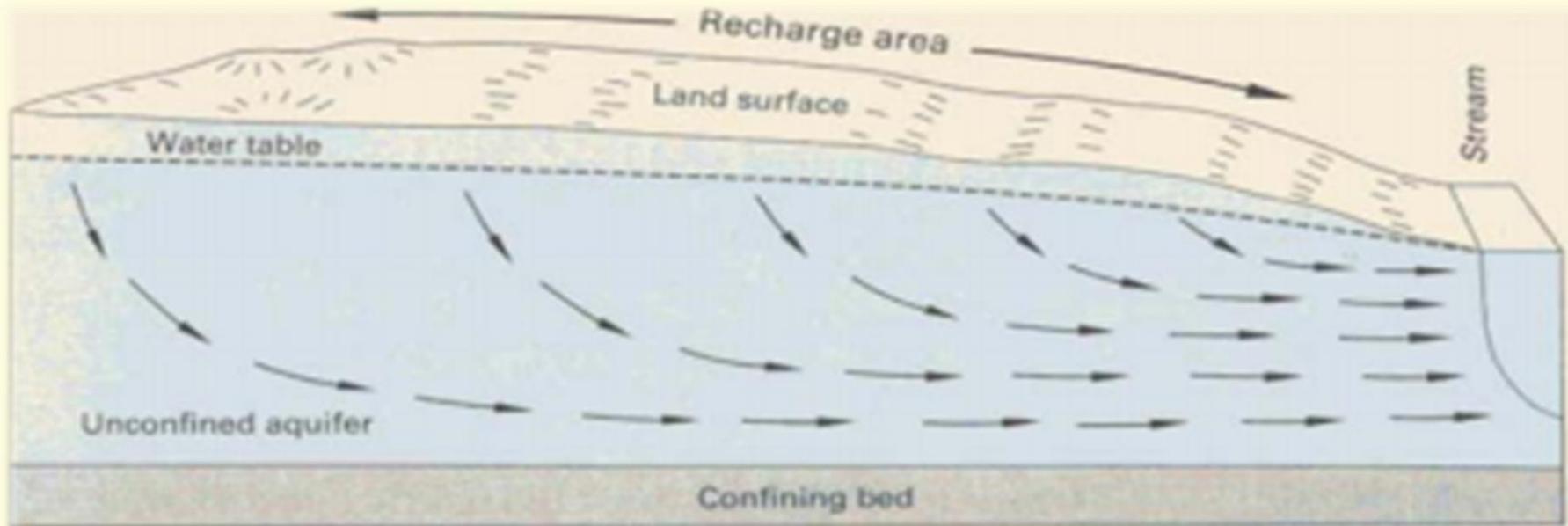
For a public surface water supply, a ZCC is a corridor along streams within a watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZCC is determined using a mathematical model that accounts for stream flows, gradient and area topography.

The length of the ZCC is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-fourth mile below the water intake. The width of the ZCC is one thousand feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream.

Zone of Peripheral Concern (ZPC):

The same as the ZCC but it extends upstream further for an additional 5-hour travel time.

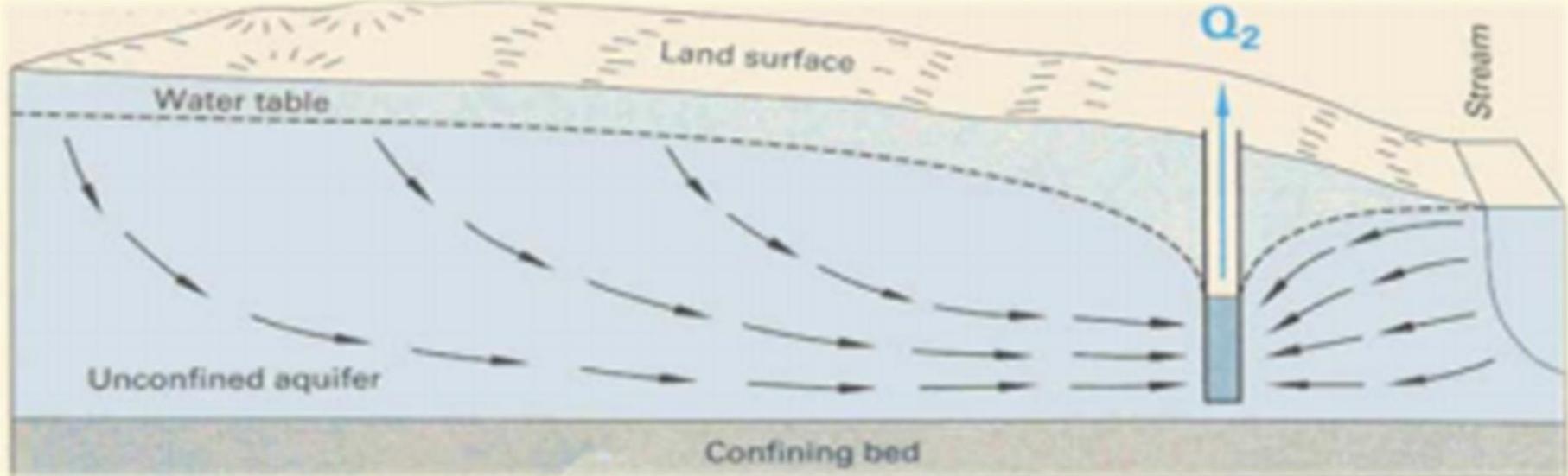
Surface Water Influenced Groundwater



Typically, the groundwater flows through the alluvial aquifer toward the river.

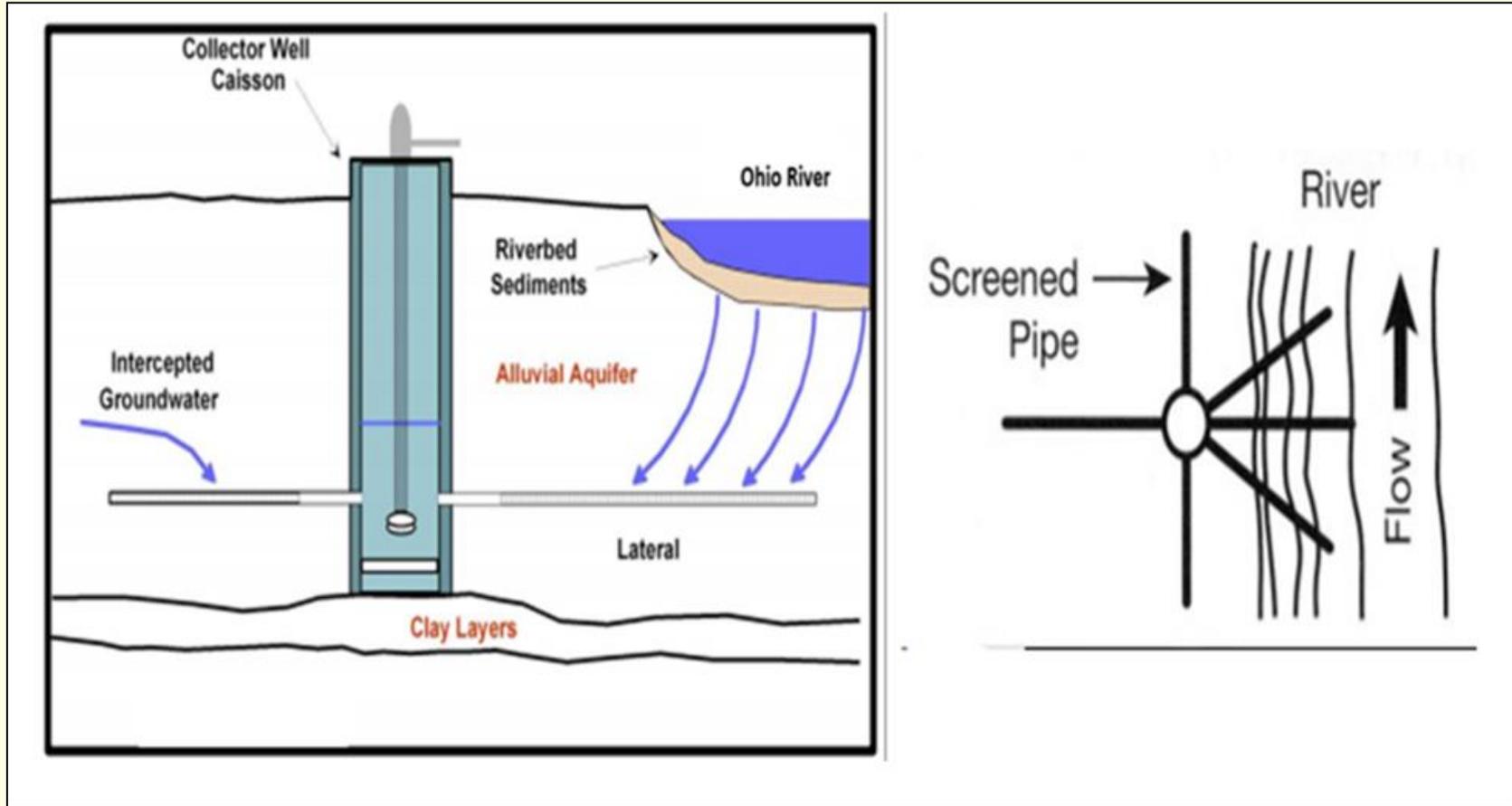
Surface Water Influenced Groundwater

SWIG's and GWUDI's (Continued)



When a well is drilled in the alluvial aquifer, the groundwater flowing toward the river is intercepted by the well and water is also drawn from the river into the well.

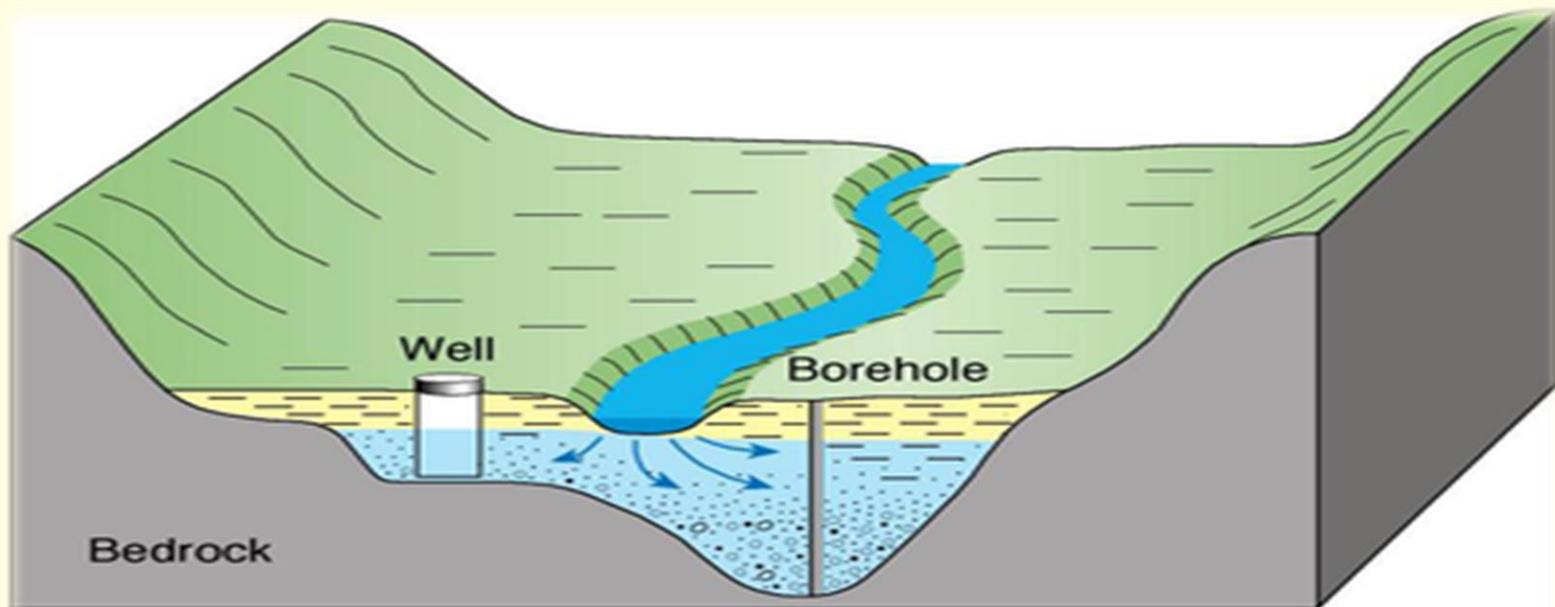
Surface Water Influenced Groundwater



Some public water systems use Raney Well intake systems, which pull high volumes of river water through the alluvial sediments via horizontal laterals drilled under the river. The water is then pumped from large collection wells to the facility for treatment.

Surface Water Influenced Groundwater

- Riverside floodplain aquifers typically have HIGH permeability.
- Water wells in the alluvial aquifer along the Ohio River are highly productive.
- These water wells in the alluvial aquifers are highly sensitive to certain types of pollution in the river.
- If some contaminants are drawn into the river's alluvial sediment, the PWS may have to deal with it for a significant amount of time, even years.



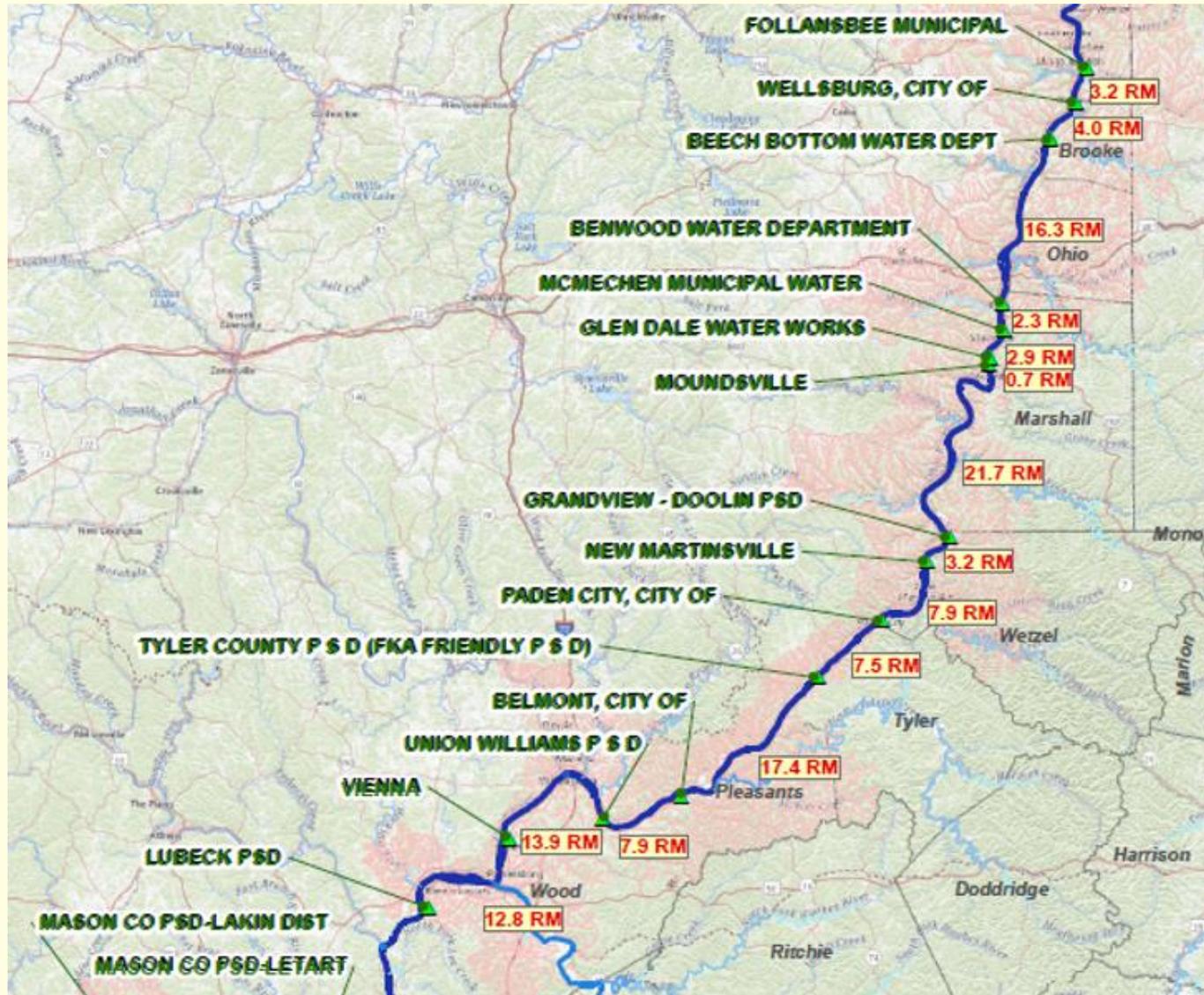
19 PWS Designated as SWIG

PWSID Number	PWS Name	County
WV3300502	BEECH BOTTOM WATER DEPT	BROOKE
WV3303701	BELMONT, CITY OF	PLEASANTS
WV3302618	BENWOOD WATER DEPARTMENT	MARSHALL
WV3300506	FOLLANSBEE MUNICIPAL	BROOKE
WV3302605	GLEN DALE WATER WORKS	MARSHALL
WV3305206	GRANDVIEW - DOOLIN PSD	WETZEL
WV3305404	LUBECK PSD	WOOD
WV3302714	MASON CO PSD-CRAB CREEK	MASON
WV3302712	MASON CO PSD-LAKIN DIST	MASON
WV3302713	MASON CO PSD-LETART	MASON
WV3302610	MCMECHEN MUNICIPAL WATER	MARSHALL
WV3302611	MOUNDSVILLE	MARSHALL
WV3305203	NEW MARTINSVILLE	WETZEL
WV3301516	NEWELL COMPANY	HANCOCK
WV3305204	PADEN CITY, CITY OF	WETZEL
WV3304801	TYLER COUNTY PSD (FRIENDLY PSD)	TYLER
WV3305410	UNION WILLIAMS PSD	WOOD
WV3305411	VIENNA	WOOD
WV3300517	WELLSBURG, CITY OF	BROOKE

SWIG Maps

The average distance, between SWIG PWS, is 11.8 miles.

Regardless of how much the travel time for the ZCC is reduced, most of the ASTs will remain in a ZCC as they overlap.



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