JEM

AIDEA JURISDICTIONAL EVALUATION METHOD (JEM)

TECHNICAL METHODOLOGY DESCRIPTION*

TECHNICAL METHODOLOGY DESCRIPTION*

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Relatively Permanent Water Identification

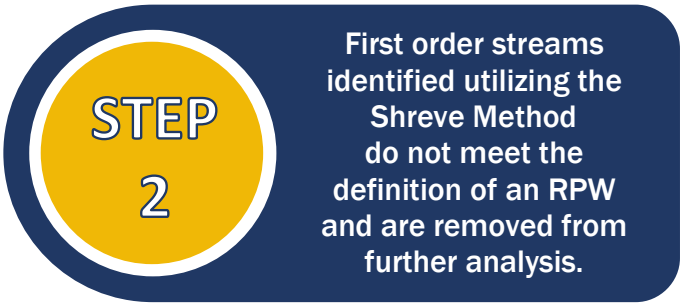
Under Sackett, only wetlands that are potentially subject to Clean Water Act Section 404 Jurisdiction are those which have a surface connection with and indistinguishable from:

a.) **Traditional navigable waters, the territorial seas, and interstate waters (Jurisdictional Waters);**

b.) **Impoundments of Jurisdictional Waters (Jurisdictional Impoundments); or**

c.) **Relatively permanent, standing or continuously flowing tributaries to either Jurisdictional Waters or Jurisdictional Impoundments (Jurisdictional Tributaries)**

The first step for any project is to identify the locations where water will flow. Jurisdictional Waters, Jurisdictional Impoundments and Jurisdictional Tributaries to which the project can eventually drain are identified. At this point, waterways "close" to the project must be included. For linear projects, the analysis must be extended to the headwaters of systems that cross the project. This is generally done using a combination of available topographic data, aerial photography, and if available LIDAR data. The output is a Digital Elevation Model (DEM) to which flow paths can be added.



While Jurisdictional Waters and Jurisdiction impoundments are readily identifiable, jurisdictional tributaries consisting of "relatively Permanent Waters" (RPWs) are more difficult to precisely define and identify. The RPW and downstream drainage network to the TNW form the basis of Section 404 Wetland Jurisdiction post-*Sackett.*

Under *Sackett*, the United States Supreme Court expressly affirms that the controlling opinion with respect to RPWs is the Scalia plurality opinion in *Rapanos:*

> *"In sum, on its only plausible interpretation, the phrase 'Waters of the United States' includes only those relatively permanent, standing or continuously flowing bodies of water 'forming geographic features' that are described in ordinary parlance as 'streams[,] . . . oceans, rivers, [and] lakes.' . . . The phrase does not include channels through which water flows intermittently or ephemerally, or channels that periodically provide drainage for rainfall (quoting Webster's New International Dictionary 2882 (2d ed. 1954)."*

To qualify as an RPW for the purposes of asserting Section 404 jurisdiction, the waterbody must be a non-wetland standing or flowing body of water that connects to a downstream Jurisdictional Water. Significantly, post-*Sackett,* a jurisdictional tributary for the purposes of Section 404 may not be:

a.) An **"Ephemeral Stream**—A stream or river that flows briefly in direct response to precipitation; these channels are always above the water table."[1];

b.) An **"Intermittent Stream**—A stream or portion of a stream that flows continuously only at certain times of year; for example, when it receives water from a spring, ground-water source, or a surface source such as melting snow. At low flow, dry segments alternating with flowing segments can be present."[2]; or

c.) **"Stormflow** is streamflow that occurs in direct response to rainfall or snowmelt…which might stem from multiple ground-water and surface-water sources (Dunne and Leopold, 1978)."[3];

The USEPA has provided following synthesis[4]:

> "Intermittent streams or stream reaches…flow continuously at certain times of the year (e.g., during certain seasons such as spring snowmelt); drying occurs when the water table falls below the channel bed elevation. Ephemeral streams or stream reaches…flow briefly (typically hours to days) during and immediately following precipitation; these channels are above the water table at all times. Streams in these flow duration classes often transition longitudinally, from ephemeral to intermittent to perennial, as drainage area increases and elevation decreases along river networks."

To begin the evaluation of whether wetlands are potentially subject to Section 404 jurisdiction, the first step is to identify the RPWs within the study area. The boundary is where an intermittent, ephemeral or stormflow only driven stream transitions to a perennial stream[5]. Under Alaskan conditions, this point in the watershed is difficult to determine due to a general absence of hydrologic data. In most of Alaska, the data available consists of USGS Topographic maps and Aerial Photography. Basic climatic data is often based on the nearest community airport which is often geographically distant from the project site.

Where hydrologic data is available, stream gauges are placed on larger rivers and perennial streams. Regional regression equations have been developed that allow estimation of high flow and low flow on ungaged streams in Alaska[6]. Unfortunately, regional regression equations are not useful for answering the question of where an RPW begins because the regression equation will always result in a positive value for discharge. That is, utilizing regional regression equations always results in continuous flow in the system being evaluated.

An alternative approach that is consistent with the minimal data available in Alaska, is to utilize stream order analysis.

EPA expressly recognizes[7] the stream order methodology developed by Strahler[8]

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[1] USEPA, 2015. **Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence**. EPA/600/R-14/475F, Office of Research and Development U.S. Environmental Protection Agency, Washington D.C. pg. A-4

[2] *Ibid*. pg. A-7

[3] *Ibid.* pg. 2-14

[4] *Ibid.* pg.

[5] "Perennial Stream—A stream or portion of a stream that flows year-round and is maintained by local, intermediate, or regional ground-water discharge or flow from higher in the river network." USEPA, 2015. **Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence**. EPA/600/R-14/475F, Office of Research and Development U.S. Environmental Protection Agency, Washington D.C. pg. A-9.

[6] Wiley, B. and Curran, J.H. 2003, **Estimating Annual High-Flow Statistics and Monthly and Seasonal Low-Flow Statistics for Ungaged Sites on Streams in Alaska and Conterminous Basins in Canada.** U.S. Geological Survey Water-Resources Investigations Report 03-4114.

[7] **Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence**. EPA/600/R-14/475F, Office of Research and Development U.S. Environmental Protection Agency, Washington D.C. pg.

[8] Strahler, A.N. 1952. *Hypsometric (Area-Altitude) Analysis of Erosional Topography*. **Bulletin of the Geologic Society of America (63)**. Pp 1117-1142.

"Stream Order (Strahler) - A method for stream classification based on relative position within a river network, when streams lacking upstream tributaries (i.e., headwater streams) are first-order streams and the junction of two streams of the same order results in an increase in stream order (i.e., two first order streams join to form a second-order stream, two second-order streams join to form a third-order stream, and so on). When streams of different order join, the order of the larger stream is retained. Stream-order classifications can differ, depending on the map scale used to determine order."

Under Strahler's stream order system, first order streams are "the smallest or "finger-tip", channels constitute the first order segments. For the most part these carry wet-weather streams and are normally dry. A second order segment is formed by the junction of any two first order streams…[9]"

Strahler's classification system, which is accepted by the USEPA is ideally suited to the answer the RPW question created by *Sackett.* One limitation to the Strahler Stream Order methodology is "That a large number of minor tributaries may intersect with a larger-order stream, adding substantially to its discharge but not its stream order"[10]. This limitation was addressed by Shreve[11], whose methodology modified the Strahler ordering by making stream order the sum of the upstream segments. Shreve's modification provides "…a classification which is more descriptive of the total network and average streamflow volumes."[12]

For identifying where perennial stream flow begins, the Shreve modifications to the Strahler ordering method were deemed most appropriate for identifying the "upper end" of an RPW for purposes of asserting Section 404 Jurisdiction.

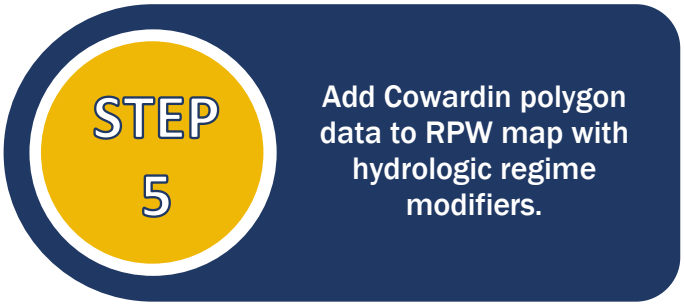
[9] *Ibid.* pg. 1120.
[10] Gordon, N.D. et al., 1992. **Stream Hydrology: An Introduction for Ecologists**. John Wiley & Sons, Chichester, U.K., pg. 105.
[11] Shreve, R.L. 1967. *Infinite Topologically Random Channel Networks.* **Journal of Geology (75)**. pp. 178-186.
[12] Gordon, N.D. et al., 1992. **Stream Hydrology: An Introduction for Ecologists**. John Wiley & Sons, Chichester, U.K., pg. 106.

To ensure that the remaining 2nd order streams resulting from the Shreve analysis actually are perennial an effort was made to determine whether or not flow occurs under a rainfall event with a 2-year recurrence. The 24-hour storm was chosen because based on the requirements of the EPA NPDES 2022 [13] . Additionally, a 24-hour storm event is likely to saturate soils to the point that runoff will occur independent of antecedent moisture conditions. This step was not run as there is insufficient data to allow continuous flow modelling. The conservative assumption that perennial flow begins in second order systems was used. All second order streams were carried forward for analysis.

AIDEA JEM STEP 4

This step was not run as there is insufficient data to allow continuous flow modelling. The conservative assumption that perennial flow begins in second order systems was used. All second order streams were carried forward for analysis.

[13] USEPA, 2022. **National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) for Stormwater Discharges from Construction Activities**, footnote 33, Page 13.



On August 29, 2023 EPA issued a final rulemaking revising the definition of Waters of the United States (WOTUS):

Changes were made to 33 CFR 328.3(c)(2) and 40 CFR 120.2(c)(1) and 2)

(1) ***Wetlands*** means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include **swamps, marshes, bogs, and similar areas.**

The revised definition indicates that the primary indicator of wetlands under Section 404 is the "prevalence of wetland vegetation typically adapted for life in saturated soil types." The U.S. Fish and Wildlife Service developed a system for classifying wetlands[14] that is based primarily on vegetation cover and secondarily on hydrologic regime. "The primary objective of the Classification of Wetlands and Deepwater Habitats of the United States, as originally drafted by Cowardin et al. (1979:3), was "to impose boundaries on natural ecosystems for the purposes of inventory, evaluation, and management."[15].

As the preface makes clear[16]:

> "The new classification, presented here, has been designed to meet four long range objectives:
> (1) to describe ecological units that have certain homogenous attributes;
> (2) to arrange these units in a system that will aid decisions about resource management;
> (3) **to furnish units for inventory and mapping [emphasis added]**; and
> (4) to provide uniformity in concepts and terminology throughout the United States.

According to FGDC:

> "The FGDC Wetlands Classification Standard is intended for all Federal or federally funded wetlands inventory mapping including those activities conducted by Federal agencies, states, and federally-recognized tribal entities, non-governmental organizations, universities, and others. Specifically, if Federal funding is used in support of wetlands inventory mapping activities, then use of this Standard is mandatory. The adoption of this Standard for all other wetlands inventory mapping efforts (non-federally funded) is strongly encouraged to maintain and expand the wetlands layer of the NSDI.
> The FGDC Wetlands Classification Standard is neither designed, nor intended, to support legal, regulatory, or jurisdictional analyses of wetlands mapping products, nor does it attempt to

[14] Cowardin L.M *et al.* 1979. **Classification of Wetlands and deepwater Habitats of the United States.** FWS/OBS-79/31. U.S. Government Printing Office, Washington D.C.

[15] Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC. pg. 2.

[16] Cowardin L.M *et al.* 1979. **Classification of Wetlands and deepwater Habitats of the United States.** FWS/OBS-79/31. U.S. Government Printing Office, Washington D.C.pg. 2.

differentiate between regulatory and non-regulatory wetlands. Federal, Tribal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than the FGDC Wetlands Classification Standard and the FGDC Wetlands Mapping Standard. There is no attempt to define the limits of proprietary jurisdiction of any Federal, Tribal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, Tribal, state, or local agencies Federal Geographic Data Committee FGDC–STD-004-2013 Classification of Wetlands and Deepwater Habitats concerning specified agency regulatory programs and jurisdictions that may affect such activities."

The Cowardin system makes it clear that wetlands are separable based on objective ecological and hydrological data. Wetlands delineators utilize the Cowardin output to generate maps of the project area. The wetland polygons generated during the delineation and the corresponding Cowardin codes are added to the RPW map generated under AIDEA JEM Step 5.

The *Sackett* Majority Held:

"The CWA's use of "waters" in §1362(7) refers only to "geographic[al] features that are described in ordinary parlance as 'streams, oceans, rivers, and lakes' " and to adjacent wetlands that are "indistinguishable" from those bodies of water due to a continuous surface connection. *Rapanos* v. *United States,* 547 U. S. 715, 755, 742, 739 (plurality opinion). To assert jurisdiction over an adjacent wetland under the CWA, a party must establish "**first, that the adjacent [body of water constitutes] . . . 'water[s] of the United States' (*i.e.*, a relatively permanent body of water connected to traditional interstate navigable waters) [emphasis added]**; and second, that the wetland has a continuous surface connection with that water, making it difficult to determine where the 'water' ends and the 'wetland' begins." *Ibid.* Pp. 6–28."

Based on this holding, all wetland polygons that do not directly abut the RPWs mapped in Step 5 are removed from the map. The removed wetland polygons cannot be Waters of the United States subject to Section 404 and are Waters of the State of Alaska.

The *Sackett* Majority Held:

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Cowardin[17] provides useful diagrams to show the relationship between wetlands and standing or flowing waters which are reproduced below. Only those wetlands that are flooded under average conditions can be considered indistinguishable from the jurisdictional water, jurisdiction tributary (RPW) or jurisdictional impoundment. For the purposes herein, only the Riverine (Figure 4) and Palustrine (Figure 6) systems have been reproduced.

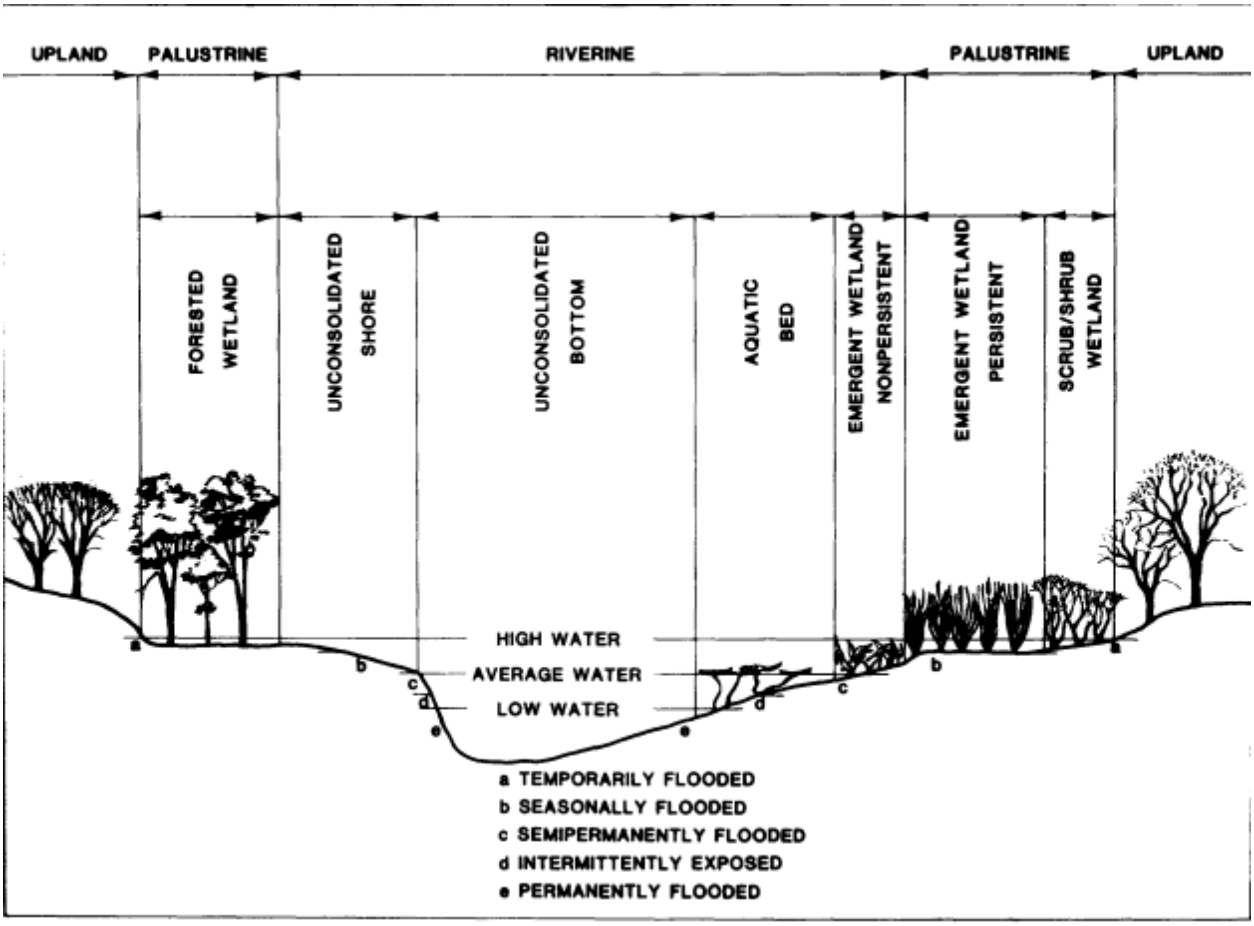

Fig. 4. Distinguishing features and examples of habitats in the Riverine System.

The Palsutrine wetlands shown in the above figure (Forested Wetlands to the left and Emergent Wetland Persistent and Shrub/Scrub Wetlands to the right) are distinguishable from the jurisdictional water or jurisdictional tributary as they typically do not have surface water present. These wetlands are not subject to Section 404 and are Waters of the State of Alaska.

[17] *Ibid.* Figures 2 through 6.

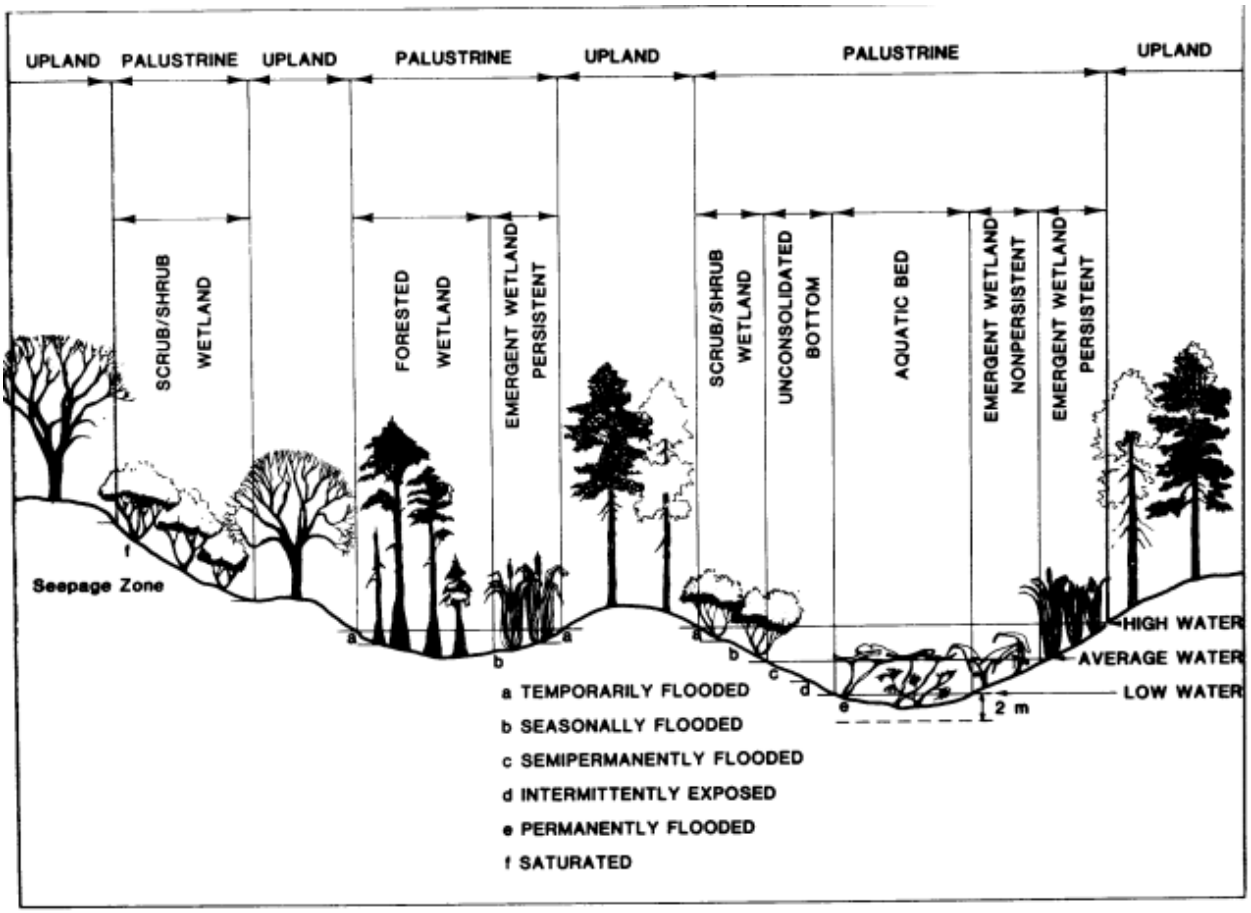

Fig. 6. Distinguishing features and examples of habitats in the Palustrine System.

The Palsutrine wetlands shown in the above figure are distinguishable from the jurisdictional water or jurisdictional tributary as they typically do not have surface water present. These wetlands are not subject to Section 404 and are Waters of the State of Alaska.

Under the AIDEA JEM, all flooded wetlands that directly abut an RPW are retained as Waters of the United States.

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