

**IMPAIRED WATER IDENTIFICATION RULE
STAKEHOLDER MEETING NOTES
September 28, 2004**

Some of ADEQ's answers have been expanded to provide more information than we were able to during the meeting.

Issue 1: Clarification was requested regarding the meaning of rule language (in current and proposed rule) that a surface water will be listed due to a "pollutant," but not "pollution."

ADEQ Response 1: Pollutant is a subcategory of pollution. Both are defined in federal regulations as "man-made or man-induced." While all water quality impairment is caused by "pollution," there must be an associated "pollutant" loading in order to develop a TMDL.

In some cases, a pollutant characteristic is on the 303(d) List, rather than the pollutant that will be used for the loading analysis. For example, surface waters may be listed for low dissolved oxygen (D.O.). A "load" cannot be assigned for D.O., but D.O. problems are often caused by excessive nutrient loading. In such cases, the TMDL would establish targets for D.O. as well as determine load allocations and reductions for nutrients.

During the presentation, we were discussing removing a surface water from the 303(d) List when the impairment is due to pollution, but not a pollutant. The example given was a lake with low D.O., where there are no associated nutrient loadings or other loadings causing the problem. The impairment was instead caused by the way flow to the lake was managed. For example, water diversions or ground water pumping may decrease the flow and thus negatively affect D.O. concentration.

It should be noted, however, that low flow does not excuse any type of pollution. The key is whether there is an associated pollutant loading. If pollutant concentrations or loadings increase due to low flow conditions then a TMDL must be developed. The source may not be known until the TMDL investigation is initiated.

Issue 2: ADEQ suggests that a documented improvement in the watershed can be used to decrease the number of samples needed to delist a surface water from the 303(d) list. This provision could be misused if the improvement did not have an effect on the particular parameter listed (example: copper is impairing the stream, and improvements were made in the watershed to reduce sediment loading, but sediment loading is not causing the impairment). How much documentation or improvement would be necessary?

ADEQ Response 2: ADEQ will ensure that rule language is clear that the improvement must be related to and have an effect upon the specific parameter impairing the waterbody (see draft language 604(G)(1)(a)(i) and (ii)).

The amount of improvement or type of documentation that will be considered is difficult to capture in a rule because of the diversity of potential actions. Note that this provision simply reduces the minimum number of samples from 27 to 10. These samples must confirm that water quality has improved for the parameter listed, and critical conditions under which exceedances occurred must be represented.

Issue 3: The higher number of samples proposed to delist a surface water, based on the assumption that the waterbody is impaired, may be unreasonable if the listing was made in error and the surface water is not truly impaired.

ADEQ Response 3: The current IWIR provides several routes for removing a surface water from the 303(d) list that was listed in error and is not truly impaired, in A.A.C. R18-11-605(E)(2) of the current rule and (604(G)(1)) of the draft rule. For example, a waterbody can be removed if it is found that credible data requirements were not fulfilled, if impairment is actually due solely to natural conditions, or if re-evaluation of the data indicates a deficiency in the original analysis. These provisions are sufficient to deal with erroneous listing decisions, without need to decrease the number of samples proposed for delisting a surface water.

Keep in mind also that multiple samples can be collected during one sampling event, meaning that 27 visits are not necessarily required in order to delist a water. The minimum number of sampling events would be three, provided that critical conditions under which original exceedances occurred were addressed.

Issue 4: With regard to Issue 3 above, ADEQ should err on the side of caution and require the higher number of samples, in order to be protective of the resource. Additionally, once a surface water is listed, the 27-sample minimum for delisting should be attainable.

ADEQ Response 4: ADEQ agrees that the rule must be resource protective. It is important to note that the 27-sample minimum for delisting was derived using the same criteria as was used to derive the listing criteria, as required by Arizona statute (see Aug. 9th presentation for details). If a 95% confidence level is needed to list a water, then ADEQ should have the same confidence in making a delisting decision. Also note that fewer samples may be acceptable with documented improvements in the watershed, as discussed above in Issue 2. We also agree that the 27-sample minimum is attainable with TMDL resources.

Issue 5: It appears that ADEQ is basing its listing methods solely on budgetary concerns and limited resources.

ADEQ Response 5: After utilizing the current IWIR for two listing cycles, it is clear that there are areas that need to be improved. At each of the IWIR stakeholder meetings, ADEQ has presented federal guidance, technical support documents, and statistical studies as the basis for its listing and delisting proposals. The proposals are consistent with federal guidance and assessment methods used across the U.S. While government agencies, like any business, must temper its decisions with consideration of available resources, we have not suggested that lack of resources is the driver for any of the changes proposed. We have continually expressed our willingness to consider other guidance or studies that would suggest a better and more defensible approach to 303(d) listing decisions.

Issue 6: Has EPA expressed approval of the IWIR proposals?

ADEQ Response 6 (from EPA Region IX staff): EPA does not approve or disapprove 303(d) listing methods, only the content of the 303(d) list that the states submit. However, EPA has reviewed the proposed rule changes and believes that they will result in more consistent listing decisions by ADEQ and EPA.

Issue 7: By reducing the number of samples needed to make listings to three for many parameters (using the binomial approach), ADEQ is ignoring any spatial or temporal component to water quality impairment.

ADEQ Response 7: ADEQ has accounted for the temporal component by requiring that the exceedances used in a listing decision occur over at least three separate sampling events (sampling events are at least seven days apart). This ensures that a listing will not be made unless sampling has shown that the exceedances are persistent or recurring. A spatial component is not necessary to list; impairment may be occurring in one limited area of the stream reach or lake. It is ADEQ's responsibility to make a listing if any portion of a surface water is impaired. The extent of the impairment will be defined during development of the TMDL.

Issue 8: With regard to Issue 7 above, one of the objectives of this process is to ensure that water quality is supportive of the aquatic life and wildlife that inhabit or use the surface water. Therefore, a listing should be made even if one limited area is impaired.

ADEQ Response 8: ADEQ agrees that the purpose of the assessment, listing and TMDL process is to maintain and/or restore support of designated uses, including support of aquatic life and wildlife. As stated above, a listing should and will be made if any portion of the surface water is impaired.

Issue 9: Using samples from only one site could mean that an erroneous listing would be made based on a "bad" sample location (example: low dissolved oxygen in a backwash area).

ADEQ Response 9: An erroneous listing such as that suggested in the example can be prevented through provisions already in place in the current IWIR, without increasing the number of samples needed to make a listing. Low dissolved oxygen in a stagnant area is natural. Provisions in rule allow ADEQ to not make a listing if it is known that exceedances are due solely to natural conditions. ADEQ is careful to check sample sites and flow measurements associated with dissolved oxygen violations.

As a further safety measure to prevent erroneous listings, ADEQ releases a draft 303(d) list to the public. If an error such as this is found, stakeholders have the opportunity to come forward with this information, or with additional data that should be considered. In fact, we strongly encourage stakeholders to submit data routinely so that it can be validated and uploaded into our database. This will ensure that ADEQ does not waste valuable resources revising assessments and releasing multiple draft 303(d) lists. Please correspond with Diana Marsh or Melanie Diroll to learn how to submit such data.

Issue 10: How does the assessment and listing process consider whether exceedances of standards are natural or human-caused (example: stormwater study on the Sacramento River showing natural exceedances of standards)?

ADEQ Response 10: Source determination is not part of the assessment and listing process, unless the natural condition is evident and documented (low D.O. in stagnant water) or a special study has already been conducted. The TMDL study will investigate sources and background conditions, and a delisting will be made if exceedances are solely due to natural conditions.

Issue 11: ADEQ should use great caution in applying the “natural condition” exception to listing and consider removing it from rule. True pre-settlement era conditions are largely unknown in this state. ADEQ should let the TMDL investigation reveal whether impairment is natural or human-caused.

ADEQ Response 11: ADEQ agrees that caution should be taken. Natural condition exceptions have only been made for dissolved oxygen violations from non-flowing water or from a spring, and for a couple of areas where a special study had already been conducted confirming natural sources. The natural condition must be confirmed in order to make this exception. If it is confirmed, a listing should not be made; therefore, we feel that inclusion of this exception in the IWIR should be continued. If it cannot be confirmed as natural, a listing will be made.

Issue 12: Florida State University’s statistical report that ADEQ is using to support changes to the binomial approach states that spatial and temporal representation of a waterbody is important. This type of representation is necessary due to the uncertainty inherent in water quality sampling.

ADEQ Response 12: The report does recommend that samples be collected “randomly and at reasonably spread locations across the water surface.” It then goes on to state that in doing so, “the true water quality of the whole reach will likely be represented by the sample measurements.” EPA CALM guidance speaks to the same issue and says that “statistical tests have good power for detecting exceedances if they are based on 30 or more samples. Smaller sample sizes are prone to yield erroneous attainment decisions because they have a low probability for detecting exceedances....”

What these statements refer to is the fact that small sample sets are very likely to miss exceedances, especially if used to represent a very large waterbody. We agree that a large sample set is important when the goal is to assess the entire waterbody and ensure that exceedances are not missed. However, as discussed above in Issues 7 and 8, ADEQ’s responsibility is to determine whether any portion of a surface water is impaired. It is not necessary to represent the entire stream or lake in order to make a listing decision.

Issue 13: With regard to proposed assessment methods for chronic Aquatic and Wildlife criteria, ADEQ suggests that exceedances could be excluded if documentation exists that chronic conditions were not occurring. In an effluent-dependent water (EDW), could discharge records be used to document this?

ADEQ Response 13: Yes, flow records from any type of surface water could be used to show that flow conditions under which the exceedances occurred were not chronic conditions (did not occur over more than three days). Note that extent and magnitude of the exceedances will be considered as well.

Issue 14: How can chronic criteria, which are based on four-day exposures, be applied to EDWs when the flow can vary so widely, even over the course of a day?

ADEQ Response 14: We have added consideration for diurnal variation (variation in flow and concentration of pollutants during the day) where documentation is available, within the weight-of-evidence section of the draft rule language. Working with chronic criteria within an EDW with diurnal variation will merit careful consideration of many factors, such as:

1. What is the standard compared to diurnal variation in concentration?
2. Were the conditions of flow and concentration routinely repeated for more than three days or even many months? Did the conditions last a couple of hours a day or most of the day?
3. What was the magnitude of the exceedance? Was it a marginal exceedance?

Discussions with representatives of the discharging facility would help to incorporate these factors into the assessment using the weight-of-evidence approach. However, if there is a lack of adequate documentation to show that exceedances were not representative of chronic conditions, ADEQ would need to be protective of the resource and make the 303(d) listing. Further review and modeling of the data would occur during the TMDL investigation.

Issue 15: Grab samples should not be used to assess chronic criteria at all. Because permittees must use a mean of four samples to assess compliance with chronic criteria, as required in standards, ADEQ must be consistent and do the same when making assessment and listing decisions. ADEQ maintains that assessments are not enforcement, but the assessments have an impact on enforcement and should use the same criteria.

ADEQ Response 15: ADEQ acknowledges that assessment and listing may impact a permitted facility, but does not agree that assessment or listing is enforcement. We have included provisions in the draft rule language to allow permittees, or any sampler, to submit evidence that chronic conditions were not occurring. Exceedances would be excluded if samples reflect conditions that lasted less than four days, as discussed above in Responses 13 and 14. We have also added a couple of new concepts since the meeting. First, in the definition of chronic criteria, we have added a provision that if four consecutive days of samples are available, ADEQ will calculate a mean or median and evaluate that value for assessment and listing. And, we have added the consideration of diurnal variability to the weight-of-evidence approach, as discussed above.

It is still important, however, to note the difference between the assessment and listing process and the compliance and enforcement process. In the case of permit compliance monitoring, a pollutant is being discharged into a waterbody, and therefore the burden of proof rests on showing that exceedances are not occurring. As discussed in Response 12 above, this requires a larger dataset to ensure that exceedances are not missed.

In the assessment process, ADEQ assumes that the waterbody is attaining, and the burden of proof rests on showing that exceedances are occurring. The frequency of monitoring and size of the dataset needed vary based on the underlying assumption and premise of the monitoring program. While a discharger may need to take multiple samples each month to show exceedances are not present, it does not take nearly so many samples to show that exceedances are present.

It is also important to bear in mind that ADEQ rarely samples water quality below a discharger. In most cases, data collected below a point source is submitted by the permittee. Therefore, it is likely that data or information would be available to show whether or not chronic conditions were occurring at the time of the exceedances, as detailed above. As stated in Response 13, flow or discharge records could be used to show whether chronic conditions (conditions that lasted for more than three days) were occurring at the time of an exceedance, or if the exceedance occurred during a very short period of high flow or discharge.

Issue 16: ADEQ is placing the burden of proof on the stakeholder by assuming a grab sample represents chronic conditions unless evidence is provided to show otherwise.

ADEQ Response 16: ADEQ acknowledges that these provisions do place some responsibility on the stakeholder to show that chronic conditions are not occurring, if they so choose. However, ADEQ has also proposed to use the weight-of evidence approach (604(E) of the proposed rule language) in making a listing decision if exceedances are marginal (only two exceedances, exceedances occurred only during high flows, evidence of diurnal variation). ADEQ proposes that further supporting evidence of impairment is necessary in these cases before a listing is made. If none exists, then ADEQ would not list the water and make the case to EPA as well that a listing is not warranted. We feel that these provisions place responsibility on ADEQ to seek out further evidence and ensure that a listing is needed. These provisions are (note the addition of diurnal variability):

- Probable anthropogenic sources in the watershed;
- Associated pollutants exceeding standards and total number of sampling events with exceedances;
- Extent of impairment;
- Magnitude of exceedance;
- Diurnal variability of the pollutant; or
- More direct measurement of impacts (i.e., high mercury in fish).

Issue 17: ADEQ should not require further evidence of impairment if exceedances are marginal. The listing should be made, and subsequent sampling can be used to verify whether or not exceedances represent chronic conditions.

ADEQ Response 17: Since use of a grab sample to represent chronic conditions does require an assumption to be made, ADEQ feels that further evidence is warranted when chronic exceedances are marginal.

Issue 18: The issue isn't whether a grab sample can represent chronic conditions; stream water quality tends to be consistent. The bigger concern is making a listing on more than one exceedance. Several grab samples are needed to show that the exceedances are truly chronic.

ADEQ Response 18: To be resource protective, ADEQ will make the assumption that chronic conditions are represented, unless evidence is provided otherwise as discussed above in Response 15.

Federal guidance advises that more than one exceedance of a chronic standard, within a three-year period, should result in a 303(d) listing. If we choose to use another assessment criteria, then we must have scientific and statistical rationale to support such a method, and it must be equally or more protective of the natural resources than EPA's assessment criteria. And we must have the monitoring resources needed to use whatever method is chosen.

Issue 19: By making the chronic listing criteria the same as the acute, ADEQ is essentially disregarding the acute standards. Decisions will always be based on the chronic criteria.

ADEQ Response 19: It is true that water quality results are evaluated against the most stringent applicable standard for a surface water. In this case, the chronic criteria for the Aquatic and Wildlife use are more stringent than the acute. The same is true for assessments of all standards: while we may have a lower lead standard for the Full Body Contact use than for the Agricultural Irrigation use, it does not make the Ag Irrigation standard irrelevant. It simply helps us to determine what type of problem we are dealing with and what uses are affected.

Chronic criteria exceedances should not be perceived as "not as serious" as acute exceedances; they are two different types of criteria to address different types of effects. While acute exceedances can be immediately lethal, chronic criteria exceedances can cause effects such as shortened lifespan, abnormal behavior, slowed growth, and reduced fertility. Both can result in the death of aquatic organisms.

By researching the scientific basis for chronic (and acute) Aquatic and Wildlife criteria, we believe we have provided sufficient exceptions in the proposed rule language that provide for consideration of chronic exposure times. To be adequately resource protective, we propose using a grab sample to represent chronic criteria. However, as discussed above in Response 13, the Department proposes that flow records or discharge records could be used to show that chronic conditions were not occurring and may allow us to exclude exceedances. These exceptions could not be used to exclude acute criteria exceedances, however, which are based on a shorter exposure time.

Issue 20: Why not use chronic criteria exceedances as a trigger to collect four consecutive days of samples? The Planning List could be used to track these waters.

ADEQ Response 20: ADEQ maintains that federal assessment and technical guidance make it necessary for ADEQ to list surface waters for chronic exceedances based on more than one exceedance in three years. We have added provisions for considering weight-of-evidence

factors if exceedances are marginal and for excluding exceedances as discussed above, in order to address stakeholder concerns regarding the use of grab samples.

If four consecutive days of samples are available, ADEQ will calculate a mean or median, and use that value to determine whether an exceedance has occurred (we have added this to the definition of chronic Aquatic and Wildlife criteria). If the TMDL investigation reveals that any listings were made in error, the surface water will be delisted.

It is important to note also that much of the data assessed comes from outside the agency, meaning we may not see it for two years after it was collected and it would take another few years more before ADEQ could follow-up on exceedances. Disregarding federal listing guidance cannot be justified, especially when follow-up action would be delayed and could allow impaired waters to remain unlisted for several years.

Issue 21: Is there a study showing that grab samples can be used to represent chronic criteria? Is it peer-reviewed?

ADEQ Response 21: We are looking into this question and will continue to research chronic criteria questions before the Oct. 14th meeting. We are especially looking into research on diurnal variations in metals concentrations, and we have added this concept to the weight-of-evidence considerations (more details to be provided at the meeting). From our research so far, it appears that if diurnal variation is occurring, typically metals concentrations should be lower during normal monitoring hours (about 9 to 5), and therefore samples taken during a typical ambient monitoring visit would not be expected to overestimate exceedances.

Issue 22: The effects of chronic criteria exceedances are organism-specific. A lot of assumptions are being made when determining impairment based on chronic exceedances. ADEQ should consider these variables and bear in mind that stakeholders are impacted by listing decisions. Limited resources should not be a reason to make hasty listing decisions.

ADEQ Response 22: ADEQ's proposed listing methods are based on federal criteria and listing guidance. The four-day exposure time used in developing the chronic criteria is based on multiple species-specific tests and is considered to be sufficiently protective of most aquatic life. As stated previously, we would exclude any exceedances if evidence is provided that the condition lasted fewer than four days.

Studies within the assessment unit showing impacts to organisms or the lack of impacts can be considered during the assessment process through the weight-of-evidence approach. This will become more of a consideration after biocriteria are adopted into our surface water quality standards.

Issue 23: Because of the extremely high number of threatened and endangered species in this state, ADEQ needs to be protective of water quality resources that so that these vulnerable species are not impacted further.

ADEQ Response 23: ADEQ agrees that listing methods should be resource protective. We believe this provides further justification for use of a grab sample to represent chronic conditions, unless evidence is provided to the contrary.

Issue 24: While resource protection is important, the benefits of this rule revision process should outweigh the costs.

ADEQ Response 24: ADEQ acknowledges the importance of cost considerations as well. We are confident that the future benefits of these rule changes will outweigh the costs. By making this rule more consistent with federal guidance, we will save the resources we are currently spending in constant revisions and corrections to our assessment that result from EPA overfiling. Currently, we are spending months of work making assessments and listings that are overruled at the federal level.

We believe that the benefits to Arizona's natural resources will outweigh the costs as well. The listing methods proposed are based on federal guidance, technical support documents, and statistical studies, and are consistent with methods used by many other states. We believe we have provided sufficient "checks and balances" within the rule, including credible data requirements, the weight-of-evidence considerations for marginal listings, and provisions for excluding certain exceedances, that should prevent unnecessary listings and associated costs to the agency and to stakeholders, while also being resource protective.

Issue 25: The proposal to remove the Planning List from rule eliminates a huge opportunity to track and schedule waters for further monitoring that show evidence of a problem.

ADEQ Response 25: ADEQ is not proposing to discontinue the practice of tracking, scheduling, and prioritizing surface waters for further monitoring. All waters assessed will be tracked from one assessment to the next, placed in one of the five categories in the Integrated Report, and scheduled for further monitoring, especially if a problem is found. Any exceedances that occur will continue to be noted in the assessment report. We would simply like to remove the concept from the IWIR, since it adds a lot of complexity to the rule, and is not directly related to the identification of impaired waters.

Issue 26: ADEQ's new term "screening value" relating to *Escherichia coli* results should be defined in rule.

ADEQ Response 26: ADEQ has added this definition to Section 601 of the proposed rule language as "a numerical value other than a Surface Water Quality Standard used to make an assessment decision."

Issue 27: EPA requests clarification on how the IWIR deals with threatened waters. The rule suggests that there are no regulations in place requiring the listing of threatened waters. EPA maintains that these regulations are in place.

ADEQ Response 27: ADEQ has researched the regulations since the meeting and agrees that CFR 130.2(j) does require that threatened waters be placed on the 303(d) list. ADEQ proposes to add threatened waters to the weight-of-evidence section (604(E)). It should be

noted, however, that this determination would require trend analysis. We have specified in the draft language that procedures and minimum data requirements to perform trend analysis would need to be developed through a public process before these types of listings are made.