Oregon Fish Consumption Rate Project

Fiscal Impacts and Implementation Advisory Committee
Memo to the Oregon Environmental Quality Commission

The purpose of this memo is to provide an overview of the convening and charge of the Fiscal Impacts and Implementation Advisory Committee (FIIAC), to summarize FIIAC discussions around costs, benefits and implementation ideas that were considered by the group, and to highlight conclusions and recommendations that culminated from this effort. Further details of the FIIAC information can be found in the Appendices that include the "FIIAC comments and response to comments on Science Applications International Corporation (SAIC) Cost of Compliance analysis" (Appendix 1) and FIIAC Meeting Summary Notes (Appendix 2).

I. OVERVIEW INFORMATION

Background

The Oregon Fish and Shellfish Consumption Rate Project, a joint project of Oregon Department of Environmental Quality (DEQ), United States Environmental Protection Agency (EPA) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), has been evaluating options to revise Oregon's fish consumption rate, which is one variable used to calculate water quality criteria protective of human health. This effort is anticipated to end in late 2008 when the Environmental Quality Commission (EQC) chooses a fish consumption rate for rulemaking.

By October 2008, DEQ, EPA, and CTUIR plan to present a report to the EQC on a range of options to revise the fish consumption rate, with a goal of one joint recommendation from those options. That report will include a range of proposed implementation options to be considered in implementing a revised fish consumption rate.

Ideally, for the three governments to develop feasible implementation options, the economic effects (both costs and benefits) of each option need to be understood. To that end, DEQ, EPA and CTUIR convened the FIIAC as a group of interested experts who could help to develop feasible implementation options and also provide input on the impacts such options may have on a wide range of permitted dischargers, the public, and other stakeholders throughout the state. The expertise of the group ranged from backgrounds in economics, business administration, public works, public health, water quality, and engineering. A list of FIIAC members is shown in Table 1.

Table 1: FIIAC Membership

Name	***Affiliation***
Deanna Conners	Oregon Dept. of Human Services (Public Health Division)
Kathleen Feehan	Confederated Tribes of the Umatilla Indian Reservation (Tribe)
Rich Garber	Association of Oregon Industries (Industry)
Sarah Kruse	Ecotrust (Economic Innovation Organization)
Kristin Lee	ECONorthwest (Economic Consulting Firm)
Eric Scott*	Confederated Tribes of the Grand Ronde (Tribe)
Susie Smith	Association of Clean Water Agencies (Municipalities)
Willie Tiffany	League of Oregon Cities (Municipalities)

Kathryn VanNatta	Northwest Pulp and Paper Association (Industry)

* Eric participated in the first four FIIAC meetings and was not able to remain on the committee through the completion of the process. Therefore he did not provide input to this FIIAC memo.

Committee's Charge
FIIAC's final Charter specified the following four charges as the focus of the group's work together:

1. Consider and possibly contribute to the Implementation Strategies Inventory that will be compiled by DEQ and used in developing implementation options for potential new human health criteria.
2. Review and comment on the Draft Fiscal Impact Analysis in accordance with ORS 183.333. The analysis will be used to develop DEQ's Statement of Need and Fiscal and Economic Impact in anticipation of a future rulemaking to raise the FCR and lower human health water quality criteria. The FIIAC will address the following questions in their review:
    - Would increasing the FCR have a fiscal and economic impact?
    - What is the extent of that fiscal and economic impact?
    - Would increasing the FCR have a significant adverse impact on small businesses?
    - What is the extent of that fiscal and economic impact to small businesses?

    In addition, it is anticipated that members of this Committee will be able to provide information about the economic benefits of an increased fish consumption rate; information about economic or other benefits of an increased fish consumption rate will be provided to the EQC to help inform their final decision.
3. Discuss implementation options for multiple fish consumption rate scenarios
4. Provide any recommendations on fiscal impact and implementation strategies

(From *FIIAC Final Charter, 1-28-08*)

II. DISCUSSION OF FISCAL IMPACTS

a. Cost Analyses

As noted above, FIIAC was asked to review and comment on a fiscal impact analysis. To broaden the views, FIIAC looked at analyses that were generated from three different perspectives: federal/state, municipalities and industry.

EPA/DEQ Analysis: Science Applications International Corporation (SAIC), an independent firm, was contracted by EPA on behalf of DEQ to develop and perform a "Cost of Compliance with Water Quality Criteria or Toxic Pollutants for Oregon Waters" analysis. This cost analysis likely will be used to develop DEQ's Statement of Need and Fiscal and Economic Impact for any formal rulemaking that may result if the EQC decides to change the Fish Consumption Rate. EPA presented the analysis and revisions of the analysis to the FIIAC. In turn, FIIAC discussed the report and provided individual written comments to SAIC/DEQ/EPA (attached as Appendix 1). What follows is a brief summary of the highlights discussed at FIIAC meetings:

SAIC randomly selected seventeen facilities in Oregon for its analysis. The report identified baseline cost, changes that would be needed to meet new criteria, and drivers of cost. The methodology used was similar to that of the Great Lakes Initiative and work done in California.

The methodology involved: choosing random samples from an identified list of potentially affected facilities; pooling all available data; applying new criteria; and costing out the required changes to meet the new criteria. The criteria used for running the analysis included criteria associated with the baseline fish consumption rate (the current rate of 17.5 grams per day) and increased fish consumptions rates of 63.2, 113, 175, 389 and 620 grams per day.

SAIC evaluated the potential cost of compliance for point source facilities. To arrive at these estimates, they evaluated the four largest facilities (four municipal facilities, one of which is dominated by flow from a pulp and paper plant) and one minor industrial (steel mill). To evaluate the potential for costs at the remaining municipal and industrial facilities within the state, SAIC selected a representative random sample of 13 major facilities and two minor facilities. SAIC calculated costs for both total and incremental (i.e., above and beyond those needed for compliance with baseline standards) annual statewide costs, both with and without the costs for inflow and infiltration (I&I) controls to reduce arsenic in municipal sewer systems. SAIC also estimated costs for a range of revised FCRs (from 17.5-620 gpd). SAIC's approach to estimating costs assumed that facilities would pursue the lowest cost means of compliance with effluent limits. The means of compliance SAIC considering in calculating facilities' actions to come into compliance included:

- Optimizing treatment processes (e.g., adding chemicals to increase flocculation or filtration efficiency) to increase pollutant removal efficiencies;
- Source control (e.g., pollution prevention program, inflow and infiltration reductions, more stringent pretreatment standards);
- Installing end-of-pipe treatment technology; and
- Alternative compliance mechanisms (e.g., site-specific criterion, TMDL, or variance).

Uncertainties exist around actual use of some of the approaches included in the SAIC analysis. That said, while some of these approaches have not been commonly used in Oregon, SAIC assumed approaches were available where allowed by Oregon law.

SAIC estimated the annual costs to comply with baseline standards could range from $3.62 to $29.7 million dollars if I&I costs are included ($3.62 to $3.92 million if I&I costs are not included). In calculating the annual costs to comply with any newly proposed standards, SAIC estimated the total annual costs, statewide, would range from $75,000 to $1.82 million, with the low end representing costs attributable to revised standards based on a 63.2 gram per day fish consumption rate without I&I costs and the high end representing revised standards based on a fish consumption rate of 620 grams per day including costs associated with I&I. Because these costs are based on an extrapolation of costs estimated for the sample facilities, costs are not expressed on a per million gallon day basis, rather, they are expressed as a total statewide annual cost.

In evaluating the available data, SAIC concluded that reductions in effluent concentrations would be needed for at lease six pollutants to meet baseline criteria: 4,4'-DDT, alpha BHC, arsenic, bis(2-ethylhexyl) phthalate, dioxin, mercury. Additional reduction efforts under revised criteria would also likely be needed for three of those pollutants: Arsenic, bis(2-ethylhexyl) phthalate, mercury

In calculating these costs, SAIC found that many of the actions facilities would need to take to comply with the baseline standards would also result in compliance with the revised standards.

As a result, they found that the majority of the costs are associated with meeting the current, baseline standards. However, as noted above, they found there will be some additional costs associated with standards based on a higher fish consumption rate.

For some of the pollutants (e.g. mercury, arsenic) that SAIC concluded would most likely need additional reduction efforts, treatment technologies have not yet been proven to treat to those levels anywhere in the U.S. As a result, SAIC assumed that permittees would pursue alternative compliance mechanisms (e.g., variances) when permit limits are unable to be met. (It should be noted that these types of compliance tools are currently not in use in Oregon). SAIC estimates that one-time expenditures associated with variance applications could range from $1.43 million to $7.05 million (total statewide) under the baseline; incremental variance-related expenditures could range from $0.59 million to $2.68 million (total statewide) under revised criteria.

For additional information, SAIC included a summary of estimated costs for reverse osmosis, if that treatment were to be used at a facility. SAIC estimated the annual cost of reverse osmosis (capital plus O & M) to range from $7.1 million to $56.7 million per facility, depending on the wastewater treatment flows within the facility.

With regard to nonpoint sources and stormwater, the SAIC report provides some information regarding potential controls and associated unit costs, where available. For minor and indirect dischargers, the report notes that costs are highly uncertain based on limited or no data. The one exception to this conclusion is mercury due to its ubiquitous nature. The report notes that mercury is likely to be a pollutant of concern for minor municipal dischargers, and estimates that annual statewide compliance costs could range from $0.8 million to $3.9 million for revised mercury standards based on a 620 grams per day fish consumption rate.

For the report as a whole, SAIC noted several uncertainties in its analysis associated with data limitations, potential pollutant load reductions achievable, and how dischargers would respond to potential revised requirements and permit conditions. For the facilities analyzed, data were not available for all pollutants for all sample facilities, resulting in an inability to assess whether facilities were currently in compliance with the baseline standards. In addition, many of the revised criteria, regardless of the fish consumption rate used as the basis, are below method quantification level. As a result, there may not be measurable or quantifiable load reductions from point sources. As a result of these uncertainties, the estimated costs may be either higher or lower than those estimated by SAIC.

<u>FIIAC Member Comments on the SAIC Cost of Compliance Analysis</u>

FIIAC members provided two rounds of comments on the SAIC analysis. These comments were provided by individual members or their organizations. Generally, these comments fell into the following categories:

- uncertainty about cost estimates;
- lack of overall government costs and accurate wastewater treatment costs;
- lack of thorough discussion of economic benefits, including potential avoided costs;
- significant questions and issues regarding costs associated with inflow and infiltration (I&I) and pollution prevention (P2);
- uncertainty and feasibility issues around the reliance on variances and other non-traditional regulatory approaches in a litigious region: Oregon and EPA Region 10;

- additional costs identified by members that were missing from the analysis;
- the importance of distinguishing between baseline costs (at 17.5 gpd) versus cost to comply with revised standards;
- lack of clarity/discrepancies in baseline information;
- questions about how representative the facility samples were for Oregon;
- lack of analysis on small business impacts; and
- suggested revisions to data formatting.

Many of the comments submitted by FIIAC members were addressed by SAIC in the subsequent draft. FIIAC plans to do a review of the most recent draft of the analysis but, due to extenuating circumstances, including a delay in the release of the second draft, no consensus conclusions have been stated by the group at the time of this memo.

Industry Analysis: the Northwest Pulp and Paper Association (NWPPA) and the Association of Oregon Industries (AOI) representatives shared information with FIIAC from a CH2MHill cost analysis report that was developed beginning in 2006. This report found that, similar to the SAIC analysis, metals are a driver for detection and, therefore, cost. Mercury and arsenic, both of which can be naturally occurring elements, showed highest detection levels. The summary information shared with the FIIAC included effluent data at NWPPA sites and the estimated costs for end-of-pipe controls and removal technology methods that could be or are used to address them.

At the June 27 public workshop, NWPPA presented summary information from its second cost study done by HDR Inc. This study was based on a fish consumption rate range of 63-389 grams/day. NWPPA emphasized that (per DEQ's information) most point sources do not yet have permits incorporating the current criteria based on 17.5 grams/day. The HDR analysis studied various wastewater treatment options and the advantages and disadvantages to using each. Four mill effluents were used to analyze capital costs for each treatment technology based on 175 grams/day. For a mid-sized Oregon mill discharging 19 million gallons per day, iron coprecipitation was estimated at $25 million, nanofiltration was estimated at $67 million and reverse osmosis was estimated at $79 million. Annual operating and maintenance costs estimated for iron coprecipitation was $20 million, nanofiltration was $6.7 million and reverse osmosis was $7.4 million. Finally, annualized costs were estimated, over a 10-year period, for iron coprecipitation at $24 million, for nanofiltration at $16 million, and at $19 million for reverse osmosis. These estimated costs were compared to current yearly operation and maintenance costs for wastewater treatment, which were estimated to be approximately $3 million.

Municipalities' Analysis: The Association of Clean Water Agencies (ACWA) also shared summary information with FIIAC about the estimated costs to municipalities of implementing a higher fish consumption rate in Oregon. Again, metals and organic chemicals were of highest concern and, as a result, ACWA suggested that effective implementation and management should focus on pretreatment programs and pollution prevention.

ACWA estimated that capital costs for micro-filtration and reverse osmosis technologies to address metals would cost between $2.5 million and $3.5 million per million gallons per day, assuming some portion of the final effluent to be blended prior to discharge. Without blending, capital costs were estimated at about $6 million to $15 million per million gallons per day.

Based on these cost estimates, the ACWA information showed a combined capital cost range of $2.3-$3.3 billion for all of the four largest wastewater treatment systems in Oregon, including Portland, Clean Water Services, Eugene/Springfield and Corvallis. At the time of this memo, ACWA had committed to analyzing these broad costs to show what this would mean to ratepayers, and planned to provide that information to DEQ as soon as it is available. ACWA did note that operating costs to comply with an increased fish consumption rate would be significant, and those costs would include substantial energy consumption, chemical usage, ongoing operating and maintenance and disposal of briny sludges.

FIIAC Member Comments on the Industry and Municipalities Cost of Compliance Analyses

FIIAC heard presentations on the cost analyses noted above, but did not have the opportunity to analyze either of these analyses to the same extent that it reviewed the SAIC analysis. Summary information was shared and discussed at two FIIAC meetings and at the June 27 public workshop. Information about baseline assumptions, underlying data, calculations, or methodologies of these analyses were not made available nor were they a part of FIIAC discussions. As such, most FIIAC members noted that the industry and municipal cost analyses were not able to differentiate between the costs associated with current baseline criteria compliance as opposed to costs to comply with future criteria based on a potential increase in the fish consumption rate. It also was not possible to identify different costs associated with the different potential future fish consumption rates. As a result of this and time constraints related to this process, FIIAC was unable to reach any consensus conclusions about the analyses themselves or overall costs that will be associated with an increase in Oregon's fish consumption rate.

b. Benefits Discussions

As noted above, DEQ did not have the time or funding to research and do a quantitative analysis of the direct and indirect potential benefits of increased fish consumption rates. Because of this, members of the FIIAC worked together to provide initial information about the potential benefits of an increased fish consumption rate and also shared ideas for how DEQ could best reflect potential benefits within the time and fiscal constraints of this process (see attached "Potential Economic Benefits from an Increased Fish Consumption Rate".

FIIAC was provided with information from FIIAC members, the Oregon Environmental Council and DEQ relative to benefits. FIIAC members generally agreed that a fiscal impact assessment, by definition, should consider both costs and benefits. However, no specific consensus conclusions or recommendations related to benefits have come from FIIAC at this point. FIIAC members shared economic principles in FIIAC meetings, at the June 27 public workshop and shared here for the EQC:

- Environmental protection entails both costs and benefits and there are multiple ways that a healthy environment provides economic value.
- Costs may be easier to quantify than benefits, and benefits are equally important to understanding overall impacts.
- Costs and benefits can be distributed differently across public, business, and society at large and have different impacts on different groups.
- When either costs or benefits are "external" to the decision, the economic signals are distorted.

- Benefits from a revised FCR would likely not be limited to fish consumers only. A key outcome of a revised FCR that actually resulted in achieving more stringent water quality criteria would be a reduction in toxic contamination in waterways and an overall improvement in water quality.

Based on information shared with the group about economic benefits analysis, FIIAC members worked together to provide examples of the kinds of potential benefits that might result from setting a fish consumption rate and meeting water quality standards. The list of potential benefits was generated by the group and shared during the public workshop (see Table 2):

Table 2: Potential Benefits of Raising the Fish Consumption Rate and Meeting the Standards

Benefit	***Examples***
Human Health	Safe drinking water; avoided costs from environmentally attributable diseases; reduced risk for those who do eat fish; recreational – reduced risk from water contact
Environmental	Water reuse opportunities from cleaner effluent; business—cleaner intake water for downstream industries; ecosystem health; tourism; amenity/aesthetic/property values; avoided costs to industries and utilities; fewer contaminants; fishing – tribal, commercial, recreational and subsistence; improve other species in the food chain: birds, etc.; higher quality water supply
Cultural	Enable religious/ceremonial activities; children; healthy fish – icon of the Northwest and local, sustainable food options

Potential Benefits of Specific Implementation Strategies

Strategy	***Potential Benefits***
Toxic Reductions	Reduced human health impacts; innovative possibilities used to reach more efficient systems when not fearful of litigation stemming from strict liability regulatory framework; costs of litigation reduced; reduced O&M; reduced hazardous waste removal costs;

	reduced energy costs and associated emissions
Stormwater Control	Co-benefits for toxics reductions and control of other important stressors that affect fish health such as sedimentation and warm water temperatures
Infiltration and Inflow (I&I)*	Reduce quantity of water and toxics entering plant, reducing operating costs

(* It should be noted that ACWA agencies are already engaged in I&I programs and do not agree that an incremental increase in I&I will result in toxics reduction and question the efficacy of additional increases in I&I rehab work since 100% I&I removal is currently not possible.)

Given the discussions and input from FIIAC members, the following caveats relative to both lists of potential benefits are noted:

- point sources are likely a small component of all contaminant sources at a statewide scale;
- this is a list of categories of expected results for achieving water quality standards – and it is unknown what outcomes will actually result from this effort; and
- this is not an exhaustive, definitive or predictive list.

FIIAC heard from one of its members that, generally, an implementation strategy that achieves the same pollutant reduction at a lower cost may have higher net benefits and that some of the alternative approaches considered by FIIAC may produce additional benefits that are not yet known. The distribution of costs and benefits across affected stakeholders may differ across implementation strategies.

The FIIAC did not examine specific costs and benefits associated with any of the alternative strategies, but there was general consensus that some of the alternative implementation strategies may produce higher net benefits than end-of-pipe treatment alone. The amount and type of benefits depend on the extent to which a higher fish consumption rate actually reduces pollutant levels. Strategies that reduce pollutants more quickly, achieve more pollutant reductions and/or have a greater certainty of achieving reductions will have higher benefits. Finally, both benefits and costs need to be considered to best understand the overall economic effects of a revised fish consumption rate and for optimal economic outcomes to be achieved in Oregon.

c. General Comments about FIIAC Fiscal Impact Discussions and Areas for Future Refinements

This memo would not be complete without noting that funding from EPA supported the SAIC analysis of the estimated costs associated with changing Oregon's fish consumption rate. Costs for studies related to industry and municipalities were born by those entities. However, funds were not available to support an analysis of potential benefits associated with an increased fish consumption rate during this process. Instead, CTUIR and two FIIAC members provided assistance for researching studies on the economic benefits of water quality improvements and toxics reduction programs. FIIAC members themselves undertook the remainder of the analysis presented above. FIIAC's discussion of impacts to small businesses was limited by the fact that NWPPA and AOI were the only industry representatives at the table and there was neither time

nor data in this stage of the process for DEQ or others to do a more in-depth analysis of the potential economic impacts to other small businesses beyond ongoing outreach efforts. Several FIIAC members pointed out that small businesses that discharge to pretreatment systems under industrial user permits had not been fully quantified or identified, nor had they been included in the SAIC, NWPPA or ACWA cost reports--in discussion or analysis. That said, DEQ committed to continue outreach efforts to other potentially affected industry interests, and expects more engagement to occur after an EQC decision is made on this issue, especially if DEQ begins its rulemaking process in 2009.

III. DISCUSSION OF IMPLEMENTATION STRATEGIES

At the request of DEQ, EPA and CTUIR, the FIIAC developed and refined a list of potential compliance implementation strategies in an Implementation Matrix over the course of several FIIAC meetings (see attached "Implementation Matrix"). The matrix includes a series of possible implementation approaches and some of the potential advantages, disadvantages, relative costs, regulatory status and outcomes associated with them. Most FIIAC members agreed that the matrix should be viewed as a fairly comprehensive list of ideas that DEQ should consider now and in the future in order to implement a new fish consumption rate. Some members felt strongly that regulatory certainty and legal assurances must be provided by DEQ and EPA in order for the 'non-traditional' options to be considered viable prior to moving forward with implementation of a revised fish consumption rate. While most FIIAC members agreed it is important to be realistic about the feasibility of implementing new approaches in the near term (i.e. three to five years), due to legal uncertainties and uncertainties about funding to support new measures, they also suggested that *all* potential ideas should be put forth for further examination and perhaps future use.

From the matrix, the FIIAC began to formulate ideas around options that lead to a 'comprehensive approach to toxics reduction'. Some members felt that the primary focus of such an option should be on the major human health based contaminants of concern, and then move on to Reasonable Potential Analysis problems in individual permits. Toxics reduction options might include several of the individual approaches listed in the matrix. FIIAC members agreed that, to take a comprehensive approach, a compliance schedule will likely be needed in order to move into the other regulatory compliance tools under the Clean Water Act. Some FIIAC members noted that none of the regulatory compliance tools are currently being used in Oregon permits although they may be in use in other parts of the country. Some FIIAC members also shared the hope that compliance schedules *will* be used as a tool in the future, and suggest that a decision is needed soon about the feasibility of using this tool in Oregon: to be a realistic tool, any such decision should be properly documented to provide credibility and certainty to potential users of the tool. It should be noted that some FIIAC members expressed concern that moving forward without legal assurances for the creative tools and options included in the matrix would have unknown and worrisome consequences for permittees.

FIIAC explored the broader matrix via a "Path to Compliance Matrix." Three alternative pathways to compliance were discussed:

1) Technology-based advanced treatment to meet effluent limits based on the revised standards. Compliance schedules would be needed, as well as "pass-through" credits (also known as intake credits) and variances.

2) A toxics reduction program plus 'best conventional treatment.' Compliance schedules would be used, coupled with a toxics reduction program and best conventional treatment in the first permit cycle. Then, if met, continue with a compliance schedule or, if not met, consider additional pollution prevention and or reduction approaches, look at other tools such as variances, use attainability analyses (UAA), pass-through credit, and/or offsets/trading.
3) Use of a water quality benchmark in the first permit cycle. The objective for this would be to provide less legal liability for the permittee than using a numeric limit in the permit. The same tools might be used for the first permit cycle, then the second cycle could use a compliance schedule, variance, pass through credits, UAA and/or offsets/trading.

FIIAC members were leaning towards the second approach, yet some members noted that the details of the approach still need to be fleshed out before they are comfortable supporting it. Those who had concerns noted that permit holders must comply with the Clean Water Act. The current strict liability emphasis of statutes in Oregon requires end-of pipe treatment and, without regulatory off-ramps, permit holders will be required to install yet unproven treatment technology. Yet, in general, the FIIAC had concerns about relying solely on current end-of-pipe treatment technologies to achieve effluent limits (first approach), due to feasibility issues. Some FIIAC members were interested in the benchmark approach for the first permit cycle as it is similar to the mechanism that has been used in the stormwater permitting program, and it would provide permittees the time and opportunities to determine what technologies and programs will and won't work to achieve compliance. Other FIIAC members expressed concerns about setting a benchmark rather than a numeric effluent limitation based on water quality standards in the third approach as it reduces the enforcement mechanisms that would otherwise be available. Additional options proposed for consideration by NWPPA and AOI are included on page 3 of the Implementation Matrix: D*e minimus* and Bifurcated criteria. To aid understanding of the above approaches, DEQ developed a flow chart that demonstrates how a permittee might apply some of the suggested compliance strategies (see attached "DEQ Implementation Flow Chart".

The Implementation Matrix provides analysis of the technical, legal, political and economic feasibility of the various implementation options. Some FIIAC members felt these concerns will need to be addressed prior to the option being employed by DEQ.

IV. BRIEF SUMMARY OF ANSWERS TO FIIAC CHARTER QUESTIONS

The following bullets summarize responses to the questions specified in the FIIAC Charter, at the time of writing this memo:

- Would increasing the FCR have a fiscal and economic impact? **Yes**
- What is the extent of that fiscal and economic impact? **Uncertain, and, need to consider both costs and benefits.**
- Would increasing the FCR have a significant adverse impact on small businesses? **Not known at this time.**
- What is the extent of that fiscal and economic impact to small businesses? **More information needs to be gathered to answer this question.**

V. CONCLUSIONS AND RECOMMENDATIONS

At this time, the FIIAC has reached no consensus on the anticipated costs or benefits of a revised FCR. A broad range of information was shared with the FIIAC over the course of six months of work together that led the group to draw some general conclusions. The degree of uncertainties and limitations such as varying perspectives on the assumptions imbedded in each of the cost analyses, lack of funds to support a comprehensive benefits analysis, and a lack of cost and benefits analysis for the specific and various alternative implementation strategies the group discussed, affected the FIIAC's ability to draw strong conclusions or provide consensus recommendations to the EQC at this time.

Still, there are some statements the FIIAC can make for the EQC to contemplate when considering whether or not to increase Oregon's fish consumption rate:

- It will take time for municipalities, industry and others to comply with water quality standards that would result from a higher fish consumption rate, and the amount of time needed is likely to vary based on the FCR and implementation strategy chosen.
- Based on the cost analyses provided for this effort, a higher fish consumption rate and resulting water quality criteria will have increased costs associated with it. This is especially true if permit holders are limited to installing end-of pipe treatment technology to meet more stringent water quality standards The level of costs depends on the implementation strategies available.
- Benefits will be accrued from meeting a water quality standard (and the level of those benefits depends on the degree to which pollution reduction is achieved).
- Traditional technology treatments that would be needed to meet more stringent water quality standards if only an end-of-pipe approach is used have not yet been proven to be effective. Therefore, innovative regulatory approaches, beyond installing end-of-pipe treatment technologies, are needed to help attain the standard. Because many of the tools that might be utilized to implement an innovative regulatory approach have never been used in Oregon, it is hoped that a decision to allow appropriate use of compliance schedules is made soon.
- The state should set an approvable standard that protects all fish consumers in Oregon, and the implementation approach to achieve that standard should be:
    - innovative;
    - comprehensive;
    - able to be implemented;
    - cost effective;
    - integrated across point-source and non-point source boundaries; and
    - provide for reasonable legal assurances/safety net.
- The broader state-wide focus to achieve good water quality should be on pollution prevention and toxics reduction measures.

This memo is respectfully submitted to the EQC by DS Consulting on behalf of the Fiscal Impacts and Implementation Advisory Committee
August 13, 2008.

POTENTIAL ECONOMIC BENEFITS FROM AN INCREASED FISH CONSUMPTION RATE

A Working Discussion Piece Prepared in Support of the FIIAC[1]

June 2008

The economic evaluation of environmental regulation is frequently narrowly focused on the costs of proposed rules to the regulated community. While these costs may be significant, the FIIAC believes that it is equally important to understand that environmental regulation frequently results in benefits. These benefits are often overlooked in the economic analysis portion of rulemaking processes.

This paper will qualitatively discuss the potential economic benefits that may result from an increased fish consumption rate. Where available, the discussion will use local data demonstrating economic benefits from increased pollution control (a direct result of increasing the fish consumption rate). In some situations, non-local data is used merely to illustrate potential benefits that could be realized in Oregon from increased water quality. This paper is not intended to posit that a certain dollar amount of benefits will accrue in Oregon, but rather, is meant to be read in light of the discussion of potential costs of an increased fish consumption rate, and show that while there will be likely costs associated with an increased fish consumption rate, there will also be likely benefits.

Human Health Benefits

Any reduction in the total toxic load in Oregon waterbodies is likely to have a positive effect on the human health of Oregonians. This will translate into an as yet unknown economic benefit through avoided costs. A recent study by the Oregon Environmental Council determined that environmentally attributable diseases, like cancer, birth defects, and neurobehavioral problems, and the direct and indirect costs of treating and caring for people afflicted by these diseases costs Oregonians at least $1.57 billion annually.[2] This cost only represents the fraction of the cost of treating and caring for persons with diseases that can be reasonably attributed to environmental contaminants, meaning they are conservative estimates. While some of the diseases in the report, and thereby the costs, do not arise from water or fish borne toxics, the report highlights that "policy, and in particular, environmental health policy, fails to fully consider the environmentally attributable economic costs of diseases and disabilities."

While the Price of Pollution study only briefly discussed specific causes of environmentally attributable diseases, other studies have highlighted the human health risk posed by the consumption of fish. The following table, drawn from the Lower Columbia River Bi-State Program's 1996 Human Health Risk Assessment, shows the cancer risk posed by the consumption of fish from the Columbia River[3]:

[1] Prepared by Ryan Sudbury, Confederated Tribes of the Umatilla Indian Reservation

[2] Oregon Environmental Council, *The Price of Pollution*, 2008. Pg. iii.

[3] Tetra Tech. *Assessing Human Health Risks from Chemically Contaminated Fish in the Lower Columbia River*, 1996. Pg 5-5 (assumes a 70 year exposure timeframe).

	Chinook	Carp	Sucker	Sturgeon	Steelhead
6.5 g/day	18 cancers in 1,000,000 exposures	160 cancers in 1,000,000 exposures	37 cancers in 1,000,000 exposures	54 cancers in 1,000,000 exposures	5.6 cancers in 1,000,000 exposures
54 g/day	150 cancers in 1,000,000 exposures	1,300 cancers in 1,000,000 exposures	300 cancers in 1,000,000 exposures	450 cancers in 1,000,000 exposures	46 cancers in 1,000,000 exposures
176 g/day	490 cancers in 1,000,000 exposures	4,400 cancers in 1,000,000 exposures	1,000 cancer in 1,000,000 exposures	1,400 cancers in 1,000,000 exposures	150 cancers in 1,000,000 exposures
The Oregon DEQ target for potential cancer risk is 1 excess cancer in 1,000,000 exposures.					

Salmonids and resident fish showed similar patterns of potential risk from noncarcinogenic health threats, such as developmental and central nervous system impairments. Reducing toxics in Oregon's water and fish will reduce the costs associated with treatment and care of environmentally attributable diseases, and will result in a positive economic benefit to Oregonians.

Oregonians may receive additional economic benefits in terms of reduced health care costs due to consumption of greater amounts of fish, in place of other meat sources. For those who eat fish for the health benefits, the increased abundance of healthy local fish may also reduce costs associated with the purchase of fish from more remote locations (i.e. Alaska, etc.), resulting in an economic benefit for the consumer.

Salmon Restoration Benefits (and Reduced Costs)

Recovery of threatened and endangered salmon and steelhead costs Oregon hundreds of millions of dollars a year. The costs are incurred because of increased regulation; higher electricity prices; expense of public funds for recovery and mitigation programs; etc… A portion of this expense is related to toxic contamination in Oregon's waterways. A recent report released by the Lower Columbia River Estuary Partnership found that by some estimates, exposure to toxic contaminants causes delayed, disease-induced mortality of up to almost ten percent of all the juvenile Chinook salmon that move through the estuary.[4] This figure does not include the mortality caused by failure to avoid predators as a result of toxic exposure, which if included, would increase the mortality rate. The toxics issue is of such great importance that NOAA Fisheries ranks the need to address toxic contaminants in the top seven of twenty-two suggested actions to improve juvenile salmonid survival in the lower Columbia River.[5]

The reduction of toxics in Oregon's waters may not only reduce the costs associated with salmon recovery, but it may also increase the economic benefit derived from recreational and commercial fishing. A report released in 2005 concluded that restored salmon and steelhead

[4] *Lower Columbia River Estuary Partnership, Lower Columbia River and Estuary Ecosystem Monitoring: Water Quality and Sampling Report. 2007.*
[5] *Ibid.*

fisheries would result in $544,000,000 of annual economic benefits to the state of Idaho alone.[6] Economic benefits to Oregon and Washington may be similar, if not higher, based on a higher population of fish and people in the lower Columbia River Basin.

Recreational and Aesthetic Benefits

Reduced toxics in Oregon's waterways will likely increase recreational fishing and tourism to swimming and fishing locations throughout the state. Healthy, clean fish may help- restore fish as an icon of the northwest, and increase tourism to the region. Additionally, cleaner rivers and fish may lead to increased birding and wildlife viewing opportunities, as the benefits of cleaner fish work themselves up the food chain, resulting in substantial economic benefits.

While these statewide values are difficult to calculate or predict, a study of the Willamette basin found considerable recreational and aesthetic economic benefits resulting from water quality improvements as a result of point source pollution controls[7]. The study found that for the time period between 1972 and 1992, point source pollution controls resulted in between $275 million and $594 million worth of annual recreational and aesthetic economic benefits for the Willamette basin.[8] The study defined recreational and aesthetic uses as including recreational fishing, swimming, wildlife viewing, and general aesthetic benefits (using a Willingness to Pay for protection theory).These numbers indicate that cleaner water (and by connection, cleaner fish and wildlife) results in significant economic benefits for Oregon and its citizens.

Property Values Benefits Associated with Less Toxic Water Bodies

A reduction in toxics found in Oregon waterways may lead to increased property values for properties located near rivers or lakes. A recent study from the Great Lakes region estimated that property values were significantly depressed in two regions associated with toxic contaminants (PAHs, PCBs, and heavy metals). The study showed that a portion of the Buffalo River region (approx. 6 miles long) had depressed property values of between $83 million and $118 million for single-family homes, and between $57 million and $80 million for multi-family homes as a result of toxic sediments. The same study estimated that a portion of the Sheboygan River (approx. 14 miles long) had depressed property values of between $80 million and $120 million as the result of toxics.[9] While this study related to the economic effect of contaminated sediment, the idea that toxic pollution depresses property values is easily transferable to Oregon. A reduction in toxic pollution in Oregon waters may have a substantial economic benefit to property values in close proximity to Oregon waterways, and also result in additional property tax revenues to pay for state programs.

Benefits and Reduced Costs of Cleaner Drinking Water

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[6] Ben Johnson & Associates, *The Potential Economic Impact of Restored Salmon and Steelhead Fishing in Idaho.* 2005.

[7] Environmental Protection Agency, *A Benefits Assessment of Water Pollution Control Programs Since 1972*, Part I, EPA-EE-0429 (2000). Pg. 6-15–6-29.

[8] *Ibid*.

[9] *Economic Benefits of Sediment Remediation*, <http://www.nemw.org/Econ%20Ben%20Report06%20braden.pdf> (last accessed June 20th, 2008).

Much of Oregon's drinking water comes from surface water sources. The Willamette Basin had ninety-four million gallons of drinking water withdrawals in 1990 alone.[10] Oregon's drinking water stands to become cleaner as a result of an increased fish consumption rate and the associated stricter water quality standards. There are numerous economic benefits and averted costs associated with cleaner drinking water. Water suppliers may benefit from lower pretreatment costs and averted costs from needing to obtain water from headwaters sources. There are also the avoided costs of aversion behaviors, such as buying household pretreatment/water filtration systems, and bottled water, which costs between 240 and 1,000 times as much as tap water[11] and the containers need to be recycled or disposed of in landfills. Reduced toxics in Oregon's waters may result in real economic benefits in terms of reduced household and producer expenses.

Reduced Costs to Downstream Surface Water Users

Fewer toxics in the river may reduce costs incurred by downstream surface water users, who have to pre-treat water for industrial or commercial use (i.e. food processors). Additionally, reduced toxics in the water column may also reduce costs associated with end-of-pipe treatment for downstream water users, as they will not need to remove toxics present at the intake source.

Benefits from Potential Implementation Strategies

The FIIAC is discussing alternative avenues to address implementation issues associated with an increased fish consumption rate. Some of the non-traditional implementation strategies would have associated economic benefits. Off-site toxic mitigation programs, in place of additional end-of-pipe treatment, would cleanup legacy toxics, thereby increasing the magnitude of the potential economic benefits discussed above. Increased stormwater controls to reduce the inflow of toxics into surface waters may result in economic benefits related reduced erosion and sedimentation of waterways, and increased fish health and abundance from reduced stormwater pollution and stream temperature (i.e. reduced water runoff from hot pavement).

Conclusion

While economic benefits of environmental regulation are sometimes difficult to quantify, the FIIAC believes it is important to acknowledge that such benefits are likely to be realized given an increased fish consumption rate, and as such deserve equal consideration in the decision-making process. Decreased health care costs, increased property values, additional recreational and commercial fishing opportunities, and cleaner drinking water, among others, are all potential benefits that may result from an increased fish consumption rate and, therefore, these potential economic benefits should be considered during any economic analysis of an increased fish consumption rate.

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[10] Environmental Protection Agency, *A Benefits Assessment of Water Pollution Control Programs Since 1972*, Part I, EPA-EE-0429 (2000). Pg. 6-14.

[11] *The Real Costs of Bottled Water*, San Francisco Chronicle, Feb. 18th, 2007, < http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2007/02/18/EDG56N6OA41.DTL> (last accessed June 21st, 2008).

Fish Consumption Rate Process--Alternative Matrix

Option Name	Approach	Regulatory or Voluntary?	Chemical Driver	Affected Party	Regulatory Certainty	Impl. Steps/Schedule	Monitoring Plan	Compliance Enforcement Mechanism	Costs				Benefits	Expected Results	Feasibility			
									Capital	O&M	Pollution	To Regulated Comm.			Tech	Legal	Political	Economic
Compliance Schedules	**General Approach:** Use of schedules of compliance where immediate compliance with water quality-based effluent limitation can not be achieved	Regulatory; authorization usually contained in State WQS and implemented through permitting process	All	Permittees	Certain	Must show that immediate compliance not possible; interim milestones must be identified leading to reasonable further progress; permit must contain final enforceable limits	Could be included						Water quality based-effluent limits will ultimately be attained; legal mechanism contained in permit.	Appropriate in circumstances where compliance with water quality-based effluent limits is ultimately expected, with some certainty		Unknown: Currently being litigated on related issue		
	Phosphorous in Oklahoma: Set more stringent phosphorous criterion, received resistance from Arkansas, decided to phase-in criterion through compliance schedule language with objective of meeting criterion within 10 years (2012).	Regulatory; authorization and some schedules contained in State WQS; implemented through permitting process	Phosphorous	Dischargers in Oklahoma and Arkansas	Certain	Schedules established for large cities to meet interim limits; Medium sized entities (0.5 MGD-1 MGD req'd to reduce P to the maximum extent possible through voluntary controls aimed at reaching interim limit or P loading limited based on flow and effluent concentration.		Compliance schedule					Continued progress toward meeting WQS while actions in addition to point source reductions are being pursued.			Yes		
Variances	**General Approach:** Where analyses demonstration dischargers cannot meet WQS based on 1 of the 6 bases contained in the regulations (most likely reasons include "widespread social and economic impact" or naturally occurring pollutant concentrations," dischargers may get a variance	Regulatory; contained in State WQS; burden of proof on user	All	Permittees	Limited certainty	Applicant must show that cannot meet water quality-based effluent limits; may include terms and conditions during term of variance; 1 every 3-5 years variance must be renewed to assure conditions under which variance granted still exist	Could be included	EQC decision requiring EPA approval			Limit unknown	Applicant bears burden of proof for variance	Progress toward reductions may occur			Yes	Requires EQC and EPA approval	
	Mercury in the Great Lakes States: Statewide variance procedures in Michigan, Ohio, Wisconsin with typical POTW types and limits.	Regulatory	Mercury	POTWs	Certain - depends on type of POTW	Must meet minimum effluent quality; submit information indicating no readily available end-of-pipe treatment technology; development and implementation of pollutant minimization program	Yes						Continued reductions in mercury; cost-effective source reduction activities			Yes (current legal challenge in one state)		

Option Name	Approach	Regulatory or Voluntary?	Chemical Driver	Affected Party	Regulatory Certainty	Impl. Steps/Schedule	Monitoring Plan	Compliance Enforcement Mechanism	Costs				Benefits	Expected Results	Feasibility			
									Capital	O&M	Pollution	To Regulated Comm.			Tech	Legal	Political	Economic
Uses and Variances	**PCBs in Delaware Estuary:** Approach still being formulated--under consideration are 10 year incremental waterbody WQS implementation plans for PCBs (like a variance). Criterion is not attainable and not expected to be for decades. Fish consumption use was replaced with Restoration Use. Permittees would have narrative effluent limit requirements based on Restoration Use.	Regulatory	Historical PCBs in sediment	Permittees; other sources of PCBs	Objective is for regulatory certainty, unknown at this time	10 year incremental plans to reduce PCBs	Monitor to report every 10 years on PCB reduction	If plans are found to be ineffective, EPA will not renew the plan					Minimize historical levels of PCB contamination					
Offsets	**General Approach:** New or expanding sources seek more cost-effective reductions in the same pollutant elsewhere in the waterbody/watershed to allow additional increased mass loadings of a pollutant	Regulatory		Permittees; other sources of the same pollutant										Overall reductions in water body				
Intake Credits	**Great Lakes Approach:** Where intake water exceeds the water quality criteria, water quality-based effluent limitations are set equal to the mass and concentration of the intake water.	Regulatory	Pollutants where high levels are found in intake water	Permittees	Certain	Sufficient information to characterize intake water	Must monitor to assure compliance with limits						Not required to treat pollutants that are not part of facilities processes.		Yes	Federally, Yes; may need additional work in Oregon		Yes
Phased Implementation	**Mercury Reduction in Minnesota:** New fish tissue based Hg criterion will only be used initially for human health, but could be used to set effluent limits in the future	Regulatory	Mercury reduction		Uncertain	Wait for EPA to finalize Hg implementation guidance							Adequately protective Hg criterion					
SSC Based on Natural Conditions	**General Approach:** Adopt SSC for water body that can not attain criteria due to natural conditions (i.e. geologic sources of arsenic)	regulatory	most likely arsenic			Rulemaking to set SSC for specific water body based on natural background levels										Yes		
UAA	**General Approach:** Revise designated use for water body that can not attain criteria due to natural conditions	regulatory	most likely arsenic			Rulemaking										Yes		

Option Name	Approach	Regulatory or Voluntary?	Chemical Driver	Affected Party	Regulatory Certainty	Impl. Steps/Schedule	Monitoring Plan	Compliance Enforcement Mechanism	Costs				Benefits	Expected Results	Feasibility			
									Capital	O&M	Pollution	To Regulated Comm.			Tech	Legal	Political	Economic
Toxics Reduction Approach	Alternative toxics reduction approach based on reasonable potential analysis along with integrated statewide toxics reduction implementation.	Both, regulatory to meet the needs of the Clean Water Act.	To be determined. Should be focused on priority pollutants.	All Oregonians: Citizens; Industries; Agriculture; Forestry; Consumers; Government; Legacy Site Owners	Certainty for point sources would have to be verified through EPA approved process. For other sources some would be certain, some uncertain.	NPDES permit requirements. SB 1010 plan requirements. Forest practices act requirements. Other toxic requirement tools.	NPDES monitoring requirements. DEQ toxics monitoring. Other regulatory monitoring.	NPDES, SB 1010, Forest Practices, Toxic Substances Control Act, Title V, other enforcement mechanisms.	Potentially low for elements of a toxics reduction plan. Legacy source controls potentially high.	Program costs are probably most significant for toxic reduction programs.	Unknown what this category addresses	Implementation could cost local businesses, consumers, farmers and industries.	Eliminate toxics from entering the waste stream. Achieving toxics reductions outside the Clean Water Act regulatory scheme	Improved water quality, human health benefits	Legacy sources maybe most other activities likely low technologies requirements. So yes.	Requires EPA sign approval and endorsement. Statutory changes may be required for non-point sources.	Requires major local political support. Statutory changes require state political support.	In most cases this option is economically viable.
Traditional Treatment Approach	Microfiltration followed by Reverse Osmosis--w/blending	Regulatory: technology and or numeric based	All metals and toxics that are not removed through conventional treatment	Point sources and POTWs	Depending on the numeric limits, this could be difficult given that levels may be below detection	POTWs would have to revamp facilities plans, process, CIPs, financing and rates--would require compliance schedules to achieve	Would be part of NPDES permit and DMRs	NPDES permits; CWA provisions	$2.5m to $3.5 m per mgd=$2.3 billion to $3.27 billion for Corvallis, MWMC, CWS, & Portland	Significantly increased electrical and chemical and sludge disposal costs	Increased pollution & green house effect from energy consumed; additional chemical	All costs would be born by rate payers	Known technology increases treatment levels	1)Large amount of money spent with little incremental improvement--not a cost-effective way to treat the problem. 2)Wide spread non-compliance from inability to fund multibillion $ program, while sources left unchecked.	variable with some unknowns	meets CWA objectives	low	low
Traditional Treatment Approach	Microfiltration followed by Reverse Osmosis--full treatment	Regulatory: technology and or numeric based	All metals and toxics that are not removed through conventional treatment	Point sources and POTWs	Depending on the numeric limits, this could be difficult given that levels may be below detection	POTWs would have to revamp facilities plans, process, CIPs, financing and rates--would require compliance schedules to achieve	Would be part of NPDES permit and DMRs	NPDES permits; CWA provisions	$6 m to $15 m per mgd=$5.6 10 billion to $14.025 billion (for same POTWS)	Significantly increased electrical and chemical and sludge disposal costs	Increased pollution & green house effect from energy consumed; additional chemical	All costs would be born by rate payers	Known technology increases treatment levels	1)Large amount of money spent with little incremental improvement--not a cost-effective way to treat the problem. 2)Wide spread non-compliance from inability to fund multibillion $ program, while sources left unchecked.	variable with some unknowns	meets CWA objectives	low	low
Pass-through Allowance (Variation of "Intake Credits")	**General Approach**: Mass (lb/day) allowance/credit granted based on concentration x flow for human health pollutant of concern, natural or background, brought in via intake water.	Regulatory	HH WQ Criteria below feasible quantitation or removal by FCR increase	Point sources and POTWs	Fits with additional implementation tools	Permittee required to submit valid sampling, flow and mass calculation data for water intake and effluent	Required for NPDES application renewal or by compliance schedule	NPDES permits, Industrial User permits				Sampling, Flow and Engineering Costs by permittees~est. $10k-$25k depending on complexity	Equitable, permittee not unfairly penalized for naturally occurring or background COC's.	Potential for practical, meaningful tool	high	Verify if used in some states. Not currently used in Oregon		high

Option Name	Approach	Regulatory or Voluntary?	Chemical Driver	Affected Party	Regulatory Certainty	Impl. Steps/Schedule	Monitoring Plan	Compliance Enforcement Mechanism	Costs				Benefits	Expected Results	Feasibility			
									Capital	O&M	Pollution	To Regulated Comm.			Tech	Legal	Political	Economic
WQ Benchmark Criteria	**General Approach**: Revised FCR used to establish HH Toxics Benchmarks. Benchmarks used to establish WQ permit goals. Implementation requirements follow a "top down" evaluation that looks at enhanced sampling, feasible technology, toxics use reduction and pollution prevention evaluation and implementation.	Regulatory	HH WQ Criteria below feasible quantitation or removal by FCR increase	Point sources, POTWs, Non-point Sources	Discuss	Implementation requirements follow a "top down" evaluation schedule that looks at enhanced sampling, technology evaluation, toxics use reduction and pollution prevention and raw material substitution evaluation.	Monitoring requirements established in permit (compliance schedule or specific conditions) and through ODEQ guidance	Compare Stormwater Benchmarks, NPDES or IU Permits	Exact capital would depend on the feasibility analysis			Engineering costs could be significant. Estimate $50-100k for municipal and industrial permittees	Fits nicely with planned comprehensive SB 737 work and step-wise implementation of the 17.5 g/day standard and application of the RPA, both of which have not been fully implemented by ODEQ and the regulated community	Could potentially avoid political and legal quagmires of multiple new impairments, listings and fish advisories	Would specifically be designed to provide for technical feasibility	Could potentially help avoid significant legal costs for all parties		Has meaningful progress that has a medium level of cost
De Minimis	**General Approach**: Establish pollutant-specific PQL, MDL or ML (or alternative) as a *de minimis* values for each of the HH WQ Criteria COC's.	Regulatory Narrative Approach	HH WQ Criteria below feasible quantitation or removal by FCR increase	Point Sources and POTWs	Discuss	ODEQ include in WQ standards narrative	Monitoring established in permits	NPDES, Stormwater and IU permits				Capital and O&M likely required for some to achieve de minimis levels	Solves some practical and technology gap problems	Meaningful, practical tool for all parties involved	High, requires monitoring	May currently be used by default, without specific narrative	High	High
Bifurcated Criteria	**General Approach**: Using WQ toxics prioritization based on fish consumer studies, establish a two-part WQ Criteria. Focus available resources on the highest priority pollutants that drive human health concerns, avoiding one-size-fits-all unintended consequences	Regulatory	Revise WQ criteria for top priority list toxics (examples: pesticides, methyl mercury and PCBs)	Point sources and POTWs	TBD	3 parties establish two-tiered priorities consistent with other regulatory programs including SB 737 and state and regional toxics reduction priorities and timelines	Monitoring established in permits	NPDES, Stormwater and IU permits	TBD		TBD	Capital and O&M likely required for some to meet WQ standards	Focuses municipal, industrial and public resources on problem COC's	Equivalent toxicity reduction results achieved at more technically and economically feasible levels. Dovetails with SB 737, LCREP and other state and region-wide toxics reduction priorites.	More feasible than an across-the-board WQ Criteria revision	ODEQ develop rationale and narrative for rulemaking	May be more saleable to public	Medium

Fish Consumption Rate Process--FIIAC Implementation Ideas Matrix

Option Name	Approach	Regulatory or Voluntary?	Chemical Driver	Affected Party	Regulatory Certainty	Impl. Steps/schedule	Monitoring Plan	Compliance Enforcement Mechanism	Costs				Benefits	Expected Results	Feasibility			
									Capital	O&M	Pollution	To Regulated Comm.			Tech	Legal	Political	Economic
The following is FIIAC's recommended approach for reducing contaminants in fish consumed by humans. This approach focuses on reducing major contaminants of concern, encourages finding and developing the best technology to do so, and uses permits to enhance compliance.																		
Toxics Reduction Approach	Alternative toxics reduction approach based on reasonable potential analysis along with integrated statewide toxics reduction implementation.	Both, regulatory to meet the needs of the Clean Water Act.	To be determined. Should be focused on priority pollutants.	All Oregonians: Citizens; Industries; Agriculture; Forestry; Consumers; Government; Legacy Site Owners	Certainty for point sources would have to be verified through EPA approved process. For other sources some would be certain, some uncertain.	NPDES permit requirements. Other toxic requirement tools.	NPDES monitoring requirements. DEQ toxics monitoring. Other regulatory monitoring.	NPDES, Toxic Substances Control Act, other enforcement mechanisms.	Potentially low for elements of a toxics reduction plan. Legacy source controls potentially high.	Program costs are probably most significant for toxic reduction programs.	Unknown what this category addresses	Implementation could cost local businesses, consumers, farmers and industries.	Eliminate toxics from entering the waste stream. Achieving toxics reductions outside the Clean Water Act regulatory scheme	Improved water quality, human health benefits	Legacy sources maybe most other activities likely low technologies requirements. So yes.	Requires EPA sign approval and endorsement. Statutory changes may be required for non-point sources.	Requires major local political support. Statutory changes require state political support.	In most cases this option is economically viable.
WQ Benchmark Criteria	**General Approach**: Revised FCR used to establish HH Toxics Benchmarks. Benchmarks used to establish WQ permit goals. Implementation requirements follow a "top down" evaluation that looks at enhanced sampling, feasible technology, toxics use reduction and pollution prevention evaluation and implementation.	Regulatory	HH WQ Criteria below feasible quantitation or removal by FCR increase	Point sources, POTWs, Non-point Sources	Discuss	Implementation requirements follow a "top down" evaluation schedule that looks at enhanced sampling, technology evaluation, toxics use reduction and pollution prevention and raw material substitution evaluation.	Monitoring requirements established in permit (compliance schedule or specific conditions) and through ODEQ guidance	Compare Stormwater Benchmarks, NPDES or IU Permits	Exact capital would depend on the feasibility analysis			Engineering costs could be significant. Estimate $50-100k for municipal and industrial permittees	Fits nicely with planned comprehensive SB 737 work and step-wise implementation of the 17.5 g/day standard and application of the RPA, both of which have not been fully implemented by ODEQ and the regulated community	Could potentially avoid political and legal quagmires of multiple new impairments, listings and fish advisories	Would specifically be designed to provide for technical feasibility	Could potentially help avoid significant legal costs for all parties		Has meaningful progress that has a medium level of cost

Option Name	Approach	Regulatory or Voluntary?	Chemical Driver	Affected Party	Regulatory Certainty	Impl. Steps/schedule	Monitoring Plan	Compliance Enforcement Mechanism	Costs				Benefits	Expected Results	Feasibility			
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Uses and Variances	**PCBs in Delaware Estuary:** Approach still being formulated--under consideration are 10 year incremental waterbody WQS implementation plans for PCBs (like a variance). Criterion is not attainable and not expected to be for decades. Fish consumption use was replaced with Restoration Use. Permittees would have narrative effluent limit requirements based on Restoration Use.	Regulatory	Historical PCBs in sediment	Permittees; other sources of PCBs	Objective is for regulatory certainty, unknown at this time	10 year incremental plans to reduce PCBs	Monitor to report every 10 years on PCB reduction	If plans are found to be ineffective, EPA will not renew the plan					Minimize historical levels of PCB contamination					
	The following tools would be used where appropriate to achieve the above results:																	
Pass-through Allowance (Variation of "Intake Credits")	**General Approach**: Mass (lb/day) allowance/credit granted based on concentration x flow for human health pollutant of concern, natural or background, brought in via intake water.	Regulatory	HH WQ Criteria below feasible quantitation or removal by FCR increase	Point sources and POTWs	Fits with additional implementation tools	Permittee required to submit valid sampling, flow and mass calculation data for water intake and effluent	Required for NPDES application renewal or by compliance schedule	NPDES permits, Industrial User permits				Sampling, Flow and Engineering Costs by permittees~est. $10k-$25k depending on complexity	Equitable, permittee not unfairly penalized for naturally occurring or background COC's.	Potential for practical, meaningful tool	high	Verify if used in some states. Not currently used in Oregon		high
Compliance Schedules	**General Approach:** Use of schedules of compliance where immediate compliance with water quality-based effluent limitation can not be achieved	Regulatory; authorization usually contained in State WQS and implemented through permitting process	All	Permittees	Certain	Must show that immediate compliance not possible; interim milestones must be identified leading to reasonable further progress; permit must contain final enforceable limits	Could be included						Water quality based-effluent limits will ultimately be attained; legal mechanism contained in permit.	Appropriate in circumstances where compliance with water quality-based effluent limits is ultimately expected, with some certainty		Unknown: Currently being litigated on related issue		
De Minimis	**General Approach**: Establish pollutant-specific PQL, MDL or ML (or alternative) as a *de minimis* values for each of the HH WQ Criteria COC's.	Regulatory Narrative Approach	HH WQ Criteria below feasible quantitation or removal by FCR increase	Point Sources and POTWs	Discuss	ODEQ include in WQ standards narrative	Monitoring established in permits	NPDES, Stormwater and IU permits				Capital and O&M likely required for some to achieve de minimis levels	Solves some practical and technology gap problems	Meaningful, practical tool for all parties involved	High, requires monitoring	May currently be used by default, without specific narrative	High	High

Option Name	Approach	Regulatory or Voluntary?	Chemical Driver	Affected Party	Regulatory Certainty	Impl. Steps/schedule	Monitoring Plan	Compliance Enforcement Mechanism	Costs				Benefits	Expected Results	Feasibility			
									Capital	O&M	Pollution	To Regulated Comm.			Tech	Legal	Political	Economic
Offsets	**General Approach:** New or expanding sources seek more cost-effective reductions in the same pollutant elsewhere in the waterbody/watershed to allow additional increased mass loadings of a pollutant	Regulatory		Permittees; other sources of the same pollutant										Overall reductions in water body				
UAA	**Generic Approach:** Revise designated use for water body that can not attain criteria due to natural conditions	regulatory	most likely arsenic			Rulemaking										Yes		

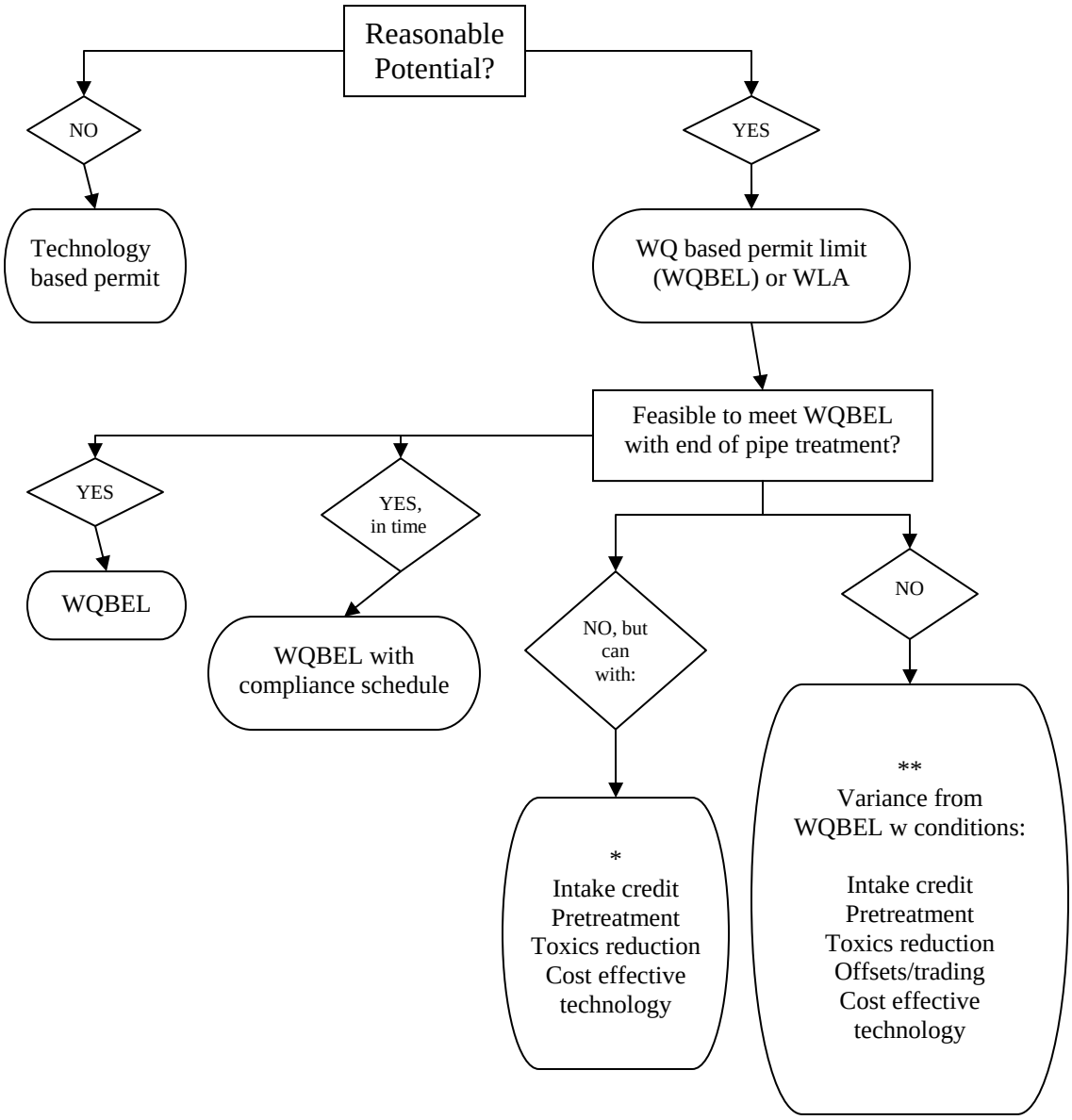

Figure 1. Implementation framework for permitted point sources that have a reasonable potential to exceed the applicable criteria.

*Quantitative analysis will be needed to show attainment with the WQBEL. A compliance schedule may be needed.
**Variances could be done for individual sources or multiple sources in similar circumstances.
Note: The measures in these boxes be used in combinations.

Measures that involve modifying the applicable criteria include:

- Site specific criteria, i.e. based on natural background levels or other site specific conditions (criteria must protect designated use).
- Beneficial use revision or removal/UAA. (For example, are there some water bodies that should not be designated as drinking water sources.)