

LISTING CRITERIA
for
OREGON'S 1998 303(d) LIST
of
WATER QUALITY LIMITED WATER BODIES

Oregon Department of Environmental Quality

October 1998

BACKGROUND: The 1972 Federal Clean Water Act (CWA) in Section 303(d) requires each state to identify those waters for which existing required pollution controls are not stringent enough to achieve that state's water quality standards. For these waters, states are required to establish total maximum daily loads (TMDLs) in accordance with a priority ranking. The requirements for listing water quality limited streams still in need of a TMDL are contained in several parts of the Code of Federal Regulations 40 CFR. The most recent updates were published July 24, 1992 and became effective August 24, 1992. In addition, the U. S. Environmental Protection Agency (EPA) Region 10 has established guidance entitled, "Guidance Document for listing water bodies in the Region 10 Section 303(d) Program," (November 1995, available upon request).

The clarification of the intent of Section 303(d) in 1992 required the State to "demonstrate good cause" for not listing a water body and puts the burden of proof on the State to justify exclusion of any water body (Federal Register, Volume 57, No. 143, Friday July 24, 1992, pg 33047, preamble to Section 130.7 TMDLs). The State must use all existing and readily available water quality data to prepare the Section 303(d) list. At a minimum, the following sources of data should be considered: waters identified as partially or not meeting water quality standards in the 305(b) report; waters for which dilution calculations or predictive models indicate nonattainment of standards; waters for which problems have been reported by other agencies, institutions and the public; and waters identified as impaired or threatened in the State's nonpoint assessments submitted to EPA under Section 319 of the CWA.

Standards are typically designed to protect the most sensitive beneficial use within a water body. Listings can be based on: evidence of a numeric standard exceedence; evidence of a narrative standard exceedence; evidence of a beneficial use impairment; or antidegradation (i.e. a declining trend in water quality such that it would exceed a standard prior to the next listing period).

When a state submits its Section 303(d) list and supporting documentation to EPA for review and approval, the submission will constitute the bulk of the administrative record supporting EPA's approval of the list. The submission should include: the Section 303(d) list including pollutants impairing water quality and the priorities and waters targeted for TMDL development during the next listing cycle; a description of the process the state used in developing the list; any criteria and guidelines used by the state in developing the list; the basis for listing decisions made; and a summary of the response to public comments.

This is a summary of the listing process and criteria used by the Oregon Department of Environmental Quality (DEQ) to develop its 1998 303(d). The 303(d) list decision matrix for developing the 303(d) list is contained in separate documentation. This guidance was based on the following documents: Oregon Water Quality Standards (OAR 340-41) and "Guidance Document for listing water bodies in the Region 10 Section 303(d) Program."

A summary of the response to public comment will be developed based on comments received during the public comment period held from September 27 - November 1, 1996 and the comment period held February 19 - April 20, 1998.

LISTING PROCESS OVERVIEW: The Department's process to develop the 1998 303(d) list consisted of the following steps:

First Public Review Period: The first public comment period, which was from September 27, 1996 to November 1, 1996, provided the public with an opportunity to comment on the 1994/96 303(d) list and the criteria used to develop that listing. Modifications were made, as appropriate, to the list and were included in the draft which went out for public comment February 17 to April 20, 1998.

Data Gathering and Review: The Department put out a public notice from September 22, 1997 to November 21, 1997 seeking further technical information on the condition of Oregon's surface waters. Data received during the "Call for Data" along with data received during the first public review process, as well as, additional data gathered by the Department was reviewed to determine whether it met the minimal data requirements, whether standards were exceeded or beneficial uses were impaired, and then evaluated to determine if any rationale for not listing applied (as outlined below).

The Department actively sought out data collected by other federal and state agencies, tribes, local governments, watershed councils, private and public organizations and individuals. DEQ especially focused on obtaining data from the U.S. Forest Service and Bureau of Land Management which have land management responsibilities for large portions of Oregon.

Second Public Review Process: A Draft 1998 303(d) List of Water Quality Limited Water bodies was released for public review between February 19, 1998 - April 20, 1998. A series of 7 Public Hearings were held throughout the state between March 16 and April 2, 1998. A summary of the written and oral comments and DEQ's responses to those comments from both comment periods is available from DEQ as separate documents.

Final 1998 list: The Draft 1998 303(d) list was revised where appropriate, based on the review of public comment. Oregon's Final 1998 303(d) list was submitted to US EPA Region X with supporting documentation for EPA's approval/disapproval (if disapproved, EPA has 30 days to develop a list) on October 16, 1998. Supporting documentation include: a decision matrix indicating what information was considered and what action was taken; criteria used for listing water bodies; summaries of the public comment; responses to commonly asked questions and response summary.

LISTING PROCESS AND DECISION MATRIX: The following is a summary of the process used to evaluate data for the development of the 1998 303(d) list. It also provides information for how the 303(d) List Decision Matrix and the list were developed. The Decision Matrix consists of the following columns: Name and Description, Water body Segment, Parameter, Criteria, Season, Basis for Consideration of Listing, Supporting Data or Information, Rationale for Not Listing, Listing Status and Listing Change From 1994/96.

Name and Description: The name and the segment of stream or area of water body considered.

In general, rivers and streams were listed for their entire length (mouth to headwaters) unless there was information available to divide them into segments. Larger rivers were segmented based on factors such as changes in land use or slope, presence of a dam or other major structure such as a major irrigation diversion or major tributary. Rivers and streams were also segmented based on water quality data indicating different water quality status. Segments identified in the Nonpoint Source Assessment (DEQ, 1988) were utilized as a starting point. These segments were reviewed as part of the public review process of the Nonpoint Source Assessment. The listing of an entire stream is consistent with the approach that is identified under 340-41-026 (3) (D) (i) which encourages the development and implementation of a temperature management plan on a watershed basis. The Department is interested in gaining data that will aid in further refining the segments listed and is interested in developing the list more on a watershed basis. Headwaters can be defined as the natural perennial/intermittent stream interface of the named stream. Segments are based on professional judgment and the Department will review its approach in future listing updates.

Water body Segment #: Segment Code that was used internally to reference the stream segment in Department data bases. Contact the Department if you wish further information about the code.

Parameter: Name of water quality standard being considered.

Criteria: The specific water quality conditions the water body is being compared with and must meet to be in compliance with the standard..

Season: The time of year when a violation of the water quality standard is a concern.

Basis for Consideration of Listing: The Department is required to, at a minimum, assemble and evaluate “all existing and readily available water quality related data and information” including: waters identified as partially or not meeting uses or as threatened in its most recent 305(b) report; waters for which dilution and predictive models indicate nonattainment of water quality standards; water for which water quality problems have been reported by local, state or federal agencies, public or academic institutions for which they have data; waters identified as impaired or threatened in a nonpoint assessment submitted to EPA under section 319 of the CWA.

- **305(b) Report:** This report is required every two years under the Clean Water Act in order to report the status of the nation’s waters to Congress. EPA has published guidelines for developing this report. Included in these guidelines are criteria for rating water quality. In general, waters with less than or equal to 10% exceedence of a standard are considered as meeting the standard, waters with greater than 10% and less than or equal to 25% exceedence of a standard are considered moderately impaired and waters with greater than 25% exceedence of a standard are considered severely impaired. Waters that were listed as being moderately or severely impaired in the 1994 305(b) were considered for the 303(d) list and were noted under “Basis for Consideration of Listing.” For the final listing, the past ten years of data (WY 86 - 95 or 10/85 - 9/95) were evaluated using the most recent standards. Standards for pH, dissolved oxygen, temperature and bacteria were modified as of 1/11/96. Therefore, some streams that were identified as not meeting standards in the 1994 305(b) report may not be listed on the 303(d) list based on more recent data or modification of standards.
- **Data Evaluated:** In general DEQ evaluated data collected in the last 10 Water Years (i.e. WY87 to 96 or 10/86 to 9/96) when it was available or reports and studies published during that time period. Older data, reports and studies were reviewed and evaluated on a, case by case, basis using DEQ’s professional judgment as to their relevance. When data was available to DEQ for WY97 (10/96 to 9/97) it was used in the evaluation for considering whether a water body should be listed (in many cases agencies and groups had not completed

their analysis of WY97 data by the time the “Call for Data” request went out). See individual listing criteria for specific Data Requirements.

- **Available data:** Where data was available, the source of the data was indicated.
- **Nonpoint Source Assessment:** If a water body was identified in the Nonpoint Source Assessment (DEQ, 1988), the Assessment was referenced along with the segment number and the evaluation given from the assessment. It is important to note that the NPS Assessment was developed using survey questionnaires to initiate an on-going problem identification process. Supporting data was not collected during the development of the assessment, instead the respondent would reference whether they were basing their determination on any data that they might have available (definition for “data” was undefined), visual observation or perception. Water quality problems based on perception were not included on the matrix. The information source used by the respondent is cited on the decision matrix. The notation “data” in this column means that the respondent was basing their judgment on data available to them at that time. It does not mean that the Department has that data.

The Department has identified these sources of information under the “Basis for consideration for Listing” column on the Decision Matrix. Water bodies for which supporting data was made available were further reviewed for listing purposes. Those water bodies for which no supporting data was available were not included on the 303(d) based on the lack of supporting data. This reason was stated under the “Rationale for Not Listing” column and under “Status” it was noted that data was needed. These water bodies are considered Water bodies of Potential Concern and the Department will continue to search for data on these water bodies for future listings. This approach is discussed in EPA Region X listing guidance regarding anecdotal information (page 3-10).

Supporting Data or Information: This is a brief summary of the information used by the Department in making its determination. Typically, the following are listed: source of data, location data was collected, the frequency and magnitude of the exceedences if any, the appropriate standard, season and year data was collected or represents. In some cases, reference documentation was noted and briefly summarized.

Rationale for Not Listing: Based on EPA Guidance, there are several situations where waters that do not meet State water quality standards do not have to be placed on the list. Water bodies can be excluded from the proposed list for any one of the following:

1. New information showing that water quality standards are being met. This may include more recent or more accurate data, more sophisticated modeling, or identification of flaws in the original assessment.

As a general rule of thumb, it should take similar data to get off the list as it took to get on the list. For example, if the listing was based on two successive years of a standard not being met, the Department would look for at least two successive years of data indicating that the standard is being met. In several cases, data was available for a site which indicated that it met the standard one year but not another year. If the Department was able to determine that there was a probable explanation as to why data from one year was more representative of stream conditions, the Department would use that data as a basis for listing.

For example, if only two years of data were available and data was collected during a drought year (showing the stream temperature was above the standard) and a more typical year (indicating that the stream met the standard), the water was not placed on the 303(d) list. In other words, where multiple years of data were available, if the only data showing an exceedence of the standard was data collected during a drought year, the segment was not put on the 303(d) list but identified as a Potential Concern. The Department will encourage that additional data be collected to confirm that these waters are typically meeting standards. If only one year of data was available for a stream and this data was collected during a drought year, the stream was put on the 303(d) list until it can be shown that the water does meet standards. This judgment was used in evaluating temperature data.

For the 1998 303(d) list purposes, a drought year was determined based on a drought emergency being declared by the governor. Drought emergencies were declared in 1991, 1992 and in 1994 for selected counties: If a Drought Emergency declaration was made for a given year, drought conditions are assumed to apply to the entire state. DEQ uses the

declaration of a Drought Emergency as a general indication that drought conditions exist within the state. DEQ does not make a distinction between one county and another or one watershed and another, but assumes drought conditions exist throughout the state.

2. Waters were placed on the proposed list based on standard violations caused by natural conditions with no direct human caused influences. The rationale for removal of proposed waters based on natural conditions must be sufficiently documented and agreed upon by appropriate DEQ staff. Additionally, DEQ also relied on a guidance document from EPA ("Establishing Site Specific Aquatic Life Criteria Equal to Natural Background" Nov. 5, 1997) for evaluating whether natural background conditions had been met. For this listing, waters that exceeded standards but drained wilderness or similar areas, met EPA's guidelines definition for natural background and were well documented that there were no contributing human contributions were removed from the list due to natural conditions provided this judgment was made by the land management agency and the land management agency documented that no past or present human influences had or were occurring which might contribute to a standard exceedence.
3. "Other pollution control mechanisms" which have been completed or are scheduled for implementation will achieve water quality standards on water body segments proposed for listing (under 40 CFR 130.7(b)(1)). Per EPA guidance, the following information about the controls needs to be provided to remove a proposed segment:
 - The controls are relative to the problem;
 - The controls are required by permit, license, contract, grant condition or other means to assure their completion;
 - The time frame for implementation is identified;
 - Planned monitoring is identified and/or collected data are evaluated to check effectiveness of the controls.

For "other pollution control mechanisms" (such as a permit) EPA's guidance requires that to exclude water bodies from the 303(d) list because of "existing pollution control mechanisms" the state must demonstrate that the water bodies will meet water quality standards by the next listing cycle (i.e. within two years).

1. The segment has a TMDL approved by EPA. Segments that have TMDLs established will be removed as long as implementation is satisfactory, but will retain their Water Quality Limited status (per OAR 340-41-006(30)) until they meet water quality standards.
2. Data did not meet minimum data requirements, quality assurance or listing criteria. These requirements are described in more detail below.
3. There was either little or no data available for the Department to evaluated.

Listing Status: The status of the water body for the particular parameter was listed. The following status categories were used:

- OK - generally met the standard and does not go on the 303(d) list;
- Need Data - no supporting data or information provide; water body does not go on the 303(d) list but is considered to be a potential concern;
- Potential Concern - This was used in situations where data was presented that indicated a water body may typically meet water quality standards except under unusual circumstances (e.g. unusual weather circumstances - see "Rationale for not Listing" for further discussion) or in DEQ's professional judgment the data available was inconclusive to justify a listing or in situations where toxics exceed levels of concern used in projects, but did not exceed definitions used for the 303(d) list. In these cases, these water bodies are identified as being of potential concern, the Department will continue to seek follow up data to verify the assessment.
- Study - in the case of pH, certain eastern Oregon basin standards identify that if values are above 8.7 but not 9.0, further study should occur to determine if elevated pH is anthropogenic or natural in origin. These waters are not considered water quality limited as they do not exceed the standard.
- 303(d) List - water body exceeds listing criteria and has been placed on the 303(d) list.
- TMDL - A TMDL has been established, approved by EPA and is being implemented. The water is considered Water Quality Limit (per OAR 340-41-006(30)) until it meets the water standard unless it requires more than Best Control of Technology to do so. These waters are not part of the 303(d) list as they have a TMDL and will be tracked separately in the 305(b) report.

- **Tribal Waters** - Indicates that the water body is entirely or partially within Tribal Reservation Boundaries. Those water bodies entirely on Tribal Reservation Boundaries are not part of Oregon's 303(d) list submittal to EPA for approval. For those water bodies that are partially within Tribal Reservation Boundaries only that portion within Oregon's jurisdiction is part of Oregon's 303(d) list. DEQ has included water bodies on tribal lands in the 303(d) list to give a more complete picture of water quality concerns within the state's boundaries.

Listing Change From 1994/96: This column identifies changes that have occurred to the 303(d) list since it was last approved by EPA in June 1996.

- **Addition** - This designation indicates either a new water body segment was added to the Decision Matrix, an additional parameter was added for a water body segment already in the Decision Matrix, or a water body segment and/or parameter moved from not being 303(d) listed to being 303(d) listed.
- **Status Modification** - The Listing Status of a water body segment already in the Decision Matrix was changed, but did not result in a 303(d) listed segment.
- **Segment Modification** - A water body segment already in the Decision Matrix was modified in some way. Normally this would occur if data had been received which showed water quality was either being met or not being met at a different place than was shown in the 1994/96 Decision Matrix. This would result in either the splitting, shortening or lengthening of a segment.
- **Removed** - This designation indicates the listing status of a parameter which had been listed for a water body segment in the 1994/96 303(d) list had been modified by removing it from the 1998 303(d) listing. There are five categories for removal:
 - (1) Listing Error - The parameter and/or segment was listed as a 303(d) water body in the 1994/96 list in error.
 - (2) TMDL - A Total Daily Maximum Load (TMDL) has been developed and approved by EPA for the parameter and/or segment.
 - (3) Other Control Mechanism - It was determined by DEQ that a Control Mechanism other than a TMDL had been developed which would satisfy the definition of "existing pollution control mechanisms" (i.e. the water bodies would meet water quality standards by the next listing cycle (i.e. within two years).
 - (4) Natural Conditions - It was determined that the water quality exceedences were due to natural causes unaffected by human activity.
 - (5) Met Water Quality Standards - Based on DEQ's criteria water quality standards were being met for the parameter of interest with in the water body segment.

Minimum Data Requirements: There are two minimum requirements: 1) information describing quality assurance and quality control such that the Department can reasonably apply the available data should be available and 2) enough information should be submitted to indicate that standards are or are not exceeded, or uses are or are not impaired, and that such measurements are representative of the water body (these are described under each parameter listed on the following pages).

Quality Assurance and Control: Reports and data submitted to the Department containing chemical data should either be accompanied by QA/QC documentation, outline the QA/QC efforts in the body of the report, refer to a standard QA/QC protocol or have QA/QC protocol available. During review, the Department may require submittal of QA/QC protocols referred to and the results of the QA/QC efforts. Analytical testing methods shall be in accordance with the most recent edition of Standard Methods for the Examination of Water and Waste Water or an EPA approved method or other methods acceptable to DEQ and conforming with preservation, transportation and holding time recommendations. Field kits using chemical tests are not acceptable unless QA/QC can be demonstrated.

Field instruments are to be operated and calibrated according to manufacturers recommendations, or other acceptable, demonstrated method.

Biological monitoring including surveys of habitat and sedimentation should follow standardized field protocols. Justification and descriptions of appropriate reference conditions or locations should be included.

Guidance for quality assurance and control and monitoring for specific parameters are available from the Department's Laboratory Division. The Department encourages the following:

1. Sampling and analysis conducted under a QA/QC plan;

2. Laboratory samples analyzed using Standard Methods or EPA approved methods or other methods acceptable to DEQ and suggested QA/QC protocols including analysis of replicates, blanks and recovery spikes, where appropriate;
3. Field instruments operated and calibrated according to the manufacturers recommendations;
4. Data reviewed and documented to assure that QA/QC objectives of the plan were met.

Listing Criteria: Criteria used for listing a water body is described by parameter which are listed in alphabetic order on the following pages.

PARAMETER: Aquatic Weeds or Algae
BENEFICIAL USES AFFECTED: Water Contact Recreation, Aesthetics, Fishing
STANDARDS or CRITERIA: OAR 340-41-(basin)(2)(h)

Standards applicable to all basins:

(h) The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation, or industry shall not be allowed;

WATER QUALITY LIMITED CRITERIA: Macrophytes: Documented reports of an abundance of invasive, non-native macrophytes (those listed on the “A” or “B” Noxious Weed List maintained by the Department of Agriculture) that dominate the lake assemblage of plants and significantly reduces the surface area available for lake usage; frequent herbicide treatments to control aquatic weeds; or other activities initiated to manage weed growth such as through a Coordinated Resources Management Plan in response to frequent complaints about weeds interfering with various uses.

Periphyton (attached algae) or Phytoplankton (floating algae): Documented evidence that algae is causing other standard exceedences (e.g. pH or dissolved oxygen) or impairing a beneficial use.

TIME PERIOD:
Annual

DATA REQUIREMENTS:
Reports since 1979 (date of DEQ’s first Lake Classification submittal to EPA by McHugh). Earlier data will be considered on a case by case basis.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Clean Lake Studies and data summaries conducted under contract;
- TMDL Studies

PARAMETER: **Bacteria (*E. coli*)
or Water Contact Recreation (Fecal Coliform)**

BENEFICIAL USES AFFECTED: Water Contact Recreation

STANDARDS or CRITERIA: OAR 340-41-(basin)(2)(e and f)

Standards applicable to all basins:

(e) Bacteria standards:

(A) Numeric criteria: Organisms of the coliform group commonly associated with fecal sources (MPN or equivalent membrane filtration using a representative number of samples) shall not exceed the criteria described in subparagraphs (i):

(i) Freshwaters and Estuarine Waters other than shellfish growing waters:

(I) A 30-day log mean of 126 *E. coli* organisms per 100 ml, based on a minimum of five (5) samples;

(II) No single sample shall exceed 406 *E. coli* organisms per 100 ml;

(f) Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing or shellfish propagation, or otherwise injurious to public health shall not be allowed.

[Note: this standard replaced the following fecal coliform standard as of 1/11/96. Fecal Coliform data was used to develop the 303(d) list as it was the most commonly measured indicator of organisms of the coliform group commonly associated with fecal sources. Future listings and modifications will be based on *E. coli* data as new data becomes available:

Freshwaters and Estuarine Waters other than shellfish growing waters: A log mean of 200 fecal coliform per 100 milliliters based on a minimum of five samples in a 30 day period with no more than ten percent of the samples in the 30 day period exceeding 400 per 100 ml].

WATER QUALITY LIMITED CRITERIA: A 30-day log mean of 126 *E. coli* organisms per 100 ml or more than 10% of the and a minimum of at least two exceedences exceed samples exceed 406 *E. coli* organisms per 100 ml or, if *E. coli* data is not available, the geometric mean of fecal coliform bacteria exceeds 200 per 100 milliliters or more than 10 percent of the samples and a minimum of at least two exceedences exceed 400 per 100 milliliters for the season of interest;

TIME PERIOD:

Summer: June 1 through September 30 (period of highest use for water contact recreation);

Fall-Winter-Spring (FWS): October 1 to May 31;

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86) or study conducted under funding under Federal Clean Water Act Grant Funding (Section 208) prior to 10/85. Earlier data will be considered on a case by case basis. A minimum of 5 representative data points available per site collected on separate days for the season of interest.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Departmental of Environmental Quality, U.S. Geological Survey, U.S. Bureau of Reclamation, City of Portland and Salem and Unified Sewage Agency routine or intensive monitoring data;
- Willamette River and Columbia River Bi-State Studies conducted under contract;
- Section 208 and other Clean Water Act Funded studies in Tillamook Bay, Coos Bay, Malheur County and Bear Creek

PARAMETER: **Bacteria (Fecal Coliform)**
BENEFICIAL USES AFFECTED: Shellfish
STANDARDS or CRITERIA: OAR 340-41-(basin)(2)(e and f)

Standards applicable to North Coast, Mid Coast, South Coast, Umpqua and Rogue basins:

(e)(ii) Marine waters and estuarine shellfish growing waters: A fecal coliform median concentration of 14 organisms per 100 milliliters, with not more than ten percent of the samples exceeding 43 organisms per 100 milliliters.

(f) Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing or shellfish propagation, or otherwise injurious to public health shall not be allowed.

[Note: U.S. Food & Drug Administration criteria for classifying shellfish water is based on geometric mean, not median, therefore this statistic was used]

WATER QUALITY LIMITED CRITERIA: Fecal coliform values exceeding statistical standards or shellfish harvesting allowed under a management plan that conditionally approves harvesting to certain locations, times and conditions or shellfish harvesting closed due to water quality.

TIME PERIOD:
Annual

DATA REQUIREMENTS:
Data collected since Water Year 87 (10/86) or study conducted under funding under Federal Clean Water Act Grant Funding (Section 208). Earlier data will be considered on a case by case basis. A minimum of 15 representative samples per site collected on separate days over a three year period are required for classifying a shellfish growing area under FDA requirements.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Departmental of Environmental Quality routine or intensive monitoring data;
- Cooperative monitoring of shellfish growing water through the Oregon Health Division, Department of Agriculture, Department of Environmental Quality and local county Health Departments;
- Section 208 and other Clean Water Act Funded studies in Tillamook Bay and Coos Bay.

PARAMETER:	Biological Criteria
BENEFICIAL USES AFFECTED:	Resident Fish and Aquatic Life
STANDARDS or CRITERIA:	OAR 340-41-027

Standards applicable to all basins:

Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

“*Aquatic species*” means any plants or animals which live at least part of their life cycle in waters of the State.

“*Biological Criteria*”: means numerical values or narrative expressions that describe the biological integrity of aquatic communities inhabiting waters of a given designated aquatic life use.

“*Resident Biological Community*” means aquatic life expected to exist in a particular habitat where water quality standards for a specific ecoregion, basin, or water body are met. This shall be established by accepted biomonitoring techniques.

“*Without Detrimental Changes in the Resident Biological Community*” means no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region.

“*Ecological Integrity*” means the summation of chemical, physical and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region.

“*Appropriate Reference Site or Region*” means a site on the same water body, or within the same basin or ecoregion that has similar habitat conditions, and represents the water quality and biological community attainable within the areas of concern.

WATER QUALITY LIMITED CRITERIA¹: Aquatic communities (primarily macroinvertebrates) which are 60% or less of the expected reference community **for both** multimetric scores and multivariate model scores are considered impaired. Streams with either multimetric scores or multivariate scores between 61% and 75% of expected reference communities are considered as streams of concern. Streams greater than 75% of expected reference communities using either multimetric or multivariate models are considered unimpaired.

-or-

Where monitoring methods determined a Biotic Condition Index, Index of Biotic Integrity, or similar metric rating of poor or a significant departure from reference conditions utilizing a suggested EPA biomonitoring protocol or other technique acceptable to DEQ.

TIME PERIOD:

Annual

DATA REQUIREMENTS:

Similar habitat types sampled in assessed and reference sites, and assessed and reference sites sampled in the same season, if reference sites are used. For macroinvertebrate assessments a minimum of 6 square feet of stream bottom must be sampled per stream reach assessed. Where less than 6 square feet of stream bottom is sampled results that indicate impairment are listed as streams of concern. Data collected since WY 87 (10/86). Earlier data will be considered on a case by case basis.

EXAMPLES OF DATA USED FOR '98 LISTING:

- Department of Environmental Quality, U.S. Forest Service, Bureau of Land Management and Unified Sewage Agency biomonitoring data;
- Willamette River and Columbia River Bi-State Studies conducted under contract.

Note 1: The Water Quality Limited Criteria “Fishery data on escapement, redd counts, population survey, etc. that show fish species have declined due to water quality conditions” should not have appeared under the Biological Criteria. This wording was intended to be use as one method to demonstrate a beneficial use impairment under Habitat Modification Flow Modification and Sedimentation and was not used to make listing decisions for biological criteria.

PARAMETER:	Chlorophyll <u>a</u>
BENEFICIAL USES AFFECTED:	Water Contact Recreation, Aesthetics, Fishing, Water Supply, Livestock Watering
STANDARDS or CRITERIA:	OAR 340-41-150

Standards applicable to all basins:

340-41-150 The following average Chlorophyll a values shall be used to identify water bodies where phytoplankton may impair the recognized beneficial uses:

- (a) Natural lakes which thermally stratify: 0.01 mg/l
- (b) Natural lakes which do not thermally stratify, reservoirs, rivers and estuaries: 0.015 mg/l

WATER QUALITY LIMITED CRITERIA: 3-month average Chlorophyll a value exceeds standard. Data was screened for a greater than 10 percent of seasonal values exceed standard based on multi-year data collections; if there were greater than 10% exceedences, data was reviewed for exceedence of the 3-month average criteria that is identified in the rule;

TIME PERIOD:

Summer: June 1 through September 30 (period of highest use for water contact recreation);
Fall-Winter-Spring (FWS): October 1 to May 31;

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86) or study funded under the Clean Lakes Program Grants prior to 10/83. Earlier data will be considered on a case by case basis. A minimum of 5 representative data points available per site collected on separate days during peak algal growing season (typically summer).

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Clean Lake Studies and data summaries conducted under contract;
- Departmental of Environmental Quality, Bureau of Reclamation and Unified Sewage Agency data;

PARAMETER:	Dissolved Oxygen
BENEFICIAL USES AFFECTED:	Resident Fish and Aquatic Life, Salmonid Spawning & Rearing
STANDARDS or CRITERIA:	OAR 340-41-(basin)(2)(a)

Dissolved Oxygen concentration shall not be less than the following:
Standards applicable to all basins (adopted 1/11/96, effective 7/1/96)

During times and in waters that **support salmonid spawning until fry emergence from the gravels:**

- Dissolved Oxygen shall not be less than 11 mg/l; unless
- intergravel dissolved oxygen is greater than 8.0 mg/l (as a spatial median minimum), then DO criteria is 9.0; or
- where conditions of barometric pressure, altitude and naturally occurring temperatures preclude attainment of the 11 or 9 mg/l standard, then dissolved oxygen levels shall not be less than 95% saturation.
- Spatial median minimum intergravel dissolved oxygen concentration shall not fall below 6.0 mg/l.

For waters identified as providing **cold-water aquatic resources**, the dissolved oxygen shall not fall below 8.0 mg/l (unless it is diurnal monitoring data that can be used to estimate the 7-day minimum, then the minimum shall not fall below 6.5) or where conditions of barometric pressure, altitude and naturally occurring temperatures preclude attainment of the 8.0 mg/l standard, then dissolved oxygen levels shall not be less than 90% saturation.

For waters identified as providing **cool-water aquatic resources**, the dissolved oxygen shall not be less than 6.5 mg/l.

For waters identified as providing **warm-water aquatic resources**, the dissolved oxygen shall not be less than 5.5 mg/l.

For **estuarine waters**, the dissolved oxygen concentrations shall not be less than 6.5 mg/l.

For **marine waters**, no measurable reduction in dissolved oxygen concentration shall be allowed.

WATER QUALITY LIMITED CRITERIA: Greater than 10 percent of the samples exceed the appropriate standard and a minimum of at least two exceedences of the standard for a season of interest.

TIME PERIOD:

Rearing: as identified by ODFW Staff;
 Spawning through fry emergence: as identified by ODFW Staff

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86). Earlier data will be considered on a case by case basis. A minimum of 5 representative data points available per site collected on separate days or diurnal data collected on at least two separate days.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Departmental of Environmental Quality, U.S. Geological Survey, U.S. Bureau of Reclamation and Unified Sewage Agency of Washington County routine or intensive monitoring data;
- Willamette River and Columbia River Bi-State Studies conducted under contract;
- City of Portland and Salem Data.

PARAMETER:

Habitat Modification

BENEFICIAL USES AFFECTED:

Resident Fish & Aquatic Life, Salmonid Fish Spawning & Rearing

STANDARDS or CRITERIA:

OAR 340-41-(basin)(2)(i)

Standards applicable to all basins:

The creation of tastes or odors or toxic or other **conditions that are deleterious to fish or other aquatic life** or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.

-or-

OAR 340-41-027

Standards applicable to all basins:

Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

WATER QUALITY LIMITED CRITERIA: Documentation that habitat conditions are a significant limitation to fish or other aquatic life as indicated by the following information:

- Beneficial uses are impaired. This documentation can consist of data on aquatic community status that shows aquatic communities (primarily macroinvertebrates) which are 60% or less of the expected reference community **for both** multimetric scores and multivariate model scores are considered impaired. Streams with either multimetric scores or multivariate scores between 61% and 75% of expected reference communities are considered as streams of concern. Streams greater than 75% of expected reference communities using either multimetric or multivariate models are considered unimpaired.
-or-
Where monitoring methods determined a Biotic Condition Index, Index of Biotic Integrity, or similar metric rating of poor or a significant departure from reference conditions utilizing a suggested EPA biomonitoring protocol or other technique acceptable to DEQ.
-or-
Fishery data on escapement, redd counts, population survey, etc. that show fish species have declined due to water quality conditions; and
- Habitat conditions that are a significant limitation to fish or other aquatic life as documented through a watershed analysis or other published report which summarizes the data and utilizes standard protocols, criteria and benchmarks (e.g. those currently used and accepted by Oregon Fish and Wildlife or Federal agencies (PACFISH)). Habitat conditions considered here are represented by data that relate to channel morphology or in-stream habitat such as Large Woody Material, Pool Frequency, Channel Width:Depth Ratio (other habitat factors are considered elsewhere - cobble embeddedness or percent fines would be considered under sedimentation, stream shading would be factored in under temperature, etc).

TIME PERIOD:

Annual

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86) and included in the most recent watershed analysis or published report. Earlier data will be considered on a case by case basis.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- U.S. Forest Service and Bureau of Land Management Watershed Analyses or Wild and Scenic River Environmental Impact Statements or other published reports.

PARAMETER:

Flow Modification

BENEFICIAL USES AFFECTED:

Resident Fish & Aquatic Life, Salmonid Fish Spawning & Rearing

STANDARDS or CRITERIA:

OAR 340-41-(basin)(2)(i)

Standards applicable to all basins:

The creation of tastes or odors or toxic or other **conditions that are deleterious to fish or other aquatic life** or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.

-or-

OAR 340-41-027

Standards applicable to all basins:

Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

WATER QUALITY LIMITED CRITERIA: Documented flow conditions that are a significant limitation to fish or other aquatic life as indicated by the following information:

- Beneficial uses are impaired. This documentation can consist of data on aquatic community status that shows aquatic communities (primarily macroinvertebrates) which are 60% or less of the expected reference community **for both** multimetric scores and multivariate model scores are considered impaired. Streams with either multimetric scores or multivariate scores between 61% and 75% of expected reference communities are considered as streams of concern. Streams greater than 75% of expected reference communities using either multimetric or multivariate models are considered unimpaired.
- or-
- Where monitoring methods determined a Biotic Condition Index, Index of Biotic Integrity, or similar metric rating of poor or a significant departure from reference conditions utilizing a suggested EPA biomonitoring protocol or other technique acceptable to DEQ.
- or-
- Fishery data on escapement, redd counts, population survey, etc. that show fish species have declined due to water quality conditions; and
- an established or applied for Instream Water Right, and
 - documentation that flows are not frequently being met such as through statistical summaries of stream flow based on actual flow measurements, and
 - identification of human contribution to the reduction of instream flows below acceptable level indicated (e.g. evidence of water rights and diversions above or in the segment).

TIME PERIOD:

Annual

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86) or most recent Basin fishery plan or watershed analysis. Earlier data will be considered on a case by case basis. Statistical flow summaries were utilized if representative of general conditions in the stream.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- U.S. Geological Survey or Water Resource Department Flow Summaries;
- Oregon Department of Fish and Wildlife or Northwest Power Planning Council Subbasin Fishery Plans or U.S. Forest Service and Bureau of Land Management Watershed Analyses;
- Established or requested Instream Water Rights;
- Water Availability Summaries from the Water Resource Department.

PARAMETER:	Nutrients	
BENEFICIAL USES AFFECTED:	Aesthetics or use identified under related parameters	
STANDARDS or CRITERIA:	OAR 370-41-470(5)(a) - Tualatin Subbasin OAR 340-41-385(1) - Bear Creek Subbasin	
Bear Creek:	Total Phosphorus as P (mg/l):	May 1 through November 30 0.08
Clear Lake:	Total Phosphorus as P as an annual loading:	241 pounds per year
Garrison Lake:	Total Phosphorus as P as an annual loading:	562 pounds per year
Tualatin:	Total Phosphorus as P (mg/l):	May 1 through October 31
	Tualatin (RM 0 - 33.3)	0.07
	Tualatin (RM 33.3 - 38.5)	0.05
	Tualatin (RM 38.6 - 52.8)	0.045
	Tualatin (RM 52.9 - 58.8)	0.04
	Tualatin (RM 58.9 to 67.8)	0.02
	Scoggins Creek	0.06
	Gales Creek	0.045
	Dairy Creek	0.045
	McKay Creek	0.045
	Rock Creek	0.07
	Fanno Creek	0.07
	Chicken Creek	0.07
Yamhill:	Total Phosphorus as P (mg/l):	May 1 through October 31 0.07

In addition to TMDLs in the Bear Creek, Clear Lake, Coast Fork, Garrison Lake, Tualatin River and Yamhill River, draft or proposed final TMDLs have been established for phosphorus to address pH, dissolved oxygen or other water quality problems in the following water bodies: Grande Ronde, and South Umpqua. Nutrient TMDLs are currently being developed for the Columbia Slough and Klamath River.

WATER QUALITY LIMITED CRITERIA: Greater than 10 percent of the samples exceed standard and a minimum of at least two exceedences of the standard or criteria used in draft TMDLs for a season of interest;

TIME PERIOD:

June through September or as specified under the specific standard above.

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86). Earlier data will be considered on a case by case basis. A minimum of 5 representative data points available per site collected on separate days during peak algal growing season (typically summer).

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Departmental of Environmental Quality, U.S. Geological Survey, U.S. Bureau of Reclamation and Unified Sewage Agency of Washington County routine or intensive monitoring data;
- Willamette River and Columbia River Bi-State Studies conducted under contract;
- Clean Lake Studies and data summaries conducted under contract;

PARAMETER:

pH

BENEFICIAL USES AFFECTED:

Resident Fish & Aquatic Life,
Water Contact Recreation

STANDARDS or CRITERIA:

OAR 340-41-(basin)(2)(d)

Summary: pH shall not fall outside the following ranges:

General Basin Standards (adopted as of 1/11/96):

Deschutes Basin:	6.5 to 8.5;	North Coast Basin:	6.5 to 8.5;
Goose & Summer Lake Basin:	7.0 to 9.0*;	Owyhee Basin:	7.0 to 9.0*;
Grande Ronde Basin:	6.5 to 9.0*;	Powder Basin:	6.5 to 9.0*;
Hood Basin:	6.5 to 8.5;	Rogue Basin:	6.5 to 8.5;
John Day Basin:	6.5 to 9.0*;	Sandy Basin:	6.5 to 8.5;
Klamath Basin:	6.5 to 9.0*;	South Coast Basin:	6.5 to 8.5;
Malheur Basin:	7.0 to 9.0*;	Umatilla Basin:	6.5 to 9.0*;
Malheur Lake Basin:	7.0 to 9.0*;	Umpqua Basin:	6.5 to 8.5;
Mid Coast Basin:	6.5 to 8.5;	Walla Walla Basin:	6.5 to 9.0*;
		Willamette Basin:	6.5 to 8.5;

* when 25% of the measurements taken between June and September are greater than pH 8.7, the Department shall determine whether the value higher than 8.7 are anthropogenic or natural in origin

Water body Specific:

Cascade Lakes:	6.0 to 8.5;	Marine Waters:	7.0 to 8.5;
Columbia River:	7.0 to 8.5;	Snake River:	7.0 to 9.0;
Goose Lake:	7.5 to 9.5;		

WATER QUALITY LIMITED CRITERIA: Greater than 10 percent of the samples exceed standard and a minimum of at least two exceedences of the standard for a season of interest;

TIME PERIOD:

Summer: June 1 through September 30;
Fall-Winter-Spring (FWS): October 1 to May 31;

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86). Earlier data will be considered on a case by case basis. A minimum of 5 representative data points available per site collected on separate days or diurnal data collected on at least two separate days.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Departmental of Environmental Quality, U.S. Geological Survey, U.S. Bureau of Reclamation and Unified Sewage Agency of Washington County routine or intensive monitoring data;
- Willamette River and Columbia River Bi-State Studies conducted under contract;
- Clean Lake Studies and data summaries conducted under contract;
- Studies done under contract to the U.S. Forest Service or for Hydropower Recertification Projects

PARAMETER:

Sedimentation

BENEFICIAL USES AFFECTED:

Resident Fish & Aquatic Life, Salmonid Fish Spawning & Rearing

STANDARDS or CRITERIA:

OAR 340-41-(basin)(2)(j)

Standards applicable to all basins:

The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed.

WATER QUALITY LIMITED CRITERIA: Documented that sedimentation is a significant limitation to fish or other aquatic life as indicated by the following information:

- Beneficial uses are impaired. This documentation can consist of data on aquatic community status that shows aquatic communities (primarily macroinvertebrates) which are 60% or less of the expected reference community **for both** multimetric scores and multivariate model scores are considered impaired. Streams with either multimetric scores or multivariate scores between 61% and 75% of expected reference communities are considered as streams of concern. Streams greater than 75% of expected reference communities using either multimetric or multivariate models are considered unimpaired.
-or-
Where monitoring methods determined a Biotic Condition Index, Index of Biotic Integrity, or similar metric rating of poor or a significant departure from reference conditions utilizing a suggested EPA biomonitoring protocol or other technique acceptable to DEQ.
-or-
Fishery data on escapement, redd counts, population survey, etc. that show fish species have declined due to water quality conditions; and
- documentation through a watershed analysis or other published report which summarizes the data and utilizes standard protocols, criteria and benchmarks (e.g. those currently used and accepted by Oregon Fish and Wildlife or Federal agencies (PACFISH)). Measurements of cobble embeddedness or percent fines are considered under sedimentation. Documentation should indicate that there are conditions that are deleterious to fish or other aquatic life.

TIME PERIOD:

Annual

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86) and included in the most recent watershed analysis or published report. Earlier data will be considered on a case by case basis.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- U.S. Forest Service and Bureau of Land Management Watershed Analyses or Wild and Scenic River Environmental Impact Statements or other published reports.

PARAMETER:	Temperature
BENEFICIAL USES AFFECTED:	Resident Fish & Aquatic Life, Salmonid Fish Spawning & Rearing
STANDARDS or CRITERIA:	OAR 340-41-(basin)(2)(b)

Standards applicable to all basins (adopted 1/11/96, effective 7/1/96):

Seven (7) day moving average of the daily maximum shall not exceed the following values unless specifically allowed under a Department-approved basin surface water temperature management plan:

- **64°F (17.8°C);**
- **55°F (12.8° C)** during times and in waters that support salmon spawning, egg incubation and fry emergence from the egg and from the gravels;
- **50°F (10°C)** in waters that support Oregon Bull Trout;
- **68°F (20°C)** in the Columbia River (mouth to river mile 309);
- **68°F (20°C)** in the Willamette River (mouth to river mile 50);

[except when the air temperature during the warmest seven-day period of the year exceeds the 90th percentile of the 7-day average daily maximum air temperature calculated in a yearly series over the historic record]

WATER QUALITY LIMITED CRITERIA: Rolling seven (7) day average of the daily maximum exceeds the appropriate standard listed above. In the cases where data was not collected in a manner to calculate the rolling seven (7) day average of the daily maximum, greater than 25 percent (and a minimum of at least two exceedences) of the samples exceed the appropriate standard based on multi-year monitoring programs that collect representative samples on separate days for the season of concern (typically summer) and time of day of concern (typically mid to late afternoon).

TIME PERIOD:

Rearing: June 1 through September 30;

Spawning through fry emergence: October 1 to May 31 or water body specific as identified by ODFW Biologists;

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86). Earlier data will be considered on a case by case basis. Given the statistical basis of the proposed standard, continuous monitoring data was preferred and should reflect conditions during the warmest months (typically July and August) or period of interest. Multi-year monitoring programs with monthly data collection or single year monitoring programs with weekly data collections (not continuous monitoring data) were utilized to fill in data gaps where there was no continuous monitoring data available and if they had quality assurance available and collected representative samples on separate days for the season of concern (typically summer) and time of day of concern (typically mid to late afternoon).

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Continuous temperature monitoring data collected by the Department of Environmental Quality, U.S. Geological Survey, U.S. Forest Service, Bureau of Land Management, Confederated Tribes of the Umatilla Indians, Oregon Department of Fish and Wildlife, and the Cooperative Extension Service.
- Department of Environmental Quality, U.S. Geological Survey, U.S. Bureau of Reclamation and Unified Sewage Agency of Washington County routine or intensive monitoring data;

PARAMETER:	Total Dissolved Gas
BENEFICIAL USES AFFECTED:	Resident Fish and Aquatic Life
STANDARDS or CRITERIA:	OAR 340-41-(basin)(2)(n and g)

Standards applicable to all basins:

(n) The concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection shall not exceed 110 percent of saturation.

(g) The liberation of dissolved gases, such as carbon dioxide, hydrogen sulfide, or other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation, or other reasonable uses made of such waters shall not be allowed.

Water body Specific:

- Columbia River had an alternate standard for specific periods of time since 1995 to allow additional spill over dams for fish passage

WATER QUALITY LIMITED CRITERIA: Greater than 10 percent of the samples exceed standard and a minimum of at least two exceedences of the standard or a survey that identified beneficial use impairment due to total dissolved gas such as assessment of fish condition;

TIME PERIOD:

Annual

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86). Earlier data will be considered on a case by case basis. A minimum of 5 representative data points available per site collected on separate days or a representative survey that includes assessment of fish condition.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- Monitoring programs conduct by the Army Corp of Engineers of the Columbia River and Snake River;
- Oregon Department of Fish and Wildlife Data;
- Hydropower Recertification Studies.

PARAMETER:	Toxics
BENEFICIAL USES AFFECTED:	Resident Fish and Aquatic Life, Drinking Water
STANDARDS or CRITERIA:	OAR 340-41-(basin)(2)(p)

Standards applicable to all basins:

OAR 340-41-445(2)(p)(A): Toxic substances shall not be introduced above natural background levels in the waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses;

OAR 340-41-445(2)(p)(B): Levels of toxic substances shall not exceed the criteria listed in Table 20 which were based on criteria established by EPA and published in Quality Criteria for Water (1986), unless otherwise noted;

OAR 340-41-445(2)(p)(C): . . . Where no published EPA criteria exist for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.

WATER QUALITY LIMITED CRITERIA ¹:

Water Quality Standards Violations:

- The water quality standard listed in Table 20 (see OAR 340-41) for the chemical is violated more than 10% of the time and for a minimum of two values.*

Other Evidence of Impairment of Beneficial Uses:

- A fish or shellfish consumption advisory or recommendation issued by the Health Division specifically refers to this chemical.
- The chemical has been found to cause a biological impairment via a field test of significance such as a bioassay. The field test must involve comparison to a reference condition.

TIME PERIOD: Annual

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86). Earlier data will be considered on a case by case basis. As there is limited toxics data available, listings will generally be based on at least two exceedences and data will be evaluated based on the Department's best professional judgment.

EXAMPLES OF DATA USED FOR 1998 LISTING²:

- Departmental of Environmental Quality data or studies;
- U.S. Geological Survey toxic studies
- Willamette River and Columbia River Bi-State Studies conducted under contract;
- Oregon State University studies conducted under contract;
- U. S. Fish and Wildlife and National Marine Fisheries Wildlife Studies.

Note 1: In the draft listing criteria document, several examples of sediment and fish tissue evaluation methods were found in the toxics listing criteria. However, most sediment and fish tissue data was not evaluated based on the methods outlined below because these methods are very complex and expensive to carry out. In order to clarify how toxics data was evaluated for 1998 listing purposes, those example evaluation methods have been taken out of the listing criteria and are discussed specifically below:

The following methods have been separated from the above Water Quality Limited Criteria to better clarify that these methods are not routinely used for evaluations for listing purposes, but are only considered when the method is applied during the course of a special study. DEQ may use the following two methods to determine whether a beneficial use impairment is occurring if an investigation and study has been completed which allows for the determination of one of the following:

- DEQ may use a partitioning method to determine whether chemicals found in sediments can be expected, via partitioning, to violate water column water quality standards listed in Table 20 (see OAR 340-41). Because of the complexity and intensive resource use this method has not been used to evaluate sediments for the 1998 303(d) list.

- The chemical has been detected in more than 10% of available fish tissue samples, and the mean of the detects exceeds a screening value derived from Table 20. The screening value is developed as follows:

$$\text{Fish Tissue Screening Value} = \text{Table 20 Criteria for Protection of Human Health (ug/l)} \\ * \text{BCF (l/kg)} * (\text{mg}/1000 \text{ ug})$$

where BCF = Bioconcentration Factor. BCFs were obtained from the EPA Region VIII Criteria Chart (July 1993)... (July 1993).

This method has been used once in the Columbia Slough to list several toxic parameters, but has not been used elsewhere for listing purposes because it is very resource intensive.

Note 2: DEQ has not determined what, if any, numeric sediment guidelines are appropriate for Oregon's sediments and has not propagated numeric sediment standards. Instead DEQ relies on the demonstration of a beneficial use impairment either through a bioassay, health advisory or a study demonstrating a beneficial use impairment exists within a given water body. EPA has also not been able to develop numeric sediment criteria. Additionally, there are few guidance levels available for evaluating sediment quality.

For the studies and reports reviewed by DEQ the authors of these studies and reports (such as, the Lower Columbia River Bi-State Program by Tetra Tech; the National Water-Quality Assessment (NAWQA) program Willamette Basin by the USGS and Phases I, II and III of the Willamette River Basin Water Quality Study by USGS) wished to compare the values they found in the sediments to some reference value. Since there were not local guidance values available the authors choose several guidance documents as screening tools (sediment values for marine waters (Long and Morgan), values developed by Ontario, Canada for the Great Lakes, New York State draft standards, and USGS's Methods for Comparing Water-Quality Conditions among National Water-Quality Assessment Study Units, 1992-1995 (which used EPA's proposed sediment-quality criterion (SQL) and advisory levels (SQAL), effects range-median (ER_M) developed by Long and others (1995), Probable effect level (PEL) developed by MacDonald (1994) for Florida Department of Environmental Protection and apparent effects threshold-high (AET-H) developed by Barrick and others (1988))). These guidance values were used to determine whether a compound's value in the sediment might be considered elevated, recognizing that the guidance values may not be appropriate for use in the local area. The authors noted that the use of the guidance values was only to identify potential problem areas and problem chemicals for screening purposes and to help in planning future studies and were not used as standards. Guidance values were used in this way because "no single type of sediment-quality guideline is generally accepted in the scientific literature, and there may be substantial differences (up to three orders of magnitude) between different guideline values for a given constituent."

Because the studies used certain numerical guideline values for screening purposes, even though the values may not be appropriate, DEQ acknowledged the use of these guidelines in determining elevated levels and has identifying the status of those waters with elevated levels as a "Potential Concern". Only those waters which have demonstrated a beneficial use impairment will be listed on the 303(d) list.

Guidelines differ from criteria (numerical or narrative values recommended by EPA) and standards (criteria adopted by individual states and approved by EPA) and are not legally binding. EPA has not developed sediment criteria and DEQ does not have sediment standards. This is due, in part, to the difficulty of relating concentrations found to be toxic in one area to another area. Factors, such as particle size, hardness of the water, form of contaminant, etc., will affect the toxicity. Similarly, organisms native to those waters and life stages will differ in their reactivity. For these reasons EPA and DEQ have recommended a tiered approach for screening sediment for dredge disposal purposes, which includes the use of a bioassay for demonstrating whether a beneficial use impairment would exist. Based on these reasons DEQ has chosen not to list segments based on exceeding guidelines used by these studies, but has identified the status of those waters and parameters as a "Potential Concern".

PARAMETER:

Turbidity

BENEFICIAL USES AFFECTED:

Resident Fish and Aquatic Life, Water Supply, Aesthetics

STANDARDS or CRITERIA:

OAR 340-41-(basin)(2)(c)

Standards applicable to all basins:

No more than ten percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activities.

WATER QUALITY LIMITED CRITERIA: A systematic or persistent increase (of greater than 10%) in turbidity due to an operational activity that occurs on a persistent basis (e.g. dam release or irrigation return, etc).

TIME PERIOD:

Annual

DATA REQUIREMENTS:

Data collected since Water Year 87 (10/86) on a frequent enough basis (e.g. daily) to establish a relationship between water quality and a turbidity causing activity. Earlier data will be considered on a case by case basis.

EXAMPLES OF DATA USED FOR 1998 LISTING:

- U.S. Forest Service Wild and Scenic River Study