C O M M E N T

FUNCTIONAL EQUIVALENCY? ASSESSING GROUNDWATER DISCHARGES UNDER *COUNTY OF MAUI*

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The U.S. Supreme Court issued its ruling in *County of Maui v. Hawaii Wildlife Fund* (*Maui*) on April 23, 2020.[1] Until then, there was a split among the circuit courts as to whether discharges to navigable waters through groundwater are regulated under the Clean Water Act (CWA).[2] The impact of this issue could be widespread, possibly bringing many more water-related projects into the CWA process. As a result of the Court's decision, the issue may require additional time to proceed through the regulatory process. It could also set the stage for additional litigation over the environmental impact of a facility and thus delay construction and increase the cost.

I. The *Maui* Decision

In *Maui*, the Court held that the CWA requires a national pollutant discharge elimination system (NPDES) permit if the addition of the pollutants through groundwater is the "functional equivalent" (FE) of a direct discharge from the point sourcea into navigable waters.

The case centered on a once-pristine reef in Maui, Hawaii, which environmental groups (plaintiffs) argued has been devastated by pollutants from a wastewater reclamation facility. The county owns and operates the Lahaina Wastewater Reclamation Facility, which is the principal wastewater treatment plant for West Maui County, receiving approximately four million gallons of sewage per day from a collection system serving 40,000 people. The sewage is partially treated and either sold for irrigation purposes or injected into four underground injection control wells. Once injected, the effluent comingles with groundwater. Dye was injected into the effluent, and after 87 days, the dyes were found to have traveled approximately half a mile and discharged into the Pacific Ocean.

Under the federal CWA NPDES permit program regulations, permits are required only for "direct discharges" of pollutants from "point sources" such as pipes, ditches, tunnels, conduits, and channels to surface waters.[3] Conventional interpretations of the NPDES rules provided that when an intervening physical hurdle, in this case groundwater, stood between the discharge point and surface water, a permit would not be required.

An NPDES permit sets forth the limits on what can be discharged, and sets up monitoring and reporting requirements and other provisions to ensure that the discharge does not harm water quality or the health of humans, fish, birds, and so on. The permit translates general requirements of the CWA into specific provisions based on the discharger's specific operation. These permits can be very difficult to obtain due to many requirements that must be met and, for most dischargers, the permits often require a full understanding of the receiving water hydrology.

However, in its decision, the Court ruled that the CWA regulated some groundwater pollutants that find their way into navigable waters such as oceans, rivers, and streams. In so ruling, it also rejected the U.S. Court of Appeals for the Ninth Circuit's decision in this case.[4] The Ninth Circuit, unlike other circuits, had stated that if the contaminant flow to navigable water or a water of the United States

1. 140 S. Ct. 1462, 50 ELR 20102 (2020) (*Maui*).
2. 33 U.S.C. §§1251-1387, ELR Stat. FWPCA §§101-607.
3. *Id.* §1362(14), §502(14).
4. *Maui*, 140 S. Ct. at 1472.

(WOTUS) was "fairly traceable," the CWA would be triggered and permitting under the CWA would be required.

In response, the Court stated that the "fairly traceable" standard is not appropriate. Justice Stephen Breyer, speaking for the majority, stated that the Ninth Circuit's opinion was too broad and would ultimately trigger permitting requirements in "surprising, even bizarre circumstances." Justice Breyer stated that permitting may even be required for pollutants carried to navigable waters on a "bird's feathers, or, to mention more mundane instances, the 100-year migration of pollutants through 250 miles of groundwater to a river."[5]

In remanding the case to the lower court, Justice Breyer articulated a new metric for evaluating nonpoint sources. His majority opinion states that NPDES permits will be required for a discharge of pollutants that reach navigable waters via groundwater if the discharge is either "direct" (as set forth in the CWA) or the FE of a direct discharge from the source. He also said that the Ninth Circuit's previous ruling would be "significantly broader" than the "extreme" position of the county and the federal government, which argued for the requirement that obtaining permits was not logical and that it would "vastly expand the scope" of the CWA.[6] However, in reality, the U.S. Environmental Protection Agency (EPA) has applied such permits to "some (but not all)" such discharges for "over 30 years."[7] As a result, this argument was rejected and Justice Breyer concluded, "In that time [30 years] we have seen no evidence of unmanageable expansion."[8]

This decision will affect municipal and private entities under a wide variety of circumstances. Managing this requirement will increase development costs of many projects, open up a new avenue to challenges by project opponents, and open up projects already operating to further scrutiny.

Businesses or landowners that utilize wells for disposal of wastewater (as the county did with its wastewater) and persons that operate disposal or percolation ponds, spreading grounds, infiltration basins, and drains that discharge to land before reaching surface waters, should carefully consider their options under this new legal landscape and whether or not their discharges will require an NPDES permit.

In a dissent, Justice Samuel Alito was critical of the majority, saying that instead of interpreting the text of the CWA, the Court had "devised its own legal rules." He stated by insisting that a permit is required for direct discharges as well as the FE the majority settled on a rule "that provides no clear guidance and invites arbitrary and inconsistent application." "Just what is the 'functional equivalent' of a direct discharge?" Justice Alito asked. "Entities like water treatment authorities that need to know whether they must get a permit are left to guess how this nebulous standard will be applied."[9]

This decision will likely elicit additional citizen and non-governmental organization lawsuits, as permitted under the CWA. However, this decision should have no impact on claims under other federal environmental laws (such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)[10]), and may not impact a state law, but it is possible various state agencies will adopt this challenging ruling.

The Court's opinion did not describe criteria used to evaluate a nonpoint source as "functionally equivalent." The decision stated that the Court would leave it to the lower courts to determine on a case-by-case basis if there is an FE. The biggest factors in deciding if a discharge is FE may likely be time and distance. Other factors suggested by the Court will also be considered, including:

- What the pollutants travel through (conveyance lines, media);
- Dilution that occurs along the travel path;
- Amount of pollutant discharged compared to amount entering surface waters;
- Manner of pollutant entry to surface waters; and
- Degree to which the pollutant maintains its specific identity.

The Court did not provide guidance on how these factors should be weighted or scaled.

II. "Functionally Equivalent" Discharge

To evaluate potential factors associated with the issue of an FE discharge, the actual definition of FE must be considered. When two practices, methods, techniques, procedures, designs, materials, or components perform the same or equal function and provide the same or improved utility or outcome, they would be considered FE. The question to be answered is whether a release of chemicals through percolation ponds, injection via wells, spreading grounds, infiltration basins, and drains (that discharge to land and seep into the subsurface, which in turn are transported through groundwater before reaching and discharging to a WOTUS), is equivalent to discharge from a storm drain outfall directly into a navigable water.

In *Maui*, the county discharged millions of gallons of partially treated wastewater every day to underground wells, where it then flowed through groundwater and emerged from submarine springs in the Pacific Ocean half a mile away. Scientists and residents had suspected since the mid-2000s that wastewater was flowing through ground-

5. *Id.* at 1471.
6. *Id.* at 1477.
7. *Id.*
8. *Id.*
9. *Id.* at 1484.
10. 42 U.S.C. §§9601-9675, ELR Stat. CERCLA §§101-405.

water into the ocean, and releasing nitrogen that sparked algae growth and damaged coral reefs.

The Court's opinion on the issue of FE appears to rely on research by the University of Hawaii, Manoa.[11] The research scientists observed seaweed growing near the shore that had high concentrations of a nitrogen isotope associated with human activity such as wastewater and fertilizers. Airplanes and drones equipped with infrared cameras showed a plume of unusually warm water emerging in the ocean just southwest of the treatment plant. Researchers injected fluorescein dye into the wells as a tracer and monitored for the dye emergence into marine waters along the beach. The dye first turned up in the ocean nearly three months later, with concentrations peaking between nine and 10 months later.

III. The CWA

The CWA establishes the basic structure for regulating discharges of pollutants into WOTUS and regulates quality standards for surface waters. The forerunner of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act.[12] The CWA was significantly reorganized and expanded in 1972 when "Clean Water Act" became the Act's common name.

Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry and developing national water quality criteria recommendations for pollutants in surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained through EPA's NPDES to control discharges. The CWA also recognized the need for planning to address the critical problems posed by nonpoint source pollution.

Under the CWA, EPA delegates the NPDES permit program to state, tribal, and territorial governments, enabling them to perform most of the permitting, administrative, and enforcement aspects of the NPDES program. EPA retains oversight authority. Currently, 47 states and one territory are authorized to implement the NPDES program. Two basic types of permits are issued under these programs: individual permits tailored to a single facility and general permits that cover groups of similar dischargers. The public must be notified and allowed to comment on all NPDES permit applications. NPDES permits require dischargers to sample effluent and report results and incidents of noncompliance.

NPDES permits generally specify an acceptable level of a chemical pollutant or pollutant parameter in a discharge (e.g., a certain level of sand or bacteria). The permittee may choose which technologies to use to achieve that level. Some permits, however, authorize use of certain generic "best management practices" (such as installing a screen over the pipe to keep debris out of the waterway). NPDES permits ensure that a state's mandatory standards for clean water and the federal minimums are being met to protect human health and the environmental resources. States sometimes use a total maximum daily load (TMDL) approach. The TMDL is the maximum amount of a pollutant allowed to enter a water body from all potential sources, such that the water body will meet and continue to meet water quality standards for that particular pollutant.

The "WOTUS" definition has been challenged in numerous matters over decades. In the April 21, 2020, final rule by EPA and the U.S. Army Corps of Engineers, the agencies interpret the term "waters of the United States" to encompass "[t]he territorial seas and traditional navigable waters; perennial and intermittent tributaries that contribute surface water flow to such waters; certain lakes, ponds, and impoundments of jurisdictional waters; and wetlands adjacent to other jurisdictional waters."[13] The rule recognizes that WOTUS are waters within the ordinary meaning of the term, such as oceans, rivers, streams, lakes, ponds, and wetlands, and that not all waters are WOTUS.

Prior to *Maui*, groundwater discharge was regulated by state agencies and the majority of states are also authorized by EPA to implement the NPDES program. States that implement the NPDES program under EPA may develop new requirements and issue general permits that address how the factors giving rise to the issue of what is an FE should be weighted and scaled.

IV. The Science

In the *Maui* case, if nitrogen from the wastewater reclamation had been directly discharged to the ocean via a surface water channel, algae growth and resulting degradation to the reef would presumably still have occurred, but under an NPDES permit. Understandably, the FE will be dependent upon demonstrating how water and chemicals (pollutants) are transported through the subsurface and that this transport process is fairly traceable. The science explaining the flow and transport of pollutants through unsaturated soil (seepage), saturated stratigraphic units or aquifers (groundwater flow), and chemical forensics are well understood. This was demonstrated in *Maui* through isotope testing, infrared imaging, and tracer dye flow studies that connected the nitrogen isotope linked with human activity in the algae and traced its transport through dye placed in the wastewater injection wells to the area where algae was growing.

For similar cases where a pollutant from an alleged release migrates through groundwater before discharging into WOTUS, FE will require hydrogeologic migration pathway and surface water impairment assessment. The source of groundwater in a watershed is typically the precipitation that enters the water basin or the land area that contributes water to a stream, river, pond, or lake via sur-

11. *UH Researchers Link Quality of Coastal Groundwater With Reef Degradation on Maui*, Univ. of Hawai'i News, Nov. 15, 2016, https://www.hawaii.edu/news/2016/11/15/uh-researchers-link-quality-of-coastal-groundwater-with-reef-degradation-on-maui/.

12. Pub. L. No. 845, 62 Stat. 1155 (1948).

13. The Navigable Waters Protection Rule: Definition of "Waters of the United States," 85 Fed. Reg. 22250 (Apr. 21, 2020).

face runoff. Groundwater discharge to surface water can occur over a focused point (e.g., a lava tube feature typically located along ocean shorelines) or a larger area such as a river bank; the larger the discharge area, the less it may emulate a point discharge.

Hydrologic (surface) and hydrogeologic (subsurface) data collection are subject to multiple sources of uncertainty that must be taken into account from a data evaluation and modeling standpoint. Developing data quality objectives and an evaluation framework for the assessment prior to detailed data review is vital. Valid data, a documented data quality assessment, and critical and clear communication are needed to provide the basis for pollutant transport and demonstrate or disprove an FE discharge.

V. Reasonable Assessment Technique

A reasonable or impartial comparison could be used to assess FE to enable a fair judgement. As noted by the Court's opinion, these pollutant FE factors would include:

- Time of transport
- Distance
- Transport media, or what pollutants travel through
- Dilution related to volume change
- Volume change or amount discharge versus amount entering surface water
- Entry area and method to surface waters
- Degree of chemical degradation/transformation

There are clear relationships between these seven FE factors, which result in three main elements to assessing FE. Time or the migration time for a pollutant to reach a WOTUS is a function of the pollutant source, the distance between release and discharge area, and the media through which the pollutant is traveling. Migration time is largely a function of the travel distance, soil chemistry, hydraulic head or gradient, and the permeability or hydraulic conductivity of the media. The volume of the pollutant in the discharge is a function of pollutant source concentration, dilution, and the degree of chemical degradation/transformation, which are dependent on the media interconnected porosity, pollutant concentration, other chemicals or nutrients present, and degradation potential. Some pollutants are resistant to degradation and transformation. Others can attenuate, degrade, or transform under certain conditions.

The manner by or area in which the pollutant enters WOTUS includes seepage or subsurface discharge into freshwater and nearshore coastal discharge, coastal submarine discharge, or recirculation within oceans. There are clear relationships between these seven FE factors, which result in three main elements to assessing FE, including time, volume, and entry method, as discussed in the following part.

VI. Road Map for Assessing FE

Recent EPA guidance on applying the *Maui* decision to the NPDES permitting program reiterates the two threshold conditions required to trigger a permit: (1) there must be or will be a direct discharge to WOTUS, and (2) such a discharge must be from a point source.[14] The EPA guidance states that only a subset of the discharges of pollutants to groundwater that reach WOTUS are considered an FE of a direct discharge. The guidance also adds that the design and performance of the system or facility (e.g., including the engineering effectiveness and discharge and water quality data) from which the pollutant is released via an FE pathway should also be considered.

A reasonable scientific evaluation approach for the three combined or main FE factors are as follows:

- Time: a function of distance, hydraulic head, or groundwater gradient and transport media
- Volume: a function of dilution and degree of chemical degradation or transformation
- Entry method: a function of type and area of discharge

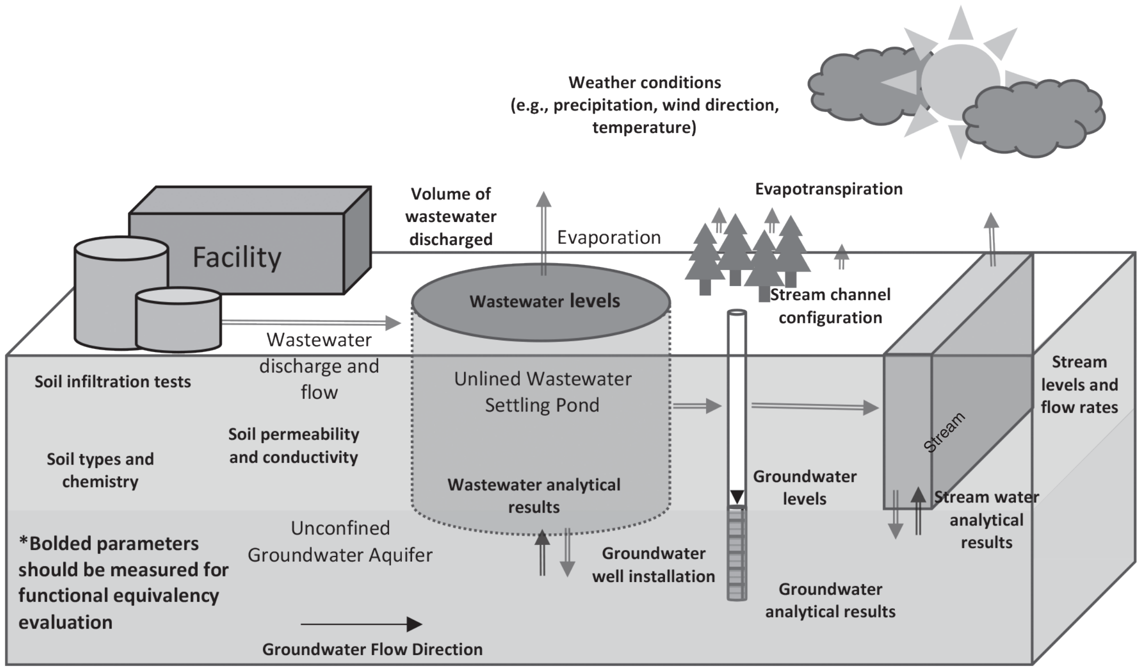
The steps for data compilation and review, collecting additional information to fill gaps, and evaluating the data and FE factors would generally include:

- Create initial conceptual site model (CSM) and data quality assessment plan
- Identify data gaps
- Fill data gaps
- Evaluate data quality
- Estimate time, volume, and entry method via modeling and chemical data review
- Revise CSM and document FE factor assessment

A CSM of the pollutant release and discharge area must initially be developed to illustrate specific facts of the physical setting and situation, identify what is known about the FE factors, and identify information (data) gaps that may exist. An example CSM for the wastewater settlement pond example, mentioned below, is shown in Figure 1.

14. U.S. EPA, Guidance Memorandum re: Applying the Supreme Court's County of *Maui v. Hawaii Wildlife Fund* Decision in the Clean Water Act Section 402 National Pollutant Discharge Elimination System Permit Program (Jan. 14, 2021), https://www.epa.gov/sites/production/files/2021-01/documents/final_ow_maui_guidance_document_-_signed_1.14.21.pdf.

Figure 1. Conceptual Site Model: Wastewater Discharge to a Settling Pond



Potential assessment of FE cases could be categorized into two groups:

> Group 1: those that are less complex or where plaintiffs have presented claims that can be assessed using simplifying assumptions and limited data, and an analytical approach may be used.
>
> Group 2: those that are more complex and require extensive data, field evaluation, additional data collection and quality assessment, and analytical and/or numerical modeling.

For both types of cases, an initial assessment would be conducted by the counsel and environmental consultant team to evaluate FE.

A Group 1 case example is a release from a near-surface water conveyance pipeline that apparently migrated to a nearby streambed resulting in degradation of water quality. The water infiltrated into the unsaturated zone above and then into groundwater and was observed seeping out of the stream bank into stream water. This relatively simple evaluation will require consideration of the uncertainty that will exist in the limited data and assumptions.

Assuming that the transport distance and hydrogeologic factors can be estimated, the migration rate or *time* factor can be estimated.

Based on the flow rate in the line and an estimated time the leak has been occurring, the volume factor of pollutants released can be estimated. An evaluation of the topography, unsaturated zone porosity, and alternate discharge points may indicate that not all leaked water traveled to the stream. In this case, water quality parameters were measured in the stream and pollutants were known to be present in the stream. The pollutant does not degrade to any measurable extent. Thus, the pollutant volume can be estimated.

If an appreciable volume of the pollutant does not enter the stream via seepage, an FE would not be valid. If the leaked water quality is demonstrated to be similar to the stream water quality, an FE would not be valid. If the conveyance line can be repaired and the release stopped, entry method is no longer significant.

A Group 2 case example is the wastewater settlement pond mentioned above and shown conceptually in Figure 1. The pond does not have an impermeable liner, is located near a stream, and is alleged to have released pollutants that caused fish kills through groundwater transport to a stream. Wastewater from the pond may be lost through evaporation or through seepage into soil beneath the pond. The amount of fluid lost over time is dependent on numerous factors that include the size of the pond, climatic conditions, fluid level, permeability of the underlying material, the chemical and organic contents, and so on. To evaluate FE for this scenario, data presented in Figure 1 would be needed over an annual (seasonal) time frame. Per recent EPA guidance, the processes at the wastewater treatment plant must also be considered.

Prior to collecting additional data shown in Figure 1, the data quality objectives and data assessment process would be developed. Once these data are collected or provided, and a statistical and uncertainty analysis has been completed, it could then be evaluated to determine if transport pathways from the pond to the stream exist, and whether a substantial amount of wastewater containing a significant level of chemical or biological pollutant was transported to the nearby stream and impacted the stream to produce a similar effect or result as a direct discharge. Data comparison to water quality criteria, analytical saturated flow calculations, or numerical unsaturated and saturated groundwater flow modeling would be part of this evaluation. The entry method for pond water entering the stream may be through more than one pathway and may require physical observation and/or chemical sample results comparisons. The entry method may also be revealed or disproved by the calculation or modeling results. Additionally, the possibility that other factors unrelated to the pond are affecting the stream would need to be considered.

The time and volume factors can be determined through unsaturated and saturated groundwater flow analytical calculations or numerical modeling. A computer model requires calibration to known factors, such as pond levels, groundwater levels, and pollutant levels or concentrations in the modeled area, to verify it can be used to represent actual conditions. Various scenarios could be assessed using analytical and/or numerical modeling to evaluate the pollutant migration and determine the main FE factors and the resultant consideration for the claim.

VII. Where the Legal Issues and the Science Merge

Whether this issue arises and needs to be demonstrated to an agency or in a trial, the basic steps to address it are the same. In fact, no matter which side of the table one finds oneself, the basic steps are likely going to be the same. Each of these steps can be complicated and often demand significant time and effort.

First off, the science used to support the selected argument must be generally accepted by those practicing in the appropriate field. Second, the argument made should be based on facts and data including but not limited to review of past or other scientific reports, site history (either documenting discharges to groundwater or possible receiving waters), site characterization and investigation reports, lithology and groundwater data, and discharge or receiving injection permits. Third, an evaluation should be made to determine if analysis of the data needs to include a groundwater model. If a groundwater model is needed, it should be started early. Fourth, based on an analysis, a cogent document should be created to provide resulting opinions. Fifth, arguments and opinions should be summarized and presented.

Given the dictates of *Maui*, one must first decide how to interpret the FE term. Over the coming years, this issue will likely be fleshed out by many court decisions, but most likely there will be substantial differences between the circuits. As a result, this matter will likely wind up presented before the Supreme Court again. In the meantime, an evaluation must start with what the Court has already stated regarding the definition of "FE." At this point, there will likely be a divergence between audiences hearing the FE argument (i.e., enforcement or environmental agencies or judges/jury during a presentation in the courtroom).

Agencies. The arguments will be directed to enforcement or environmental agencies, including professionals in various environmental fields. Given the complexities, summaries and presentations must be clear, comprehensive, and accurate. Also, it is wise to determine whether the agency, or its members, have made any statements or decisions already related to the arguments or issues being discussed.

Presentations in Court. When presenting conclusions before a court or jury, one must determine the level of knowledge of the court. Since a CWA case will most likely be presented to a mediator or a judge, due diligence is required to determine what the court may know about the CWA. However, assuming that a CWA matter has not been presented to this particular court before, or the level of court experience with the CWA is low, one needs to ensure that the basics are presented. This presentation will either be written or delivered by an expert on the witness stand. If the CWA claim is accompanied by state-law/common-law claims, there may be a jury to determine that aspect of the case. With juries, the following concerns regarding presentation are the same, there just has to be more explanation, broken down into smaller parts.

Regardless, a checklist of the various scientific issues that are involved in the case should be used to determine the best approach for presentation to ensure understanding. For example, the way groundwater flows may seem a simple proposition to those working in the field, but it is not uncommon for the layperson not to have any idea of how groundwater flow occurs.

Experience dictates that the most common scientific concepts regarding whether there has been an impact on WOTUS by groundwater are groundwater flow direction (vertically and horizontally in concert with the soil type and strata), required soil tests or analyses, and results of groundwater analytical tests and data interpretation. These categories generally fit the *Maui* categories of time of transport, distance, transport media or what pollutants travel through, dilution related to volume change, volume change or amount of discharge versus amount entering surface water, entry method to surface waters, and degree of chemical degradation/transformation. Currently, given there is not a significant set of precedents regarding FE, focusing on these categories is well-advised.

It is critical that groundwater modeling be presented clearly in layman's terms. A groundwater model should be presented as idealized, as it is intended to be a reasonable estimate of actual conditions that is not "perfect" or "precise." Often, the data used to generate the model must be "adjusted" to reflect the real system. This may be difficult for some to understand that although the model does not exactly represent the actual system, it approximates the physical system to the extent required to evaluate flow and transport. The representativeness of these complex models should be explained in a simple, easier-to-understand manner, such that the layperson understands how the model was prepared and how its conclusions relate to the FE argument.

VIII. Conclusions

The *Maui* ruling will undoubtedly prompt further litigation on WOTUS and discharges to groundwater that may require permitting under the CWA.

An initial careful review of environmental conditions related to potential or known discharges to groundwater is recommended. Additionally, tactical NPDES permitting or system changes may be advisable in situations where impairment to WOTUS or citizen or regulatory complaints may occur or may be thought to occur.

In the event of a complaint, an initial evaluation with legal counsel and an environmental consultant should be conducted to develop a response strategy. Clearly, various situations will have unique circumstances and conditions, but can be approached using the general road map and assessment principles provided here.