

FINAL DRAFT COMMENT SUMMARY
on Draft EPA Region 10 Guidance
on State and Tribal Temperature Water Quality Standards

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TABLE ONE: FINAL DRAFT COMMENT SUMMARY
on Draft EPA Region 10 Guidance on State and Tribal Temperature Water Quality Standards

Comment Category	Summary of Comments	Comment Number
GENERAL		
Comment Process	<p>The public involvement and scientific peer review process conducted by EPA was insufficient.</p> <ul style="list-style-type: none"> • Many of the comments that were submitted to EPA have been ignored. Few changes were made to technical issue papers as a result of public comments or scientific peer review. EPA's authors appear to have methodically rejected credible information. • The guidance did not reach the stakeholders who would be most impacted by their implementation. • Land management agencies and industrial landowners were not invited to participate in the “collaboration” effort to draft the guidance. • EPA should create a more open and inclusive process, including private and state sector land management entities, counties, cities, utilities, business, industry, agriculture, and other affected stakeholders. • A proposal of this magnitude should not go forward without an independent third party scientific review. 	552, 554, 557, 559, 565, 600-602, 700, 702, 703, 707-709, 711, 801, 803, 816, 807-809, 819, 820, 821, 1101, 1161
Water Quality Standard Direction	<p>EPA Region 10 failed to provide principles for establishing a defensible framework for states constructing water quality standards and identifying designated uses.</p> <ul style="list-style-type: none"> • Produce technical issue papers and a guidance document for the states to use in determining the risks and tradeoffs of various water temperature criteria. EPA should perform quantitative risk analyses for aquatic species so that states can understand the tradeoffs of various options in setting standards. • Short of ESA sanctions, EPA should identify the range of scientifically defensible standards that would achieve streamlined ESA consultation, and to help the states determine these standards through interagency coordination. EPA needs to provide the states with a predictable and streamlined process for complying with Section 7 of the Endangered Species Act. This should be done without placing the states at a regulatory disadvantage by predeciding numeric standards or imposing inflexibly narrow approaches for attaining narrative water temperature goals. 	552, 557, 601, 602, 803, 809
Guidance Generally	<p>EPA should collate the information contained in the issue papers, the guidance, and the collected technical information and comments from the tribes and states, affected industries, and other concerned groups. EPA then should produce a new draft guidance document that addresses the concerns raised by these groups. Only after an earnest review process that completely addresses these parties' misgivings will the revised guidance be meaningful in assisting the states (and tribes, hereafter referred to as 'states') with adoption of defensible water quality standards.</p>	552, 557, 558, 559, 601, 602, 803, 809
Guidance Extent	<p>EPA should limit its guidance to the development of narrative water quality criteria. Let the states develop numeric standards, if needed. The guidance should be limited to a description of current scientific knowledge that can be used by states in developing criteria and offer alternatives that could assist states in establishing temperature criteria.</p>	552, 553, 555, 557, 558, 560, 562, 565, 601, 602, 803, 809, 1000, 1307

Comment Category	Summary of Comments	Comment Number
Suspend the Guidance	Suspend the draft guidance. The draft proposal suffers from significant substantive, technical, legal and procedural defects and must be significantly revised. The draft guidance should be rewritten to eliminate circular expressions stating that their knowledge is limited, yet extensive.	600, 701- 704, 708, 800-802
Presumption	EPA inappropriately presumes that cold water species may be present where they are not known to occur or with no data to demonstrate that they have occurred.	553, 555, 556, 557, 560, 562, 565, 816, 1307
Terminology	<p>The guidance should have a glossary defining:</p> <ul style="list-style-type: none"> • All Feasible Steps • Threshold • Optimal • Viable Population • Irreversible Human Impacts • Allowances for Human Use • Mitigative Actions • Criteria, Standard • Guidance • Climatic • Target • Upper Optimal Temperature • Confidence Interval • Bounds of Uncertainty • Model Error • Data Error • Cold Water Refuge • Existing Human Disturbances 	1200, 807, 816
Streamlining	<p>EPA should provide for clear and consistent enforcement of water quality standards, providing landowners and permit-holders clarity and certainty.</p> <ul style="list-style-type: none"> • State and tribal water quality standards should be strong enough to support the ability of watershed plans to prevent further listings and to begin recovery of salmon. • The guidance should not conflict with CWA and state water quality rules. Has a summary been prepared comparing EPA’s guidance to Washington State’s criteria recommendations in the December 2000 publication “Evaluating Standards for Protecting Aquatic Life in Washington’s Surface Water Quality Standards - Temperature Criteria”? • As the guidance now is written it will further complicate the NPDES permitting process and industry’s ability to commit necessary resources to achieving attainable environmental goals. 	600, 701, 1510, 1602
Undocumented Premise	<ul style="list-style-type: none"> • The premise that water temperatures have been significantly altered in most of the Pacific Northwest’s waters to the detriment of salmon and bull trout has not been well documented and appears untrue in large parts of Idaho and some parts of Washington. • EPA should examine their legal obligation to gather, develop, document, or substantiate temperature and watershed information as justification background prior to developing such a complex guidance. 	700, 701, 1160, 1310, 1623
Other Species	EPA should revisit its assumption that aquatic organisms, including salmonids, can survive less than optimal temperatures for limited periods of time if sufficient complexity exists in the watershed to create adequate numbers of pools, side-channel habitats, and other cold-water refugia.	702, 800, 802, 1303, 1307

Comment Category	Summary of Comments	Comment Number
Economic Analysis	Costs of implementing the guidance could result in substantial increase costs. EPA should prepare an economic impact analysis of any future draft guidance and an analysis of the costs to states and private sector of implementing any standards created by the guidance.	563, 702, 703, 711, 801, 816, 820, 821, 1000, 1161
Unsupported Assumptions	All of the approaches in the guidance lack a demonstrable relationship to improved survival or propagation. EPA assumes current water temperature conditions contribute to a decline in salmonid populations and therefore, restoration to historical conditions is necessary. This theory is unfounded and not based upon science.	558, 700, 1400
Water Temperature Resilience	Resistance and resilience of water temperature to natural and human-caused disturbances remain incorrectly portrayed in the current guidance.	552, 553, 555, 557, 560, 562, 565, 601, 602, 802
Unique Water Bodies	EPA should support identifying water temperatures in streams with regard to individual water performance. For example, the Owyhee River in Idaho and Oregon needs to be viewed as the unique water body it is - a naturally warm, high desert, slow moving river. Several reaches of the Owyhee River are listed on the 303(d) list solely for water temperature violations and there is no allowance for natural conditions, such as ambient air temperature and geothermal inputs. Water quality standards for this river should be based on sound science and an understanding of the natural thermal potential. It should address impacts on land managers and industry when unreasonable TMDL standards are damaging. Municipalities should be held accountable.	23, 1451, 1608, 1611 1615-1619, 1620
Eliminate Two-Phased Approach	The guidance should focus on one set of numeric criteria, not two. Dual, competing, or successive criteria will create uncertainty, delay and wasted effort by everyone involved. Variations to criteria or alternative approaches can be addressed through the implement efforts of state and tribal authorities, such as TMDLs and Use Attainability Analyses. The CWA already requires on-going, periodic review and if needed, revisions to water quality criteria.	552, 557, 601, 602, 603, 803, 809, 1307, 1311
Man-made v. Natural	EPA has not adequately addressed man-made v. natural impacts. The guidance assumes that man-made activities have greatly changed the temperature regime of Pacific Northwest waters, but natural conditions (heat flux/heat exchange, river flows, ambient air temperatures, solar radiation) are the primary factor for determining water temperatures. EPA should further study and integrate information relative to natural conditions and thermal potential.	542, 555, 701, 800, 802, 1609
Physical/Biological Capabilities	EPA should provide guidance to the states and tribes that delivers technical support for water quality standards that are protective of salmonids and attainable within the context of the physical and biological capabilities of the states' watersheds. EPA should avoid providing guidance that is not consistent with Sections 303 and 304 of the CWA and EPA's implementing regulations.	807, 821, 1161

Comment Category	Summary of Comments	Comment Number
Comment Review	<p>This new review should include an explicit comment response document. It has been unclear how EPA has responded to both internal and external comments to date. For example, it is our understanding that peer review comments were solicited in May of 2001 as well as July of 2000. We are unable to find the peer review comments for the May 2001 iteration, let alone EPA's responses to them. It is imperative that EPA "open" this process so that stakeholders can feel that their input is meaningful and that the difficult legal, policy, and technical issues are debated candidly.</p>	552, 557, 601, 602, 803, 809
Comment Review	<p>EPA's guidance and issues papers should be based on factual evidence from EPA and other agencies that has been peer reviewed.</p> <ul style="list-style-type: none"> • Specific peer review comments were not shared with the public, and the adequacy of author responses to peer review comments cannot be determined. Provide rationale and explanation if EPA disagrees with information previously provided. • Acknowledge hatchery and NMFS data. • The guidance should provide a literature review of "appeals to authority" that are objective studies that demonstrate an application of science principles. EPA should avoid using narratives that are mere "opinions and speculations." 	552, 554, 557, 559, 601, 602, 800, 802, 803, 809, 820, 1621
Heat Loading	<p>EPA continues to make the erroneous assumption that temperature is a conservative parameter, that "heat must be transported downstream" and that some streams "may never fully dissipate added heat."</p> <ul style="list-style-type: none"> • Such assumptions could promote ineffective mitigation measures in headwater reaches that would result in wasted resources. Revise guidance to reflect that water temperature is a non-conservative parameter with a spatial limit to the influence of upstream reaches on the water temperature of downstream reaches. Reconsider the importance of heat flux dynamics to the feasibility, selection and effectiveness of mitigative actions and "offsets," as presented in the draft guidance. Considering that the thermal offset concept would be implemented under a post-TMDL NPDES permit scenario and that it is inappropriate for EPA to dictate procedures for implementation of water quality standards to the states, EPA should refrain from addressing heat load mitigation in its temperature criteria guidance. • In small and medium-sized streams, thermal processes reach equilibrium with the surrounding environment and heat load dissipates readily before reaching downstream portions of the watershed. Only in very large streams and reservoirs or lakes does heat load persist and accumulate. • EPA should be aware of basic thermodynamic principles, including adiabatic lapse rate. 	552, 557, 601, 602, 800, 802, 803, 809, 818, 1307, 1402
Stick to Criteria	<p>Water quality criteria may not include implementation methods. State standards, not criteria, commonly set out implementation methods. The 1999 biological opinions that obliged EPA to lead a regional temperature "criteria" development process were directed to the need for regional criteria protective of endangered and threatened salmonid species of fish. Implementation was not in scope and is left to the states. Region 10 should not allow the participants it invited to participate in the regional temperature criteria process to grow their mandate.</p>	552, 557, 559, 601, 602, 803, 809, 1160

Comment Category	Summary of Comments	Comment Number
Prescriptiveness of Guidance	EPA should focus on outcomes or performance characteristics that state and tribal temperature standards should meet rather than prescribing a single pathway. EPA should only offer specific steps as examples of acceptable methods to satisfy its approval criteria. EPA should identify temperature criteria or approaches that EPA already knows are “unapprovable.”The recommended temperature criteria should be as clear and as straight forward as possible and to the extent practical, reflect the variability of physical processes and the thermal potential of subbasins. Understandable criteria will facilitate improved state and tribal implementation and where necessary, enforcement.	555, 1100
Recovery	EPA should clarify if intends for temperature standards to contribute to the recovery of cold water species in addition to preventing their extirpation. Temperature standards must contribute to the recovery of cold water species, not merely prevent their extirpation.	1503, 1505
Protection of Aquatic Resources	EPA has a responsibility to protect and restore the public’s aquatic resources. EPA is not tasked to protect the economic interests of polluters. EPA must move forwards with policies and guidance that encourages (and in some cases, forces) the protection of water quality and to create the conditions that foster re-colonization of salmonid habitat.	1506
Broad Range of Scenarios	The guidance is geared toward the assumption that the anthropogenic sources of thermal change will all cause the water temperatures to <i>increase</i> . There are some instances where anthropogenic sources are currently causing temperatures to decrease. The guidance needs to ensure it considers and includes all scenarios.	1506, 1624
State Authority	The guidance should be of a general nature and is too narrow and rigid and wrongfully takes away state ability manage water quality.	551, 553, 555, 557, 559, 560, 562, 565, 1613
State Deference	The guidance should defer to the states the task of formulating water quality standards within their respective jurisdictions. Idaho has already adopted temperature standards for protection of cold water species. EPA’s standards are not an improvement and may go beyond Clean Water Act (CWA) requirements.	1160, 552, 557, 601, 602, 702, 803, 809, 820, 25, 1307, 1402
States	EPA should honor states rights and should avoid undermining state efforts to implement use-based water quality standards where all uses are considered.	559, 560, 562, 565, 800,802, 805
State Discretion	Guidance takes away too much state discretion in implementing the water quality program. It is overreaching, duplicative, overly restrictive, and lacks flexibility. Moreover it does not adequately consider scientific data and historical temperature records submitted by the states and other available mechanisms such as the CWA, ESA, and state laws designed to protect salmonids.	559, 708, 803, 807, 819, 821, 1607

Comment Category	Summary of Comments	Comment Number
State Authority	There are already a number of Oregon statutes on the books that were specifically written to protect water quality and salmon habitat including both the Oregon Administrative Rules (OAR) and Oregon Revised Statutes (ORS). For example: ORS 468B - Water Pollution Control; OAR Division 45 - Regulations Pertaining to Dischargers; ORS 527 - Oregon Forest Practices Act; ORS 197 - Comprehensive Land Use Planning Coordination (Goals Compliance for protection of ground water resources); OAR Division 41 - State-Wide Water Quality Management Plan; Division 48 - Compliance with Water Quality Requirements; ORS 541 Watershed Management and Enhancement (Oregon Watershed Enhancement Board and the Oregon Salmon Plan).	509, 525, 532
State Authority	<ul style="list-style-type: none"> • The guidance reaches beyond the authority given EPA by the CWA, by telling the states and tribes what water quality criteria must be included in the state standards. The guidance should acknowledge existing and more sophisticated state laws to protect water quality and aquatic habitat that have already been approved by EPA and ESA, such as the Forests & Fish Law (this does not use the Section 7 consultation requirement to expand the EPA scope of authority under the CWA). • The guidance should recognize the state's authority to address pollution and to balance and consider different designated uses of water and should not optimize water quality conditions for one use at the expense of another • The guidance should adhere to the purpose of water quality standards - to seek protection for fish, wildlife, recreation, agriculture, industry, navigation and other purposes. • States have tremendous experience and talent in implementing water quality standards. EPA should know about local and municipal efforts that specifically address protection of water quality and salmon habitat. • The guidance should provide technical assistance to the states and tribes when developing temperature criteria; provide technical information that supports temperature criteria that is protective of fish use and other uses of our state's waters; and provide technical information that aligns with national EPA recommendations on how states and tribes can develop temperature criteria. 	551
CWA Compliance	<p>The guidance should emphasize CWA compliance across the basin by all pollution sources.</p> <ul style="list-style-type: none"> • The guidance should not include Temperature Management Plans (TMPs) for point source polluters. • The guidance should clearly reflect the importance of ecosystem function to water temperature and salmon recovery as supported by the technical issue papers. 	1200
Technical Support	EPA's guidance fails to provided leadership required by states to address temperature problems in the region's streams and misses an opportunity to build recommendations on the five technical issues papers that form a solid foundation for understanding the biological requirements of cold-water species in the Northwest.	1503
Streamlining	The guidance does not streamline CWA and ESA review of state standards as it is not specific enough.	1503
Sufficient Harvest	The guidance should provide maximum thermal restoration in support of sufficient harvest.	1200
Lack of Detail	An overriding weakness in the documents stems from the lack of clearly defined terms and detail related to key guidance elements. This vagueness can result in wide interpretation of the guidance's intent, thereby diminishing the effectiveness or ability of EPA to assess the true impact of guidance recommendations on water temperature.	1200

Comment Category	Summary of Comments	Comment Number
Assumptions	The guidance fails to present a solid scientific and implementation framework to achieve optimal thermal conditions for salmonids. Instead it relies on assumptions and independent interpretation of key guidance recommendations by the regulating agencies to achieve project goals.	1201
Adaptive Management	Where interim criteria may be in place for a long period of time, EPA should employ adaptive management procedures to implement the criteria over the next several decades as the data, modeling, and science improve. In dealing with disparity that may occur between numeric criteria that are developed based on fish assemblages and the modeled thermal regime, physical constraints (dams) of the systems should weigh heavier when determining criteria.	1301
303(d) Listing	<p>Water bodies that violate the species life stage numeric criteria should not be placed on the 303(d) lists as impaired water bodies until natural, non-reversible, and thermal potential conditions have been assessed.</p> <ul style="list-style-type: none"> • Exceedances of species life stage numeric criteria should instead be evaluated and judgment calls made as to whether or not natural conditions could lead to exceedances some of the time. The maximum allowable human increase above that which is natural and that which is irreversible could be defined. • EPA should allow a 0.3° C increase from human causes. Given the 0.3° C allowance, the issue then becomes one of implementing the maximum allowable increase. • This maximum allowable increase could be allocated through a detailed TMDL development, which may also look at some reasonable approach for describing thermal potential criteria. 	1300
Clarity of Guidance	<ul style="list-style-type: none"> • Examples associated with a single protective temperature should be rewritten as they are confusing. • The overview of EPA’s recommendations for water temperature is poorly organized and confusing. The points in the bulleted list ought to be numbered, followed by text clearly identified as addressing each numbered point. Second paragraph: Add to the end of the last sentence “or reaches that more susceptible to cumulative as well as natural warming effects.” Fourth paragraph: The species-life-state criteria should also include thermal migration barriers since delayed migration timing may hamper life stages. • The section on development and adoption of thermal potential numeric criteria is redundant and much of the language appears to simply appease polluters. • CWA and ESA review of state and tribal temperature water quality standards that are consistent with this guidance: - is the intent that <i>approval</i> of those water quality standards be streamlined? 	1201
Habitat	The guidance should provide sufficient strength to impart change on the landscape. Numeric criteria are good for achieving this goal. The protection of potential habitat should remain in the guidance.	1200
Historically Warmer Temperatures	On what data does EPA justify its finding that “Pacific Northwest streams and rivers historically experience temperatures warmer than levels considered protective for salmonids at certain places and times”?	1504
Unacceptable Criteria	The mechanisms and projects already in place ensuring compliance with the CWA should be used by EPA to generate data for the analysis envisioned in the guidance. This would continue to utilize the scientific expertise of all Forest and Fish Rule constituencies in Washington, and avoid duplication of state and federal workload and costs.	803

Comment Category	Summary of Comments	Comment Number
Appeases Point-Source Concerns	EPA has shifted the focus of the guidance from protection of salmon to appeasing point source concerns. The guidance should fully support the CWA requirement of restoration and maintenance of surface water, in support of salmonid-beneficial uses throughout Pacific Northwest waters. This restoration must occur in a timely fashion.	1200
From Interim To Long-Term Criteria	If the guidance retains interim measures at all, the interim measures should provide a logical approach that accomplishes a reasonable amount of progress pending the derivation of the “permanent” criteria.	1100
Jurisdiction	It seems more appropriate for U.S. Fish and Wildlife Service (USFWS) and NMFS to issue the guidance, as they are the accountable agencies.	1613
LEGAL		
All Beneficial Uses	<ul style="list-style-type: none"> • The CWA requires protection of all beneficial uses, including human use for navigation, commerce, agriculture and recreation. Setting unattainable numeric temperature criteria is in effect an anti-growth and anti-industry/agriculture policy. • State laws require that existing uses shall be maintained. • State and federal law require a balance between the designated uses and the value of the water for other purposes. • The Use Attainability Analysis (UAA) process according to the CWA seems to be the only way to change a specific standards. How does the thermal potential numeric criteria process relate to UAA? 	803, 807, 1402, 1400
CWA Authority	<p>EPA Region 10 lost focus on its limited authority for setting water quality standards and designated uses of waters. It mixed CWA policy and state implementation considerations with technical issues. Policy and state implementation considerations must be kept separate from technical assessments, which need to be scientifically defensible. EPA has overstepped its CWA authority:</p> <ul style="list-style-type: none"> • In suggesting interim state water temperature standards. • In suggesting criteria that mandate an ESA recovery standard on private lands in the states of Oregon, Idaho and Washington. • By restricting the flexibility that Congress left to the states in the CWA to implement their water quality programs in a manner tailored to their specific needs. • By directing states to carry out the ESA policies of NMFS and FWS. • By departing from national temperature guidance and by issuing criteria documents mandating implementation measures that change existing EPA and state rules and programs. • By requiring states and tribes to develop site-specific numeric criteria for each subbasin in their jurisdiction. Site-specific numeric criteria are usually developed through waterbody or subbasin water quality management plans developed through the TMDL program. • As well as beyond TMDL mandates, current state standards, and beyond the ability of states to regulate. • Possibly by identifying a species life stage of a species as a “designated use”. 	552, 554, 557, 558, 601, 602, 603, 803, 809, 821, 1101, 1000, 1100, 1160, 1161, 1307

Comment Category	Summary of Comments	Comment Number
ESA Authority	<ul style="list-style-type: none"> • ESA Section 7 consultation does not increase EPA's power over state water quality standards. Region 10 created guidance as a result of an ESA process, i.e., Section 7 ESA consultation with NMFS and FWS incident to Region 10's review of Oregon's revised water quality standards. The guidance was not created to implement the CWA. State water quality standards, and EPA's actions respecting such standards, are subject to the CWA. EPA must approve a revised state standard, including criteria for temperature, if the standard is meets the requirements of the CWA. 33 USC §1313(c)(3). • The ESA also addresses, under Section 6, cooperation with states. If the guidance constitutes compliance with the ESA, it would seem logical that the guidance would also constitute an acceptable basis for a cooperative agreement with the states for conservation of T&E species. Given state primacy in water quality issues, the guidance should be modified to reference ESA Section 6 links and compliance. 	552, 557, 601, 602, 603, 707, 803, 808, 809, 820, 821, 1160, 1161
Inconsistency With Earlier Regulations	EPA published the "National Recommended Water Quality Criteria" for temperature, among other pollutants, under Sec. 304(a)(1) of the CWA (63 Fed. Reg. 68354) in 1998. This publication set out a list of National Recommended Water Quality Criteria for Non Priority Pollutants. Temperature was listed as a non priority pollutant (see, 63 Fed. Reg. 68361). Region 10 may not depart from the Agency's national recommendation. Proposed changes to any water quality criteria must follow a specific process outlined in EPA publication 822-Z-99-001.	552, 557, 601, 602, 602, 704, 707, 800, 802, 803, 809, 807, 819, 1309
Upstream Impacts	Ensure there is a legal requirement that upstream activities cannot further increase water temperatures which would lead to gradually warming downstream waters to exceed temperature standards.	1500-1502, 1622
State Discretion	States have complete discretion to adopt state criteria consistent EPA's CWA §304(a) criteria or based on other scientifically defensible methods. Under 40 CFR §131.11(b)(1) states can establish numeric criteria in state water quality standards based on EPA's section 304(a) criteria; EPA's section 304(a) criteria modified to reflect site-specific conditions; or other scientifically defensible methods. Region 10 does not establish the Agency's recommended water quality criteria pursuant to CWA Section 304(a). Region 10's guidance does not modify the agency's Section 304(a) criteria to reflect site-specific conditions and is silent about the Section 304(a) criteria. A state can adopt water quality criteria that differ from EPA's Section 304(a) criteria if the state's criteria are based on scientifically defensible methods. While EPA must review state standards, EPA does not have the authority to substitute its judgment where a state has followed 40 CFR §1311.11(b)(1) and has no right to insist that a state accept that the criteria in the guidance are scientifically defensible.	552, 557, 601, 602, 803, 809, 1309
Anti-Backsliding	EPA should provide clarification that the policy of “anti-backsliding” will not apply if SLS numeric criteria are applied within an NPDES permit and the thermal potential numeric criteria is calculated to be higher. In other words, a permit holder can readjust the permit in accordance with the new, higher standards. Industries not in compliance with the SLS numeric criteria will be reluctant to invest in changes that might later be changed again.	603, 705, 1301, 1306, 1307
Jurisdiction	The legal responsibilities of EPA vs. the states in setting water temperature standards is incorrectly portrayed in the guidance.	552, 557, 601, 602, 803, 809
ESA	ESA species protection is not paramount under the CWA and EPA should not proceed as if it is.	603, 702, 800, 802, 1613

Comment Category	Summary of Comments	Comment Number
Policy Limitations	<p>The guidance contains several policy limitations and legal defects, some fatal.</p> <ul style="list-style-type: none"> • The guidance is not consistent with Sections 303 and 304 of the CWA and EPA's implementing regulations. • The guidance treats ESA Section 7 consultation as a basis of additional EPA authority over state water quality standards. <p>The effect of the guidance is limited, at best, to a report of Region 10's technical research into an issue, i.e., biological requirements of listed salmonid species for survival and recovery. The guidance cannot increase any burden on state water quality programs. Region 10 should re-cast the guidance to create an alternative outcome including these elements:</p> <p>(1) An agreed-upon principle - EPA, the states and the tribes should administer CWA water quality criteria to achieve the biological requirements of listed salmonid species for survival and recovery, among other goals. The guidance is a set of mandatory EPA requirements for states and tribes.</p> <p>(2) An EPA technical report - SLS values, cast as a report of EPA's technical research into biological requirements of listed salmonid species. An EPA technical report reflects the scientific view of one party. The guidance converts EPA's technical views into prescriptions binding on the states.</p> <p>(3) State implementation primacy- TMDLs, TMPs, mixing zones, antidegradation and other features of state programs should be left to states, not directed by EPA. The guidance strays far from temperature criteria into implementation. Implementation is up to state and tribal governments.</p>	552, 557, 559, 601, 602, 803, 809, 807, 821, 1161
Standard Approval Not Development	EPA clearly has the authority to approve or reject state or tribal standards, but does not have the responsibility to develop standards or provide detailed "instructions on how to establish water temperature criteria" and implementation methods. This is clearly assigned to the states in the CWA.	190, 192, 194, 518, 530, 538, 545, 602, 809 1306, 1309
Burden of Proof	<ul style="list-style-type: none"> • The guidance incorrectly states that states have the burden of proof to prove other standards will meet ESA requirements; the CWA requires EPA to determine whether state standards meet ESA requirements. Therefore, EPA has the burden of proof in demonstrating that current water temperature standards are inadequate. The proposed guidance neither makes reference to the inadequacies of the current state standards nor provide notice that the standards must be changed. • States bear the burden of demonstrating how their standard meets CWA and ESA requirements even if they base their standards on the guidance. EPA must then approve or disapprove of the standards. 	820, 1160, 1503
Regulation Not Guidance	The guidance should either move away from rulemaking/setting regulation (requirement of SLS numeric criteria adoption by states); or alternatively, follow proper rulemaking procedures.	807, 809
Balanced Indigenous Population	The guidance needs to incorporate CWA Sections 303 and 316. Section 303(g) of the CWA states that temperature standards should not be more stringent than necessary to support a balanced indigenous population (according to EPA this is not limited to native or historical species). A balanced indigenous population must take into account irreversible man-made changes such as dams (early implementation of 303(g) provided for variances for point sources from overly stringent thermal water quality standards). Section 316(a) requires water quality standards to be no more stringent than necessary to assure protection and propagation of a balanced indigenous population. Optimal conditions and historical conditions are not required.	559, 1400

Comment Category	Summary of Comments	Comment Number
ESA	On what grounds does EPA believe it will ensure state water quality standards protect designated and existing beneficial uses under the CWA and meet the duty in Section 7(a)(1) of the ESA given that the guidance would allow the continued increase in water temperatures through the use of TMPs and potential thermal regimes that may not be protective of salmonids.	1504
Relaxation of Standards	SLS numeric criteria may be less protective of current temperature standards as the same 7 day average daily maximum temperature standards allow temperatures above a one day limit standard (i.e. Skagit basin 16 degrees Celsius one day maximum limit). Those seeking to relax water quality standards for temperature bear the burden of proof in demonstrating that maintaining or increasing current stream temperatures is consistent with CWA and ESA goals. That burden has not been met in this guidance.	1202
THERMAL POTENTIAL NUMERIC CRITERIA		
Irreversible Human Impacts	<ul style="list-style-type: none"> • Determining what is a “reversible” source of heat is not a scientific decision; it is a policy decision of enormous significance. • The guidance should at least include sideboards and methods for determining whether or not an impact is irreversible. This is a very important but complicated issue and invites misuse and controversy. The guidance could at least give some examples of what would typically be considered irreversible and what would not. • Determining irreversible and reversible impacts are issues that in many cases would require changes to the CWA and existing federal laws. In addition, there are political and legal processes unrelated to this project, which impact these parameters. Discussions and decisions on their assigned values must, therefore, occur among upper level policy makers and through government-to-government consultation with the tribes. As a result, predictions of thermal recovery from implementation of the temperature guidance should not at this time, be based upon assumptions regarding irreversible impacts or allowances for human use. 	1130, 1500-1502, 1508, 1100, 1624, 36, 57, 69, 72, 119,163, 600, 701-703 1160, 1202, 1301, 1306, 1308, 1400, 1402, 1506, 1612, 1622, 1200
Irreversible Human Impacts	<ul style="list-style-type: none"> • Irreversible impacts should include dams where hydropower provides 63% of Washington State’s energy needs. • Irreversible impacts should include major infrastructure facilities (e.g., dams, highways, etc.), legitimate water withdrawals pursuant to a water right, and most existing urban development. That is, the guidance should acknowledge that these facilities are likely permanent features of a subbasin landscape for purposes of calculating thermal potential. However, we suggest that the final guidance also be clear that these permanent facilities and water withdrawals be required to take all feasible steps to minimize and mitigate their impacts. Encourage the re-evaluation of thermal potential in the event these facilities are removed, relocated or terminated in the future. • EPA sites diked and drained floodplains as being irreversible; however these have wreaked huge impacts on salmon and restoration of these areas may be necessary to restore and protect salmon. Skagit County is initiating steps toward reversing some of these “irreversible” actions and the guidance could undermine this progress. 	1100, 1202, 1400, 1401

Comment Category	Summary of Comments	Comment Number
Impracticality	<p>“Historical” thermal potential numeric criteria are not warranted or practical to implement. We recommend elimination of historical thermal potential modeling in the guidance. Without accurate historic watershed records, any calculation of the thermal potential is subject to the best guesses and assumptions of computer modelers, which are likely to have little correlation to actual conditions within a watershed.</p>	552, 557, 601, 602, 803, 809, 1307, 1601
Anthropogenic Impact	<p>A clear provision for a small allowance for additional human warming should be included in the guidance:</p> <ul style="list-style-type: none"> • Be explicit on whether temperatures can be warmed above numeric criteria (either species life-stage or modeled MLE), and whether this allowance can be added to any thermal potential estimate that includes irreversible human impacts. A very small allowance (e.g., 0.3/C) should be allowed above both naturally warm temperatures and above temperatures calculated based on an allowance for irreversible human impacts. • Provide a narrative qualifier to the species life stage (SLS) numeric criteria recognizing and allowing for natural conditions that may at times exceed the numeric criteria, that allows for a small incremental increase from human activities, and allowing irreversible human impacts. • Document and substantiate why the guidance assumes there is no capacity in waters anywhere in the Pacific Northwest for thermal loading of any magnitude. 	552, 556, 557, 558, 601, 602, 711, 811, 200, 203, 809, 818, 1130, 1160, 1300, 1306
Methods for Establishing Thermal Potential	<p>Estimating historical or natural thermal potential of a water body is fraught with conjecture and uncertainty.</p> <ul style="list-style-type: none"> • Require an analysis of historical thermal potential of each of the state’s watersheds is technically undemonstrated, will yield uncertain results, is very resource-intensive, and has limited relevance in today’s highly managed landscapes and rivers of the Pacific Northwest. • Present a reasonably scientific and implementation framework for meeting thermal requirements due to proposed decisions about irreversibility of impacts, thereby downgrading the support for the beneficial use or possibly eliminating the use. • Define exactly when historical time is being considered. • Accurately identify climatic fluctuations and included in the range of temperature standards. • Using natural river conditions as the starting point for thermal potential numeric criteria incorrectly assumes fish populations have declined solely due to surface water conditions of lakes and rivers. • Little or no reliable pre-settlement temperature data exists. • Historic records are irrelevant due to global warming. 	557, 558, 1202, 1303, 1100, 1200, 1160, 1400, 803

Comment Category	Summary of Comments	Comment Number
TMDLs	<ul style="list-style-type: none"> • TMDLs are not based on natural thermal potential but on an unknown portion of it. Consequently, a TMDL cannot be considered a valid substitute for a standard. More importantly, the critical step of TMDL implementation is distinct from the mandatory TMDL allocation process. Because implementation is a separate process, the TMDL is a soft target often lacking the regulatory strength needed to ensure timely compliance. This lack of direct EPA regulatory oversight makes the TMDL an inappropriate choice for a standard. Moreover, the law (i.e., the CWA), treats standard development differently from the TMDL process. • The water quality standards ought to guide TMDL development, and so should be established separately from the TMDL process. • EPA ought to specifically state that it will allow those streams re-listed due to noncompliance with the new temperature standards to have a completion date after currently listed waters for which no TMDLs have been developed. This will assure that new TMDLs for re-listed streams are eventually completed. • Already completed TMDLs should not be re-opened until new TMDLs are completed. 	1200, 1201, 31,1504
Only After All Feasible Steps	Site specific temperature standards derived through thermal potential modeling should be used only when “all feasible steps” to solve the problem have failed to produce the SLS numeric criteria.	1500-1502, 1508
Meeting Biological Requirements	<p>EPA should provide temperature guidance criteria that adequately reflects the biological requirements of salmonids:</p> <ul style="list-style-type: none"> • EPA should not undercut the biological needs of salmon. • Although the guidance clearly states the need for optimal thermal conditions for salmonids, it fails to present a solid scientific framework to achieve this result and does not provide a convincing argument for replacement of biological criteria with the proposed modeled thermal potential. • There is no analysis indicating that the implementation of the guidance will support sustainable salmon populations. EPA backs away from ensuring “optimal thermal conditions must be present in sufficient quantity and well distributed and connected throughout their range” by developing criteria based on a subbasin’s estimated thermal potential without requiring that these criteria reflect the biological needs of salmon and support the needs of beneficial uses as required by the CWA. • The failure of the guidance to delineate limits on the amount of human impact and deviations from optimal thermal conditions is a fundamental flaw. • The guidance is based on the assumption that “irreversible thermal effects” could be accurately quantified and accounted for in order to refine predictions of a historic temperature regime into a basin’s present “thermal potential” even if the resulting thermal potential was clearly in excess of the temperature requirements of salmonids. • Industrial dischargers, landowners, and others with strong economic incentives may purchase the “scientific expertise” necessary to “prove” that the thermal potential of a given waterbody is dramatically higher than current water temperatures or temperatures necessary for salmonid survival. 	818, 1200, 1202, 1504

Comment Category	Summary of Comments	Comment Number
Approach to Modeling	<p>The technical challenges of developing water temperature standards through modeling based on thermal potential are daunting:</p> <ul style="list-style-type: none"> • The development of thermal potential numeric criteria is likely to go on for years. • There is no convincing argument that restoration to historic regimes will protect and preserve endangered species. • EPA should keep standards simple and understandable while providing multiple options for compliance. • EPA should develop and articulate more practical steps for assessing thermal potential, including watershed potential with respect to biological needs, to be implemented by others. • EPA should not use numerical modeling for establishing thermal potential criteria as it is too complex; instead, actual water temperature data should be used. • Modeling should not be required for streams that have not been thermally degraded by human activities. • EPA/states should conduct a series of pilot projects to perfect the methodology and evaluate its usefulness (this will be most useful when private entities challenge a state/tribe's decision on thermal potential numeric criteria). • A standardized temperature model for estimating natural water temperatures should be developed, tested, and accepted. EPA should involve stakeholder organizations in the review and selection of the standardized model. • Simpler methods, even if less precise, are needed to allow timely development of new criteria. • Some states and tribes currently lack the resources to develop models for setting temperature standards. The effort to establish new criteria should not hinder ongoing and future activities in restoring, improving, or maintaining existing beneficial uses such as TMDL development and implementation projects, ESA projects, and implementation of BMPs and associated monitoring. • Deciding that it is not practical to estimate natural thermal potential could provide a huge loophole to justify high temperatures and ignore causes of thermal pollution. 	1503, 1505, 1508, 552, 557, 601, 602, 600, 701,708 803, 809, 805, 807, 1160, 1001, 1300, 1303, 1304, 1308, 1402
Modeling Funding	Modeling should be funded through a public/private partnership with all levels of government together paying no more than 50% of the cost.	1500-1502, 1508
Modeling Oversight	<p>At a minimum, EPA should refer to the following modeling requirements:</p> <ul style="list-style-type: none"> • Model history: This history includes an independent technical review of the model selected to help develop a lineage of validation. • Model validation: This step, or the sensitivity analysis, helps ensure the appropriateness of applying the model to a given location. • Model verification: This step addresses whether the model programming is accurate. • Data input: This step helps to insure quality data. Model output is only as good as the input data. Therefore, it is critical to have specific guidance on the quality required for the underlying input data. 	603, 1200
Modeling Testing Required	Site specific temperature standards derived through thermal potential modeling should be used only when the model has been tested and validated.	603, 1500-1502

Comment Category	Summary of Comments	Comment Number
Modeling Approach	<p>The guidance should be permissive rather than directive on the use of modeling to set water quality criteria and the requirement to model all waters should be eliminated. This is particularly true in lower main stem rivers which have significant human alterations, as the modeling in these areas would be most likely to have a potential for notable errors.</p> <p>Clearly allow states to use modeling to revise the criteria, to set alternative targets in TMDLs, or to determine natural conditions as part of the 303(d) listing process when feasible.</p> <ul style="list-style-type: none"> • The scientific literature supporting the application and biological relevance of SLS criteria for salmonid protection is more extensive than that for physical modeling on a stream system basis. • From a practical standpoint, numeric criteria are also more easily incorporated into current CWA programs, and are familiar to the public, and state and tribal governments. Most importantly, the focus of temperature restoration is and properly should be on the salmon. • It may not be appropriate to apply the SLS criteria to every point in a stream. There are, however, options that address this situation, which were not adequately explored during development of the guidance. These narratives could emphasize the need for cold upstream waters, restoration of instream flows restoration of wetlands, conservation and restoration of cold water throughout the basin, and the critical need to reduce thermal loading from non-point in addition to point sources. Other narratives could also be included that address the use of site-specific criteria. 	1130, 1200, 1201
Modeling Approach	<p>Unproven modeling methods should not be placed in guidance. New approaches to modeling temperature should be proven superior in performance and cost-effectiveness prior to being placed into regional guidance. EPA would be free to add probabilistic modeling to the guidance at some future date if it can be proven to be a valid and workable alternative. While a case study is currently being conducted, it is only a small portion of a sub-basin and doesn't represent the scale at which the modeling and multiple lines of evidence (MLE) approaches are to be applied in the guidance. Thus, it is not a good test of the approach. The existing modeling on temperature currently used by the states is effective and defensible. There is broad support in the scientific community for the approaches that are currently being used. This was hard-won support. Probabilistic modeling is far more complex and difficult for non-modelers to understand. As we learned with trying to apply monte carlo analysis for human health criteria applications, the education and trust-building curve for this type of modeling is very high.</p>	1130, 1511
Modeling, Uncertainty, Multiple Lines of Evidence	<p>Uncertainty with other multiple lines of evidence parameters cannot be quantified. The best we will typically be able to say is where species are known to occur, where and when they are suspected to occur, and if there is any temperature data and whether it was taken during a warm weather period. Thus we believe that the potential uncertainty with these lines of evidence can only be very generally described, not quantified.</p> <p>A discussion on the process needed for an adequate analysis of the multiple lines of evidence should also be included. The application of multiple lines of evidence to reconcile uncertainty associated with the proposed modeling effort presents concerns due to the potential for misuse. Although the use of multiple lines of evidence is good practice in science, EPA fails to provide criteria for conducting this analysis. As a result, problems may arise as a result of subjective interpretation of the data. For example, the uncertainty analysis could potentially be used to delay implementation of the guidance or to set sub-optimal thermal thresholds.</p>	816, 1130, 1200

Comment Category	Summary of Comments	Comment Number
Modeling, Approach	The natural thermal potential modeling approach will make it very difficult to model without first determining the population statistics (e.g., type of distribution, its April 12, 2002 mean, and its standard error) for the model input parameters (e.g., shade, channel form, flow etc.). This will put the state in the position of needing to determine and defend the chosen distribution for each input parameter, which is much more challenging than defending a reasonable selection of static model parameters. EPA should fund several demonstration project to evaluate robust approaches to estimating an array of sub-basin specific thermal potentials across a representative rang of landscapes in Region 10 prior to the acceptance of any thermal potential numeric criteria submitted by individual state or tribal entities.	558, 559, 1130, 1509
Modeling Resource Intensive	EPA's proposed modeling process is time consuming, complicated, and resource intensive for an unproven process. The process proposed in the guidance appears to unnecessarily detract from the need for biologically based protective standards and basinwide, on-the-ground watershed restoration activities both in the interim and long term. It is also unclear whether the modeled thermal potential values have more or less scientific uncertainty associated with them compared to the species life stage criteria. The lack of financial resources to the tribes would prohibit implementation of the standard.	31,1200
Modeling	Development and adoption of thermal potential numeric criteria assumes it can be verified using experimental science methodology. Computer modeling is not science and we disagree with Region 10s use of multiple lines of evidence and modeling. EPA should only allow lines of evidence based in science. EPA should look at the pros and cons of statistical modeling versus mechanistic modeling.	800, 802
Modeling, rainfall conditions	The use of median temperature and rainfall conditions for natural thermal potential (NTP) modeling is inappropriate. Consideration of NTP under more extreme conditions would be a more useful characterization of stream thermal regimes.	603
Modeling	The guidance relies too heavily on temperature modeling rather than what species actually need to develop and survive.	708
Modeling, Approach	Reasonable estimates are easier to defend. States should not be forced to incorporate unreasonable estimates of input parameters in temperature models. Our existing modeling process uses realistic assumptions on the ranges for input parameters to use in the models (e.g., stream width, shade, depth, flow, bed roughness, color, etc). By selecting reasonably likely values we are able to use existing models to produce defensible estimates of potential stream temperatures. Our potential model error is defined by comparing predicted temperatures to observed temperatures under different seasons and flow conditions. It is also not artificially inflated by trying to account for the entire range of possible input parameter values.	1130
Develop Thermal Potential Numeric Criteria Promptly	Thermal potential numeric criteria need to take primacy over SLS numeric criteria. Thermal potential numeric criteria need to be developed promptly in an objective and scientifically sound way. Such development should be done in full partnership with local scientists and watershed councils. The Pacific Northwest should not be regulated through the TMDL process using unreasonable standards.	603, 558, 1450, 1624

Comment Category	Summary of Comments	Comment Number
Human Caused Changes	The guidance should recognize and allow for human caused changes with environmental benefits (beneficial warming and water coverage during the egg incubation period due to dams; cooling from dam outflow, irrigation replenishing groundwater, flood control).	1300, 1452, 1604
Thermal Potential Supported Above SLS Numeric Criteria	Adopting thermal potential numeric criteria based on and estimate of the thermal potential of rivers and streams within a subbasin or main river stem is supported as a better approach to setting standards than applying a one-size-fits all criteria across the landscape if it can be made less onerous on the states and tribes. Estimates of thermal potential numeric criteria should recognize a wide range of natural variability driven by climate conditions and pulse disturbances associated with ecosystem function.	558, 1450, 1624, 1160, 1607
Minimum Standard	<p>SLS should be adopted as criteria and used as the minimum standard.</p> <ul style="list-style-type: none"> • Thermal potential numeric criteria which differ from SLS numeric criteria should only be accepted if they provide even more optimal temperature regimes for the species in question. • Sources responsible for the thermal potential that is higher than the SLS numeric criteria should be committed to bring those thermal adversities down to meet salmonid needs and the extra amount of resources needed to make that happen should not be a factor in achieving those ends. 	1503, 1506, 1507, 1512
TMDLs	<p>Thermal potential numeric criteria should not be expressed as part of a TMDL:</p> <ul style="list-style-type: none"> • TMDL implementation has historically not been reliable. • Because of the slow pace of TMDL approval, adopting thermal potential numeric criteria during the TMDL process would delay implementation. • Thermal potential numeric criteria developed under a TMDL is likely to be under-protective of salmonids 	1503-1506, 1508
TMDLs	<p>EPA should have thermal potential numeric criteria expressed as part of a TMDL:</p> <ul style="list-style-type: none"> • The TMDL process provides the detailed analysis needed for establishing thermal potential. • If thermal potential numeric criteria is expressed as part of a TMDL, EPA should be explicit in how this will occur. • The temperature standard must be considered within the context of TMDLs, which requires TMDLs to be developed on realistic schedules. • States should establish water quality standards and use the TMDL's required of waters in violation to do the detailed analysis of the appropriate temperature and means to achieve it. • Temperature modeling could then be used to simulate thermal regimes, estimate feasibility of improvement and other variables to identify most effective measures for temperature improvement. Continued monitoring of temperature and biological response would then be used to evaluate the effectiveness of the measures selected on modifying temperature conditions. 	803, 810, 1304, 1306, 1308
TMDLs	Thermal potential numeric criteria should not be expressed as part of a TMDL as TMDL development has historically been extremely inefficient and litigation saturated.	800, 802

Comment Category	Summary of Comments	Comment Number
TMDLs	Irreversible anthropogenic causes of temperature increases should not be identified when identifying thermal potential numeric criteria. The most appropriate time for identifying the causes of non-supported beneficial uses and criteria exceedances should be during the development of a TMDL (or similar) problem assessments or implementation plans.	1160
Pilot/Success Studies	<p>The guidance should reference scientific studies that have evaluated the potential for implementation of a potential thermal regime to serve as a successful tool for determining temperature standards.</p> <ul style="list-style-type: none"> • Have other states/regions based water quality standards on a potential thermal regime or historic thermal regime? • What is the confidence for a major river to be accurate? • No government entity has implemented a strategy such as the one proposed. • EPA should ensure the lessons learned from the Klamath Project are incorporated into the guidance. • EPA and states may want to review analyses of current and past TMDLs to better understand benefits, locations, limitations and failures in mitigation and modeling efforts. See “A Review of the Teanaway Temperature TMDL”, Montgomery, Watson and Harza. Studies such as this can provide insight as to the most efficient mitigation measures and the cost benefits of alternative mitigation measures. 	804, 1504, 1606
Ecosystem Function	Recognition of the importance of restoring watershed processes such as in-stream flows, control of sediment delivery, riparian restoration, reconnection of floodplains, and wetland restoration as indicated in issue paper 3 would provide critical direction for thermal restoration.	557, 1200
Natural v. Historic	It is important to distinguish natural and historic thermal potential from thermal potential numeric criteria. Thermal potential numeric criteria should be redefined as “the natural and expected thermal cycle of stream defined by it’s geographic location, topographic location above sea level, and seasonal climatic variations due to local land mass influences.” EPA should establish 303(d) listings on a tiered system as suggested by the National Academy of Science.	800, 802
Historical Conditions	<p>Historical conditions should be used as the baseline which to establish conditions for thermal potential numeric criteria:</p> <ul style="list-style-type: none"> • Where “thermal potential” is defined as the “estimated thermal regime after all reversible anthropogenic sources of heat are removed,” the inclusion of the term “reversible” is inappropriate and unacceptable. • Conditions without anthropogenic degradation provide the most accurate “compass” to ensure viable thermal conditions are met. • Historical temperatures should not be estimated at key seasons, but be based on year-round historical data, reflecting the salmonid life cycle and food source needs. 	1506, 1507
Scale	We support establishing temperature criteria that are applied on a subbasin (4 th field USGS hydrological unit code) basis. The guidance recognizes the need to model that natural or historical thermal potential on a subbasin scale but then fails to recognize that thermal numeric temperature standard criteria needs to be developed on a subbasin scale as well.	1450, 1624, 1100, 1160, 1605, 1612, 1619

Comment Category	Summary of Comments	Comment Number
Scale	When assessing thermal potential, all tributaries and each individual stream/reach that comprise basins and main stem river systems should be assessed because of the use of these specific areas by salmonids and other organisms that are involved in the food chain; and because of low population level of certain species can still have in place the methodology needed to assess whether or not the thermal regulation criteria needed is there.	1507
EPA Review	EPA's acceptance of procedures to establish thermal potential numeric criteria rather than review final thermal potential numeric criteria is inappropriate.	1506
Irreversible Human Impacts	EPA should replace "irreversible anthropogenic thermal increment" with "practically irreversible anthropogenic thermal increment" to consider modern realities.	805
Irreversible	Thermal potential should include some level of irreversible human impact, but only if necessary.	1508
Characterization of Optimal Habitat	Even after modeling the thermal potential and rectifying conflicting lines of evidence, states would need to go through an exercise to characterize the amount of optimal habitat that would be available. It is not clear how this requirement would really be used, or what value added it provides. We believe it should be removed from the guidance as it suggests that if the characterization numbers do not look good then the state must not have modeled or rectified conflicts appropriately.	1130
Approach	Thermal potential should not be used as a basis for setting numeric temperature criteria. Rather, it should be used to establish where species/life stage thermal boundaries occur in the drainage basins; evaluate whether exceedances of use-based criteria are due to natural or anthropogenic causes; and set goals for water quality management plans.	558

Comment Category	Summary of Comments	Comment Number
Approach	<p>EPA should provide better direction as to how thermal potential is established.</p> <ul style="list-style-type: none"> • Application is fundamentally flawed because it assumes that our current estimates of thermal potential are equivalent to the historical conditions that once supported salmon life-history stages. Yet EPA does not provide convincing evidence that the models currently available, applied to a highly modified basin, predict equivalent thermal conditions. The modeling process described in Appendix B is speculative and lacks independent scientific confirmation and support. • Due to alteration of the watershed through construction of dams, removal of water for irrigation, urban and agricultural development, waters that appear naturally warm may in fact have historically been cooler. Moreover, the range of options available to salmon when confronted with naturally or anthropogenically-warmed water has narrowed due to loss of habitat features such as cold water refugia, flow, and habitat connectivity. Thus an analysis of the physiological and physical requirements of salmonids that shape the desired thermal regime, should be conducted with full consideration of changed watershed conditions, particularly when addressing the issue of naturally warm waters. • Estimates, as well as estimating natural or historic thermal potential, should reflect a wide range of variability which has occurred through time. • Criteria should be assigned on a sub-basin scale and by land-use activity and reductions assigned to each land use. • Geographic distribution, including geomorphic characteristics, such as shallow ground water and stream depth, and geographic location variables such as latitude and declination of a select species should be considered when assigning the range of threshold values (i.e. in Idaho the same species such as Bull Trout and Redband Trout occur from the moderate maritime influenced climate to ta more extreme desert climate in the Owyhee region). 	1200
Anthropogenic Impact	Thermal “potential” should accurately portray the thermal regime that existed before Euro-American settlement. Also, the problem with the thermal potential approach as defined is that it only accounts for actual heat inputs, and does not take into consideration decreased vegetation, decreased flows in summer, the impact of dams, etc.	1201
Watershed Based Approach	The approach in the guidance focuses too narrowly on thermal potential rather than on system potential. System potential acknowledges the complexity of watershed processes that influence temperature. Such an approach would accommodate the role of natural disturbance and will improve the accuracy of numeric criteria.	810
Limited Outcome	The proposed modeling process appears inflexible to scientific developments in the area of thermal modeling. As a result, the final basin-wide thermal regime could very likely be comprised of individual estimations of thermal potential of varying scientific quality.	1200
Methods for Establishing Thermal Potential	It is more efficient and technically credible to estimate the temperature improvements that can be gained through restoration actions than to attempt to estimate historical conditions. Such an approach is also likely to encourage more rapid implementation than the use of historical conditions.	1100
MLE	The guidance needs to more clearly state how multiple lines of evidence should be used by the states.	1307, 1503

Comment Category	Summary of Comments	Comment Number
New Science	EPA should explain the process for incorporation of new scientific information on temperature, salmon and modeling of the physical processes that impact thermal regime.	1200
ESA Consultation Expectation	EPA should clarify its expectations regarding its ultimate temperature criteria review and whether ESA section 7 consultations will be required for each subbasin standard, whether states and tribes express their criteria as narrative or numeric criteria, or a combination of the two. If federal agency ESA consultation is required for each thermal potential numeric criteria developed by subbasin, states and local agencies will likely not pursue establishing thermal potential numeric criteria.	1100
Sensitivity Analysis	If thermal potential numeric criteria is used, every thermal potential analysis should have a sensitivity analysis as an integral component to identify actions resulting in the greatest temperature reductions.	1306
Conflicting Lines of Evidence	No clear methods have been provided for determining how to rectify the many conflicting lines of evidence that would be expected in an actual sub-basin. Our preference is to use the centrist prediction of the best proven modeling methods available to set alternative targets where the SLS criteria cannot be met. A comparison with the lower confidence level of the model estimate of potential temperature is the primary method recommended in the guidance for reconciliation of conflicting information. The probability that the model error will always be on the high end, thus always assuming the water may have the potential to be as cool as the lower bound estimate, is a biased view of error estimation. The bias in this MLE rectification process is compounded by two incorrect assumptions being recommended in the guidance.	1130
Maximize Flexibility	We support maximum flexibility regarding the ultimate form and expression of temperature criteria. EPA should enable the states to express thermal potential numeric criteria as narrative or site-specific criteria.	1100
Natural Conditions	The phrase “while allowing some waters to be warmer than optimal thermal conditions” (page 3, last paragraph) should be attributed to natural warmer conditions and not conditions anthropogenically affected.	1507
Natural Thermal Potential	Natural thermal potential should reflect the state of the system prior to anthropogenic effects of Europeans, etc.	1507

Comment Category	Summary of Comments	Comment Number
Rangeland Systems	<p>Forest and rangeland systems should be treated separately. For the development of thermal potential numeric criteria in rangelands,</p> <ul style="list-style-type: none"> • Establishment of fish populations should start with measuring current conditions of “spatial and temporal variability.” • Rather than looking at historical thermal potential, EPA/states should establish a baseline for conditions currently known to sustain fish populations. If management impacts are suspected of degrading stream quality, then scientific tests can be conducted to determine whether mitigation of impacts will improve habitat for return of fish populations. Modeling should only be used to identify potential areas of concern, not to specify thermal numeric criteria. • Establishing multiple lines of evidence is problematic where few historical measurements exist and few reference conditions or pristine streams exist because of fire suppression efforts. Actual thermal variability relative to today’s conditions and the normal and natural thermal variability within a state or region should be acknowledged (i.e. invasion of western juniper; fire suppression). • Modeling of thermal potential numeric criteria should be calibrated and validated. • Thermal potential numeric criteria should be flexible to include new scientific information; adaptable; and include the stakeholders who will be affected. • There is no statistical justification for inferring that habitat parameters (such as temperature compliance criteria) from laboratory fish response data are applicable to rangeland fish. 	1302
Recovery Target	EPA should specify how it will determine if waters have met optimal water temperatures or “recovery targets”, which EPA defines as waters that would support “sustainable and harvestable levels of salmonids.”	807
Reversible Human Impacts	Reversible impacts should include the removal of streamside vegetation, which formerly provided shade and protected the stream channel (e.g., stream depth, width, etc.).	1100
Scale	EPA should consider simplifying the development of natural thermal potential by using a larger-scale approach than the subbasin level for estimating natural water temperatures.	1304
SLS/Thermal Potential Replacement	Why do the potential numeric criteria replace the species-life-stage criteria? If the potential numeric criteria do not meet the species-life-stage criteria, what is the benefit and how are salmonids protected?	1201
Thermal Potential Should Be Used as Management Tool	EPA should explore thermal potential modeling as a management tool. Because of the uncertainty associated with current estimates of temperature and our inability to model critical physical processes connected to temperature, we recommend a more conservative approach for the temperature guidance. At this time, we feel that it is more prudent to use modeled thermal potential as a management tool than as a means to set numeric criteria that would become the final goal for each stream reach. For example, modeled outputs could be used to describe expected changes to thermal regime from specific land based restoration activities. Physical processes not included in the model but critical to stream temperature (such as connectivity to floodplains or groundwater or hyporheic flow) can be addressed through other measures such as narrative statements in the guidance.	1200

Comment Category	Summary of Comments	Comment Number
Postponing Salmon Protection	The search for subbasin specific thermal potential numeric criteria will enable the ongoing argument regarding what water quality protection actions are “feasible” and how much protection should be given to beneficial uses to continue and further postpone salmon protection and on-the-ground improvements.	1202
Modeling, Uncertainty	Model uncertainty bounds are likely to defeat the multiple lines of evidence concept. In the use of a probabilistic model some statistic must be selected for defining the range of uncertainty. The draft guidance does not suggest an interval, but a 90th confidence interval was discussed in the workgroup meetings. The selection of the specific confidence interval is likely to be very important. If, as we suspect, the use of a probabilistic model often produces an exaggerated range of uncertainty, then the selection of a very high confidence interval will make comparison with the SLS criteria typically a meaningless exercise. Most of the time the criteria would likely be within the range of the confidence interval and thus by default be assumed to be attainable within the watershed. This also reinforces comments that are made in the following section on why more work needs to be done to ensure the SLS criteria are fully necessary and defensible.	1130
SPECIES LIFE STAGE NUMERIC CRITERIA		
Optimal Temperatures	<p>We know of no legal mandate within the CWA to provide optimum habitat conditions:</p> <ul style="list-style-type: none"> • The CWA only requires that designated uses are protected. • It is a questionable policy choice to promote management for such conditions given EPA’s admission that temperature conditions were rarely—if ever—optimal anywhere at any historical time. EPA should avoid the common assumption of “cold thermal conditions that historically existed” without substantiation with empirical measurements from historical periods. • From a technical point of view, optimal temperatures for species survival may be sub-optimal for growth—and actually harmful for co-existing warm water fish species and broader association of aquatic organisms.. • SLS numeric criteria are too low as they fail to adequately account for the overall effects of variable temperature regimes on the health of the aquatic ecosystem. • Similar to water quality criteria for other parameters, temperature criteria should be set to prevent harm and provide tolerable conditions, not optimal conditions. • The guidance should set forth how states may establish variances, site specific conditions and special conditions for human uses and natural variability based on the natural frequency distribution of the stream, or what is necessary under 303(g) and 316(a) of the CWA. • “Optimal” implies a single temperature range that ignores natural variability in space and time. • Optimal conditions do not recognize geoclimatic differences among water bodies in the Pacific Northwest. 	1101, 1300, 1309, 552,553, 555, 557, 558, 560, 562, 565, 601, 602, 701, 800, 802, 803, 809, 807, 1400-1402, 1302, 1307, 806

Comment Category	Summary of Comments	Comment Number
Unrealistic/ Unattainable Criteria	<p>The proposed interim criteria are so low that “natural” streams will be in violation.</p> <ul style="list-style-type: none"> • These temperatures may be optimal for salmonids, but in order to be credible, water quality criteria must be achievable in the streams in which they apply. • The imposition of a single set of numbers to all waters at all times does not make technical, ecological or programmatic sense, and is unreasonable. States should be allowed to establish criteria more suited to their geography and climates. • If “natural” streams violate these criteria, the listing of “impaired” water bodies will significantly increase under CWA Section 303(d). • The proposed water temperature standard criteria are developed for pre-dam conditions in the Columbia river. The water resources development of the Columbia River system pre-dates the CWA of 1972. • There is no evidence that actual river and meteorological conditions were considered in setting SLS numeric criteria. • SLS numeric criteria were exceeded before the dams were built (see modeling data and early Rock Island Dam (1933-1941) and Bureau of Reclamation data). • In looking at multiple lines of evidence to develop thermal potential numeric criteria, the historical or current presence of salmonids should not be a basis to assume that SLS numeric criteria have been met in the past and should be used as the current thermal potential numeric criteria. • Temperature standards should reflect reachable goals taking into account the natural conditions of high ambient temperatures and solar heating of the water and surrounding stream beds, low water flow years, and the natural lack of stream bank vegetative canopies. • Avoid forcing land managers and producers investing unnecessary time and resources to attain unreasonable, unattainable goals. • Readily available data since the 1950s show the mainstem Snake River and most of its tributaries have historically been “warm” especially in July and August with mean temperatures exceeding 19° C during those months. • Temperature criteria that propose a single number for a stream segment are not reflective of what fish “naturally” encounter. 	36,57, 69, 87, 155, 530, 542, 1305, 1101, 1160, 1000, 1100, 36,57,58,66,69,7 2, 87,119, 163, 179, 182, 515, 523, 525, 530, 532, 552, 557, 601, 602, 600, 701-703, 707, 708, 800- 803, 805, 806, 808,809, 812, 1001, 1300, 1301, 1302, 1400-1402, 1452, 1605, 1609, 1610, 1614, 1620
Optimal Temperatures	<p>EPA’s guidance requires “optimal” water temperature conditions beyond those needed to protect salmonids. EPA’s pursuit of optimal temperature conditions is unjustified by legal, policy, and technical considerations. Biological risk should be managed by minimizing negative impacts, not by optimizing water temperatures. EPA should explain better why all streams and all stream miles need to have optimal water temperature conditions for the most limiting fish. EPA should examine the heat shock protein research of Weber et al. (2001) in the context of exposure duration.</p>	1160, 552,554, 557, 558, 601, 602, 803, 809

Comment Category	Summary of Comments	Comment Number
Optimum Temperature Range	<p>There is no biologically relevant justification for setting SLS numeric criteria at the warm/upper end of the optimum temperature ranges:</p> <ul style="list-style-type: none"> • The threat is not that temperature regimes will get colder due to further anthropogenic disturbances. The guidance should be revised to recommend life-stage specific temperature maximums from the cold end of the optimal ranges for all guilds. • This allows no margin of error and does not meet biological requirements of species nor the requirements of applicable federal laws. • This is not appropriate for species designated as threatened or endangered; any further increase beyond the upper end will have a negative effect on listed species, resulting in a “take.” • Criteria, which are already set at the warm end of the spectrum, can be legally exceeded according to state water quality standards. • setting criteria at the upper end of optimal thermal range will not meet ESA requirements for designated critical habitat, whether it is occupied or not. 	1503-1505, 1509
Char/Bull Trout	<p>12° C appears too low for migration and other bull trout needs:</p> <ul style="list-style-type: none"> • EPA should follow Washington’s lead and eliminate the water temperature criteria for migratory populations of native char as it is not based upon sound science. Alternatively, EPA should not apply the proposed char migratory population criteria to those waters in western Washington where anadromous and estuary-using forms of native char are or may be present. • 12° C would relegate bull trout to sub-optimally cold temperatures in many streams much of the time. • The criteria should be 13° C maximum weekly mean temperature and the acute-threshold temperature shall not exceed 20° C (1400) 	554, 558, 564, 1300, 1304, 1307, 1400, 1402
Char/Bull Trout	<p>EPA’s guidance for temperature limits for char salmonid egg incubation is set too high at a single daily maximum temperature of 12° C. Prior EPA documentation states that the optimal egg incubation temperature for bull trout is 2-6° C.</p>	1503, 1506
Determination, Overprotective	<p>The SLS criteria are overly protective:</p> <ul style="list-style-type: none"> • The SLS criteria should defensibly be set at the warmest levels that will fully protect the resource. Taking this perspective would more likely result in politically and technically defensible criteria, and result in potentially fewer water bodies being placed on the 303(d) list. Any water body that doesn’t need to be modeled saves the state resources that can be used to support other important environmental programs. • EPA should place more careful thought into converting laboratory study results. We are concerned with the way the laboratory research that spanned entire life-stages was converted into one-week averaging periods. We think that such generalizations may be overprotective and need to be examined more thoroughly. We recommend a process by which constant test temperatures producing the desired outcome (full protection of incubation or maximal juvenile growth) are treated as long-term mean temperatures, and then the statistical relationship between that seasonal average and a shorter duration metric (e.g., 7-DADMax) established. • We strongly believe the laboratory and field research point to a warmer criteria as being adequately protective of char. Our current estimate is that juvenile bull trout rearing will be fully protected at a 7DADMax of 13° C rather than the 1DMax of 12° C recommended in the guidance. 	821, 1161, 1130, 1307

Comment Category	Summary of Comments	Comment Number
Overly conservative	<p>EPA's process for selection of SLS numeric criteria is based largely on cautious and conservative policy ("estimates of upper optimal physiological temperature preferences" that "represent temperatures above which adverse effects are more likely to occur") rather than on technical and scientific analysis. EPA should:</p> <ul style="list-style-type: none"> • Provide a specific definition of an "adverse" threshold physiological effect. • Provide a specific definition of those conditions that it assumes constitute the threshold for when "adverse effects are more likely to occur." • Conduct a risk assessment approach to setting temperature criteria for various species and life stages using the same methods as Sullivan et al. (2001). If EPA disagrees with the use of such a risk assessment approach, it should provide a rationale and explanation for its disagreement. • Allow that a case-base-case allowance be made to liberalize criteria where it can be clearly demonstrated that native/desirable species are not being impacted by the temperature exceedance (i.e. southwestern Idaho redband trout). 	1160, 552, 557, 601, 602, 803, 809, 813, 814, 815
Adaptation	EPA should consider that salmon have adapted to warmer temperatures. Elevated temperature that salmonid can tolerate increases with increasing acclimation temperature (the temperature of water fish are living at prior to exposure to elevated temperatures).	701, 555, 816, 1305, 1452
Reference Streams	EPA's guidance does not make adequate use of available water temperature data from reference streams. Pristine and/or wilderness streams should be used as guidance to more accurately establish temperature standards.	552, 557, 601, 602, 707, 803, 809, 806 1160, 1507, 1605
Primary Temperature Standard	EPA should adopt the SLS numeric criteria as the primary temperature standard.	1500-1502, 1622
Beneficial Uses	<p>Setting temperature standards for fish under the assumption that cold is better is not supported by the scientific literature. Studies of fish growth and species distribution show that the range of temperatures at which growth occurs is generally wide, and that it usually reflects the ambient temperatures likely to be found within the natural range of the species (Hokanson 1977). The guidance improperly demands "optimal" conditions for a single designated use instead of broad protection for all uses. State water quality criteria must "protect" all designated uses. The narrow focus of the guidance on the guild of salmonids preferring the coldest waters, even where the same waters are used primarily by other guilds that prefer warmer waters, undermines all of the agency's recommended criteria to protect all designated uses, including other guilds.</p>	552, 553, 555, 557, 558, 560, 562, 565, 601, 602, 803, 809

Comment Category	Summary of Comments	Comment Number
Overlap of Beneficial Uses	<p>In waters where species-life stage uses overlap, EPA recommends the use of the colder of the multiple species-life-stage criteria that may apply. As a result, beneficial uses are not balanced and other SLS could be harmed by the colder temperatures recommended.</p> <ul style="list-style-type: none"> Revise the guidance on application of different SLS numeric criteria in situations where SLS uses overlap. Possibly use the risk assessment methodology on a community basis. By incorporating the full spectrum of temperature response for each (available) species, and overlaying the curves for all (available) species, perhaps a temperature standard can be determined that meets the needs of the community without excluding any particular species. In Idaho, since sturgeon and burbot are more temperature sensitive than salmonids in the Kootenai River, both SLS and thermal potential numeric criteria standards should be set to protect those species as well as salmonids. 	552, 557, 601, 602, 803, 809, 1160
Char/Bull Trout SLS Numeric Criteria Overly Conservative	<p>EPA's recommended SLS numeric criteria for bull trout is too conservative and should be revised to reflect experimentally-determined limits of stress under varying temperature exposure regimes. The current 12° C criterion requires optimal maximum-growth temperature 24-hours per day, 365-days per year. EPA should thoroughly review and incorporate the research findings of Selong et al. (2001) (maximum growth rates at 10.9-15.4° C) and Weber et al. (2001) (initial formation of heat shock proteins at 14° C) and revise SLS numeric criteria for bull trout to be less conservative and more realistic. EPA also should thoroughly review and incorporate the research findings of Weber, Costa and Selong (2000) on Chinook salmon and Lahontan cutthroat trout that describe threshold temperature for heat shock protein formation.</p>	1160, 552, 554, 557, 601, 602, 803, 809, 821, 1161
Char/Bull Trout	<p>The SLS numeric criteria for bull trout migratory population should instead apply to the migratory life state of both migratory and resident populations. This approach complements scientific research in that both populations occupy stretches of stream to be effected by these temperature guidelines. Bull trout numbers which are protective of juvenile rearing assume that the temperatures will have dropped to the necessary levels for spawning and incubation. This should be made explicit in the guidance and validated by further research and data collection.</p>	1500-1502, 1508, 1622
Optimal Temperatures	<p>The guidance demand "optimal" conditions for a single designated use instead of a broad protection for all uses. References to potential species and pre-settlement conditions should be deleted and uses should only include those present in a water body since 1975.</p>	602, 701, 702, 704, 707, 808, 809
Temperature Variability	<p>SLS numeric criteria incorrectly establishes water quality standards that fail to recognize natural variability</p> <ul style="list-style-type: none"> Temperature criteria should be reflective of natural differences in stream temperatures between upper and lower elevation segments of watersheds and between lower watershed first-order streams as opposed to upper-watershed, high-mountain streams. If downstream reaches must achieve optimal temperatures throughout the year, then upstream reaches will tend to be colder than optimal. Because winter stream temperatures vary considerably between years, salmonid populations include individuals that spawn early and others that spawn later. SLS numeric criteria fail to recognize a protective regime that acknowledges this variability in salmonid spawning behavior. The guidance ignores a given species' variations in habitat use. 	558, 1402, 1613

Comment Category	Summary of Comments	Comment Number
SLS Distribution	It is very difficult to determine the actual geographic distribution of species-life-stages, especially when seasonal and interannual variations of use are considered. State agencies have local expertise and knowledge. EPA should defer to states for developing methodologies for determining the presence of SLSs.	552, 557, 601, 602, 803, 809
Presence/Absence of Species	<p>The guidance needs to better explain what constitutes a reasonable potential for species to be occurring at a site.</p> <ul style="list-style-type: none"> • The present range of species is insufficient to support salmon survival and recovery and geographic area and timing of uses must be such as is required to maintain the species. Commonly used methods for determining fish presence are not reliable enough to provide the sole evidence for use designation. • Some discussion is needed to describe how the infrequent presence of a species or life-stage is to be used to set the boundaries for applying criteria and rectifying MLEs. Provide states with flexibility on where criteria should be applied - states need to balance a range of considerations including evidence of species presence, and the risk of not applying certain criteria in certain areas. It would be more helpful for EPA to simply describe factors states should consider when determining where to apply the various criteria. • Location and timing for discerning where there is a reasonable potential for the presence of species should support those beneficial uses dating to 1975, including the level of water quality necessary to support those uses, irrespective of the arbitrary determination of whether “there is a reasonable potential for that use to exist.” • Utilizing historic distribution of salmonids to provide estimated thermal conditions as the sole factor for biological distribution is not a defensible approach due to variable factors affecting salmonid populations such as large-scale pulse disturbance, habitat quality, climate conditions, migratory corridor conditions, and prey-predator relationships. • Waters available for potential anadromous salmonid use due to fish passage improvements as well as newly available waters to potential non-anadromous cold-water species should be identified. • All historically occupied areas should be included in those areas with a reasonable potential for species. • EPA needs to provide clear guidance that states must provide for the protection and restoration of cold water even in areas where salmonids have been extirpated, not just areas where there is “reasonable potential” for that use to exist. • States and EPA should be aware that occasionally salmonid juveniles will drop-out from a reservoir through a fish passage facility and may be present where they otherwise would not exist. • Where there is no historical data for species presence, anyone, including federal land management agencies can use unscientific criteria to subjectively designate specific stream reaches where there is a reasonable potential for species presence. • “Reasonable potential” does not comport with a recent 9th Circuit Court of Appeals decision determining that there must be more than speculation that species exist in a listed area in order to issue an Incident Take Statement. The guidance should support identification of species presence on the basis of maps, fishing guides and other practical methods. Otherwise, the application of SLS numeric criteria could be expanded to areas where there is a “reasonable potential” for salmonids to exist. • Any definition for “reasonable potential” should be superseded by site-specific knowledge of biologists familiar with the watershed. 	1130, 1503, 1504, 1505, 1506, 1306, 1302, 807, 704, 1613

Comment Category	Summary of Comments	Comment Number
Steelhead Smoltification	<ul style="list-style-type: none"> The statement that “steelhead smoltification thresholds . . . are expected to improve water temperature conditions in mainstem Columbia and Snake river migration corridors,” appears to contradict the statements made by EPA related to the effects of tributary temperatures on the Columbia in the context of the Columbia temperature TMDL. EPA should explain this contradiction. EPA should revise its recommendations to include criteria for steelhead smoltification used throughout a watershed, not just at the confluence of a tributary with the Columbia River (the text appears to suggest the 14° C criteria is only applicable at certain locations). Steelhead smoltification temperature standard should be reduced from 14 to 12° C given current salmon runs, EPA’s recognition that the 14° C standards is “expected to result in less than maximum growth during the peak summer period, and Dr. Dale McCullough’s analysis, “A Review and Syntheses of Effects of Alterations to the Water Temperature Regime on Freshwater Life Stages of Salmonids, with Special Reference to Chinook Salmon.” In Appendix A, fix the typo which incorrectly states that 14° C is equivalent to 64° F. 	1503, 1504
Manner of Stating Temperature Criteria	<p>Neither single daily maximum temperature or seven-day average of daily maximum temperatures adequately address the biologically relevant issues of the duration of daily maximum temperatures and of the variability of temperatures. If used, these points should be set conservatively low to account for duration of daily temperatures near maximums and for likely fluctuations in temperatures. Formulations on page 8 of the guidance should be revised accordingly.</p> <ul style="list-style-type: none"> SLS numeric criteria should be re-evaluated and expressed in terms of the mode as well as chosen from the cold-end of the optimal temperature ranges. Temperature monitoring should be required to determine daily and weekly temperature distribution and to determine the critical moments of the distributions The guidance should address the biological differences of exposures to temperature for varying lengths of time. EPA should establish a sliding scale duration factor (acceptable amount of time temperatures can be above the standard decreases as maximum temperature increases) to be used in determining if maximum temperatures are out of compliance. Any calculation of a weekly mean temperature should incorporate all daily temperature variations. The variation should be represented in a way that does not skew the resulting mean and represent the daily temperature regime. EPA should explain why weekly means for temperature have been added to the high seven-day rolling average criteria. 	1509, 1306, 1303
Presence/Absence of Species	<p>EPA should recommend a method similar to Eco-System and Diagnosis and Treatment (EDT) to estimate the historical spatial and temporal distributions of species. Local citizens and tribal and state fisheries biologists should be involved in determining if water temperature criteria should be modified to expand the temporal and spatial distribution of salmonids towards the historical spatial and temporal distributions identified in the EDT process.</p>	817, 1303
Presence/Absence of Species	<p>EPA should give states and tribes the discretion to determine the presence of a beneficial use. Species presence need to not be proven for every water body within a watershed in order to adopt criteria when salmonids are present in the watershed and there are no barriers preventing fish access to streams for seasonal use; however where it is well established that salmonids are not inhabiting a stream, even when contiguous with streams supporting salmonids, it should not necessarily be concluded that these contiguous streams have a reasonable potential for salmonid uses to exist.</p>	1402

Comment Category	Summary of Comments	Comment Number
Scale	SLS numeric criteria should not just reflect the characteristics of the subbasin guild, but the characteristics of each individual species in each individual stream. The most sensitive species in each guild in a stream/reach should be used as the indicator species for which to set SLS numeric criteria.	1503, 1507
Char/Bull Trout	<p>For char, spawning and incubations recommendations are lumped together with those for juvenile rearing. The maximum recommended spawning and incubation temperatures for char should be at or below 8° C and a separate recommendation for bull trout rearing should be established. The recommended summer temperature (not to exceed a single daily maximum of 12° C) appears to be too high. Similarly, spawning migration has rarely been documented to begin at temperatures above 10° C and the recommended daily maximum should not exceed 10° C.</p> <ul style="list-style-type: none"> • EPA should be cautious in moving forward with criteria for bull trout where there is uncertainty concerning temperature needs. • In order to provide listed species protection, EPA should promulgate optimal temperatures for bull trout spawning, incubation and juvenile rearing and require them to be applied when and where these life stages occur rather than using a single maximum temperature for all three and relying upon states to provide specificity. 	1503, 1505, 1509
Use of Median Climatic Year	To have a median of a range of temperatures does not reflect past conditions. We do not support the median climatic condition clause because it is not based on defined biological requirements and will be problematic to implement both before and after modeling a basin's thermal potential. We would rather see a simple reoccurrence interval, such as a once every ten years on average, or a reoccurrence interval determined to match the climatic cycles that tend to produce extreme year statistics.	1130, 1312
Metrics	The criteria should be simplified into a single metric, preferably a 7-DADMax value, and any metrics chosen should be able to be traced back to a duration of exposure that matches the research results for the life-stage.	558, 1130
Numeric Criteria	Prior to the establishment of thermal potential numeric criteria, current state standards should be left in place and not replaced with SLS numeric criteria.	806, 817
Guilds	EPA should place adoption of criteria for the moderately cold water guild on hold and apply the requirements for the Cold Water Guild to protect these uses in light of inadequate evidence regarding their thermal needs. As for cold water salmonids, separate temperature criteria for spawning and incubation is not needed since most human effects are not influencing temperatures in the fall and winter. Juvenile rearing temperatures for this guild would be more appropriately expressed as a weekly mean temperature of 20° C.	1503, 1402
Unrealistic Criteria	Historically some river reaches likely experienced temperatures higher than the SLS numeric criteria. However, salmonids historically had more options to deal with these higher than optimum temperatures, had more cold water refugia, and were not at the same risk.	1503
Too Complex	SLS numeric criteria based on each life stage for various char and salmonids would make point source discharge permits and the determination of actual criteria at a specific time and stream reach extremely difficult, cumbersome, and problematic.	701

Comment Category	Summary of Comments	Comment Number
Interim Status	The SLS criteria should only be interim if they cannot be met within a waterbody. Watersheds which can meet the SLS criteria without model-based criteria are fully protecting their aquatic resources. By treating the criteria as interim, the guidance discourages cooperators from implementing measures that may reduce temperatures.	1130
SLS presence	In documenting salmonid life-stage presence, the guidance should recognize and discuss the need to develop biologically and geomorphically appropriate methods for stream typing agricultural and urban lands, in addition to forested lands.	1509
SLS Numeric Criteria Applicable Conditions	If SLS numeric criteria are retained as enforceable interim criteria, EPA must set forth what conditions those criteria apply (e.g. streamflow conditions).	1100
Westslope Cutthroat Trout	The guidance should explicitly include westslope cutthroat trout in the discussion of SLS numeric criteria as a unique member of one of the two cold-water guilds, together with a statement of explicit life-stage numeric appropriate to the sub-species.	1509
Site Specific Data	The guidance should require that site specific data be collected prior to adopting the SLS numeric criteria. If states adopt SLS numeric criteria and then begins establishing TMDL's for temperature, the burden will fall on water users to establish thermal potential numeric criteria or to argue for irreversible anthropogenic impacts. States should bear the burden of setting correct criteria for each stream segment.	805
Omitting Key Species	The guidance does not specifically assign SLS criteria to non-anadromous coastal rainbow trout or to west-slope cutthroat trout. They belong in the guild with the salmon and steelhead.	1130
Risk Level of SLS Numeric Criteria	The Nez Perce Tribe refers to Idaho Department of Environmental Quality criteria for its temperature monitoring and cannot support any standards less strict than those. EPA should provide dates in conjunction with temperatures, even though they vary by region.	1201
Redband Trout	The proposed life-stage specific standard for redband trout is inconsistent with the protection of viable redband trout populations. McCullough reports incidences of disease under a maximum daily standard of 20° C.	1504
Presence of Beneficial Use	It is not clear how beneficial use designations will define when and where SLS and thermal potential numeric criteria apply.	1201
Specific Attention to Forests	Areas that are on National Forest lands should be included for consideration for species life stage designations.	1512
Salmonid Food Sources	SLS numeric criteria applies not only to the various life stages of salmonids, but also to the needs of salmonid food sources.	1507

Comment Category	Summary of Comments	Comment Number
Optimal Conditions	EPA's use of "upper limits for optimal conditions" is inappropriate and unacceptable. EPA needs to be more conservative when establishing temperature limits to ensure that water temperatures provide the optimal conditions for these species.	1506
Mistaken Research	Some key research was used incorrectly. For example, the Weaver and White (1985) research on bull trout did not test incubation success but only measured seasonal average incubation temperatures in natural redds. And Ebersole et al. (2001) found redband trout density declined above 16° C and reached zero at 24° C, and thus does not support the premise that redband are more tolerant of warm water than the other salmonid stocks. We would like to know how the guidance will incorporate such discoveries both before and after it is finalized.	1130
Migratory Life Stage	<ul style="list-style-type: none"> • Migratory life stage recommendations should be applied year-round to insure that temperatures for salmonid food sources are optimal and are maintained for year-round salmonid survival. This insures that out-migrating smolts, etc. will have appropriate food sources year round. • Creation of a single summer maximum temperature for waters used for spawning, etc. as a means to create simplicity for EPA is not in the best interest of the salmonids. This allows temperature exceedances because of the averaging throughout summer and endanger salmonids at that life stage. 	1507
Juvenile Migration	EPA needs to provide temperature guidance for juvenile migration.	1506
Insufficient Evidence for Criteria	The technical support for setting criteria to protect migratory adult and sub-adult char that have left their natal tributaries is not sufficient. Too many unanswered questions remain to conclude that temperatures that protect salmon and steelhead in these downstream waters are not appropriate for protecting migratory char populations (see attached paper on setting criteria for char waters).	1130
Flexibility	Appendix A, Section 1, Paragraph 3 states: "The numbers do not represent rigid thresholds, but rather represent temperatures above which adverse effects are more likely to occur." This language should be modified so that it does not create the potential for states to interpret the SLS numeric criteria as non-rigid.	1506
Failure to Consider Developing Science	<p>Interim criteria have no validity when compared to actual river temperatures and fish behavior. It appears that these criteria are based on lab studies or specific behavior focused studies. These criteria are over-generalized and fails to consider developing science, such as studies conducted over the last 10 years by Idaho Power. Such studies indicate:</p> <ul style="list-style-type: none"> • No evidence that Snake River fall chinook spawn timing is different from what it was historically • Temperature is not the sole predictor of spawning initiation • No evidence of pre-spawn mortality due to temperature within the influence of HCC operations • No evidence to support the theory that incubation timing and emergence have been prolonged or are now later than historically believed • Growth rates downstream of the HCC are not being adversely affected by water temperature below the HCC • The fall chinook spawning/incubation temperature ranges are too cold 	700, 701

Comment Category	Summary of Comments	Comment Number
Egg Incubation	EPA has failed to propose appropriate temperature limits for spawning, incubation and juvenile rearing for cold water guild. EPA's guidance for temperature limits for anadromous salmonid egg incubation is set too high at a seven day average temperature not to exceed 13° C. Prior EPA documentation states that the optimal egg incubation temperature for anadromous salmon is 6-10° C.	1506
Determination of SLS	<p>The SLS criteria is set at a level that has no basis in the law.</p> <ul style="list-style-type: none"> • In applying SLS-criteria, EPA could use a calculated percent of historic flow to create a multiplier that would allow the criteria to vary accordingly. Alternately, a combination precipitation and temperature multiplier could be used. The multiplier would only be applied after a given percent change in either flow or combined precipitation and temperature occurred. • Regarding EPA's question of how to apply the criteria in a way that recognizes natural temporal temperature variations, is that not the purpose of the thermal potential criteria? 	1201
Define Rearing SLS	EPA should better define, identify and quantify rearing SLS areas of a water body.	803
Current State Standards Adequate	The current Oregon temperature criteria should suffice as an interim approach in Oregon. Oregon's criteria already contain biologically-based temperature values that trigger requirements to develop TMPs, reduce current heat loads, and develop TMDLs in every subbasin in the state.	1100
Application of SLS Numeric Criteria During Interim Period	<ul style="list-style-type: none"> • The guidance does not provide direction on how the Species life stage criteria would apply during the interim period. The SLS numbers should provide a firm foundation for the interim as well as the long term. These numbers, as developed by the technical group, have meaning that is irrespective of annual climatic condition, TMDLs, or basin management plans. • The SLS criteria also provide reliable guidance for setting protective standards on a temporal and spatial scale. For example, stream temperature increases in a downstream direction, reaching temperatures in the upper end of optimum in the downstream reaches. As this increase in temperature continues, the life stage is extinguished in a downstream direction. The location of the upper end of optimum in this thermal continuum shifts upstream and downstream on an annual basis depending on climatic conditions. The lower distribution limit also shifts with climatic conditions. With anthropogenic disturbance, these limits tend to shift upstream, reducing usable habitat. SLS criteria should therefore be met at the known downstream extent of use in the near term. • If it is known how the full range of use varies annually with changing climatic conditions, the "full range of use" could become a sliding point in the stream system on which to assign the upper end of optimum. The observations for extent of use most likely have been influenced by a history of water quality degradation. The reasoning behind this conclusion is that observations of the downstream extent of use, if available, were probably conducted long after significant alterations in water temperature were already made. Therefore, what we consider the "full range of use" is probably underestimated. • Errors from expecting optimum conditions at the downstream extent of use might counterbalance underestimates of the geographic extent of use. As a result, there is justification for applying upper optimum temperatures at these locations in the near term. A response to not meeting the standard would be 303(d) listing, looking for remedies in an upstream direction, and restricting further anthropogenic thermal loading in a downstream direction. 	1200

Comment Category	Summary of Comments	Comment Number
Cold Water Salmonids	<p>EPA's cold water salmonid SLS numeric criteria are too low.</p> <ul style="list-style-type: none"> • Chinook salmon in the Columbia River spawn when the weekly mean water temperature exceed 15° C. • A separate temperature criteria for spawning and incubation is not needed since most human effects are not influencing temperatures in the fall and winter. • Steelhead smoltification are not based on adequate guidance and should be eliminated from the guidance. • The weekly mean water temperature should be 20° C for the Columbia and Snake Rivers and major tributaries. • For salmon spawning, rearing and adult smolting, 17° C should be the weekly mean water temperature and the acute-threshold temperature should not exceed 24° C. 	1402, 1400
Cold Water Salmonids	For spawning and incubation, the Idaho criterion is 9° C, but again that is a daily average, and so the given criterion would be just as protective.	1201
Bull Trout	EPA should review the Fish and Wildlife Service's Dec. 9, 1998 document "Bull Trout Interim Conservation Guidance", which contains pertinent information regarding bull trout and water temperatures.	1512
Risk Level of SLS Numeric Criteria	<p>SLS numeric criteria should be sufficiently strict and risk-adverse as most water quality standards will be based upon them in developing thermal potential numeric criteria.</p> <ul style="list-style-type: none"> • The burden of proof in the development and peer-reviewed validation of a thermal potential model should be placed upon parties arguing that the criteria are too stringent. • The guidance should be revised to reflect the need to consider sub-basin geomorphic complexity at hierarchical spatial scales in the specification of water quality standards. • SLS numeric criteria should be set towards the medium range of optimal conditions in order to have a greater buffer in reducing adverse effects to salmonids and insuring that brief periods of exceedances would not create ill effects. 	1509, 1507
Char/Bull Trout	Char salmonids, spawning, incubation, and juvenile rearing: the Idaho State criteria are 13° C for rearing and 9° C for spawning, but those are daily averages, and so the given criterion would be just as protective. Appendix A suggests a decline in temperature is needed following the start of spawning. A specific temperature value would be helpful here.	1201
Char/Bull Trout	EPA should base the native char temperature standard upon a 7-day average value, instead of a single day maximum value.	1304
Char/Bull Trout	EPA should provide temperature guidance for adult habitation of char salmonids. The char guild is a resident species and water of the appropriate temperature needs to be provided in areas that do not support spawning and juvenile rearing but do support resident adult habitation.	1506
General	EPA's temperature thresholds are based on research from non-desert climates in small tributary streams or "forestry-fish" related studies. This information is not applicable to the Columbia River or its climate.	1401
Basis of Interim Numeric Criteria	If EPA retains its recommendation that the biological numbers be adopted as enforceable interim numeric criteria, it should reexamine the numbers. EPA should also make clear the specific conditions for which those criteria apply (e.g. streamflow conditions). It is not necessary to apply numbers based on the "upper end of the optimal range" everywhere the use may occur.	1100

Comment Category	Summary of Comments	Comment Number
Additional Species Life Stage	Juvenile outmigration is a critical life stage for many stocks of fish, and should be considered if temperature standards are to adequately protect native and other desirable fish. While adult migration is specifically mentioned in the guidance as a life-history stage, outmigration of juveniles is not.	558, 1160
Adult Habitation	EPA should provide species life stage numeric criteria for resident adult habitation of moderately cold water salmonids.	1506
Adult Migration	<ul style="list-style-type: none"> • EPA needs to provide guidance that clearly states that the entire length of the adult migration corridor must meet the species life stage numeric criteria values as outlined. • The adult migration species life stage numeric criteria should be set at 12-14° C to protect the eggs inside a migrating adult female. Prior EPA documentation states that “temperatures above 13° C have also been associated with significant losses in eggs even while still retained unfertilized in the body cavity of female fish. . .” • EPA should clarify on page 16, paragraph 3, when it mentions periods of sub-optimal growth, that its adult migration criteria will support recovery of these threatened and endangered species. • EPA fails to make clear, unequivocal recommendations about how and when to apply the criteria in the field and to data and information that will be used for water-quality based regulatory processes. 	1503, 1506
Adult Migration	Adult Migration: Are steelhead kelts considered here?	1201
Anadromous salmonids and Char	We recommend temperatures not exceed 21° C maximum daily mean temperature where lower mainstem reaches are used exclusively as a migration corridor for the immigration or emigration of salmonids or char.	1400
TEMPERATURE MANAGEMENT PLANS		
Permit Mixing Zones in Cold Water Refugia	<p>The guidance improperly changes state/EPA rules regarding effluent limitations and mixing zones:</p> <ul style="list-style-type: none"> • EPA’s proposal to prohibit any warming sources in cold water areas, thus prohibiting mixing zones, seems contrary to recent case law which determined that state laws exempting mixing zones from compliance with water quality standards under the CWA was not itself a violation of the act. • EPA guidance must allow the use of mixing zones. • The guidance should not eliminate the current regulatory flexibility under existing mixing zone policies, variances, or TMDL development and implementation. • Most point source discharges have de minimus impacts on receiving waters. Therefore it is more appropriate for thermal discharges to be addressed during TMDL development analysis. 	600, 601, 701, 702, 704, 705, 807, 1300, 1307

Comment Category	Summary of Comments	Comment Number
TMPs Inappropriate	<p>TMPs are not an appropriate way for NPDES permitted sources to meet the SLS numeric criteria prior to the development of TMDLs. TMPs are a thinly disguised loophole from federal requirements that apply to NPDES permit holders and therefore would be inappropriate and illegal components of water quality standards should states adopt them.</p> <ul style="list-style-type: none"> • The entire TMP discussion should be removed. If not removed, EPA must resolve the fact that it has carved an exception in the CWA by creating a loophole for NPDES permit holders because responsibilities for thermal controls may be distributed more broadly to a group of polluters who are under no or little obligation to implement those controls. • Under CWA deadlines, it is clear that no compliance schedules are authorized to be included in NPDES permits for water quality based effluent limits. If schedules are necessary, they should last only for the time absolutely necessary and in no instance should extend past the NPDES. • EPA is rescinding its long-held position that water quality standards apply to non-point sources by indicating in the guidance that EPA has no authority over NPS and can only provide for their responsibility through a TMDL. EPA needs to take a more active role in controlling NPS thermal pollution, given that this is the most widespread source of degradation. 	1503, 1505, 1512
Blockage	<p>The guidance provides no data that suggests that a temperature of 70 F would block salmonid migration.</p> <ul style="list-style-type: none"> • Further guidance is needed regarding this provision where some background stream temperatures already exceed 70 F and current mixing zone rules already exist. • Data exists showing fish passage at temperatures above 21 ° C. • If not technically supported, this provision should be deleted and existing mixing zone rules/guidance should be used in defining the width of the mixing zone. 	701, 1300, 1306, 1307

Comment Category	Summary of Comments	Comment Number
All Feasible Steps	<ul style="list-style-type: none"> • More guidance is needed for determining what will constitute “all feasible steps” to reducing thermal loading in permits and how it will be applied across the states and tribes. An explicit and determinable definition of feasible steps and “undue economic hardship” and who will make these determinations must be provided in the Guidance. • The current definition is useless because it allows the permitting authority to use any defined or undefined description of “undue economic hardship.” • Economic concerns have no place in the establishment of state temperature standards in determining “all feasible steps” • Lack of clear definition of “undue economic hardship” allows discharges to claim that any significant measures to decrease temperature discharges are “infeasible” and state agencies lack the resources to dispute such claims (e.g. Oregon DEQ’s acceptance of the NPDES permit for Blue Heron Paper Company) • Changes should be cost effective. Page 4, paragraph 4, line 7 should state “. . . would require all feasible, cost effective steps . . .” • EPA needs to state clearly that all feasible steps includes the full implementation of current “best management practices” and “best available technologies.” Defining “all feasible steps” as only those steps which can be taken without “causing undue economic hardship, as determined by the permitting authority,” will open a plethora of litigation regarding NPDES permits and will perpetuate grave thermal harm to aquatic ecosystems. • EPA/states should not have the authority to decide what will cause “undue economic harm” - barring any quantifiable criteria and guidance - this would amount to nothing more than arbitrary judgement. • The guidance recommends adoption of a “provision in water quality standards allowing NPDES sources to comply with water quality based effluent limitation (WQBELs) derived from the SLS numeric criteria Numeric Criteria through a TMP”; however, setting permit limits based on technology that is chosen on the basis of whether it will cause economic hardship is not a WQBEL and offsets are not WQBELs. 	1503, 1506, 1130, 1201, 1500-1504, 1508, 1509, 1622, 1450, 1624
Common Sense Approach	<p>EPA should employ a common sense approach to lowering temperatures:</p> <ul style="list-style-type: none"> • The guidance needs to adequately emphasize that TMPs are a tool for addressing temperature issues rather than relying on historical command-and-control tools such as NPDES permits. • A basin-wide TMP approach works best. Prescribed temperature limits incorporated into NPDES permits may or may not result in actual lowering of stream temperatures. • TMPs should have a reasonable implementation schedule, especially for offsite mitigation actions, and permit long-term offsite mitigation measures. • EPA should set forth clear goals and objectives for TMPs based upon best available science (shade and buffer theory, water will cool with a canopy of trees, is utter nonsense). 	130, 603, 802, 1311

Comment Category	Summary of Comments	Comment Number
Broadened Prescriptiveness	<p>TMP and TMDL processes are inappropriately being used to reduce water quality protection obligations applicable to point sources, not to protect beneficial uses. In the event that EPA retains something similar to a TMP in its final guidance, EPA should to take a broader view of the potential utility of a TMP approach.</p> <ul style="list-style-type: none"> • TMPs should be applicable to both point sources and nonpoint sources subject to any restrictions established under state or tribal law to the contrary. It appears that states and tribes have the discretion to not regulate nonpoint source pollution. • TMPs can also be used as an implementation mechanism for criteria developed using thermal potential as well as the SLS numbers. • TMPs can serve equally well under either pre-TMDL or post-TMDL circumstances. Similarly, they may be useful following the adoption of final criteria. • TMPs need not be restricted to a description of planned, off-site point source offsets. The plans should include a description of the milestones (i.e., all feasible steps) that each agency or facility intends to take to reduce heat discharges and ultimately come into compliance with the temperature standard, as well as the targeted dates. • TMPs should focus on requiring better characterization of source contributions and on conducting sound engineering studies to identify options facilities can take to reduce temperature. 	810, 1100, 1130, 1202
Address Non-point And Point Sources	<p>The goal of the temperature criteria guidance is to present a temperature criteria that fully supports salmon beneficial uses. A logical approach to achieving the goal of establishing criteria that fully supports salmon beneficial uses, is to impress upon the states and tribes the need to eliminate or reduce all point and non-point pollutant sources that contribute to elevated temperature in lakes and streams. The temperature guidance criteria must, therefore, be structured such that CWA compliance through state and tribal water quality standard programs address all sources of temperature pollution. Concerns exist about the proposal to adopt TMPs that allow offsetting high temperatures at one NPDES source with reductions from other sources.</p>	810, 1200, 1201, 1307
Lethality Effluent Heat Limit	<p>The basis for the incipient lethal temperature limit (i.e. 77 F/25 C) is not supported in the guidance.</p> <ul style="list-style-type: none"> • Since multi-port diffusers and jet dischargers have the ability to rapidly mix effluent with the receiving stream and dissipate temperature, specifying the time of exposure is important. • We recommend that EPA specify the 77 F temperature as an acute value, which would apply at the edge of an NPDES permit defined zone of immediate dilution (ZID) (assuming there is a technical basis for the acute criteria). Where rapid mixing does not occur, the permitting authority should not need to specify a ZID and the 77 F temperature would serve as an end-of-pipe limit. • EPA should review WA DOE's work for a instantaneous lethal temperature above which no discharges would be allowed. Ecology's data in support of a 33 degree C standard and its application to NPDES permitting appears to be more defensible than the 25 degree C value proposed by Region 10. 	601, 603, 1300, 1306, 1307

Comment Category	Summary of Comments	Comment Number
Lethality Effluent Heat Limit Too Stringent	<p>The draft guidance indicates that one of the TMP provisions should be a prohibition of a lethal heat discharge (i.e. 77 F/25 C).</p> <ul style="list-style-type: none"> • Prohibiting lethality should be built into the criteria itself rather than be left to the TMP. A temperature limit should be established to prevent blocking fish passages. Since these two prohibitions are related to mixing zones, the guidance should clarify how these conditions apply within an appropriately defined mixing zone. • Is a quarter of the stream too large an area for a mixing zone? • Considerable initial dilution may occur in the first 3-6 feet that water leaves a discharge diffuser. A moratorium on effluent temperatures in excess of 25/C is not needed in such situations to protect biota. It would be more defensible to provide a period of exposure associated with any recommended effluent temperature that if met will not cause mortality. Wherever possible, criteria should be matched to an appropriate exposure duration, so that the resource is protected with the least amount of economic and social cost. • While better supported technically than the 25/C effluent limit to prevent mortality, the suggestion that migration would be blocked by several hundred feet of water in excess of 21/C is not fully supported by the literature. What is supported is the premise that fish will delay movements up waters warmer than 21/C if they have come from significantly (3/C) cooler waters, and even then they may resume migration if they sense the temperatures from these waters are on a downward trend. • It is not clear what will be put into place to ensure lethal temperatures in receiving streams will not occur (e.g. monitoring, reporting, and automatic regulatory ramifications) 	601, 603, 1100, 1130, 1203, 1503
Performance Measures Preferred Over Implementation	<p>The guidance should identify alternative narrative criteria language or performance measure(s) to be met in the interim, rather than specify that a TMP, which is an implementation mechanism. Stringent application of offsite mitigation with SLS criteria in the interim will often result in excess offset at great financial cost to some sources - costs that in the final analysis are likely to be unwarranted.</p>	1100, 1130, 1160

Comment Category	Summary of Comments	Comment Number
Sound Science and Implementation Framework Required for TMPs	<p>The TMP allowance is inconsistent with the central requirements and goals of the CWA in that it allows dischargers to violate water quality standards in a receiving water body through adoption of a TMP.</p> <ul style="list-style-type: none"> • Certain provisions in the draft guidance, such as TMPs, shift the focus of the guidance from protection of salmon to concerns regarding public acceptance. The guidance fails to present a reasonable scientific and implementation framework for meeting thermal requirement due to a primary reliance in the interim on TMPs oriented solely to point-sources. • EPA fails to provide sound scientific rationale for how the TMP provision will benefit salmonid beneficial uses. In fact, EPA states that they are unable to recommend a scientifically based offset scheme. This provision instead appears to be a device to reduce the CWA obligations of point source polluters. The CWA does not allow EPA to undercut the biological needs of beneficial use due to social or political resistance. Nor does a state or tribes' failure to regulate non-point sources diminish CWA obligations. • This provisions could allow large point source contributors to easily circumvent CWA standards. Instead of mandating that dischargers not contribute to a violation of applicable criteria, the draft guidance bars discharges that would contribute to incipient lethal temperatures or salmonid migration blockages. • What would be the incentive for these contributors to implement the mitigation provisions? Would EPA oversee this? What would the penalties for noncompliance be? • Temperature offsets are not adequate to protect salmon. Salmonids need lower temperatures, not temperatures maintained at a net <i>status quo</i>. Salmonid populations cannot thrive with great water quality in one location in a watershed, and poor water quality in another. • The time needed to develop modeled natural thermal potential or to realize results from mitigation efforts is potentially quite long. This delay may have the effect that no further action would be required after initial creation of TMPs. As a result, point source discharges would not be in compliance with the water temperature standard for an indefinite period of time. Moreover, these sources would likely not be held accountable for temperature exceedances provided that the basin is part of a 303 (d) list. • The TMP weakens the obligations of point sources to comply with the CWA. The CWA is clear in stating that criteria are to protect the most sensitive beneficial use. Point sources cannot cause or contribute to the nonattainment of the beneficial use. The types of issues presented in the TMP discussions are upper level policy discussions and should be dealt with on a site-specific basis. 	1200, 1201, 1202, 1504
Mitigation Scale	<ul style="list-style-type: none"> • A sub-basin is too large an area for off-site mitigation because it could disconnect the sub-population or species impacted from the mitigation, thus removing the benefit from the impacted population. Off-site mitigation actions should occur in the specific source discharge area; within a stream reach; or in the range of 5-10,000 acres. • The qualification of the mitigation site as “in areas of salmonid habitat that are compatible in life stage supported, and of similar or greater productivity” is good language, but “similar” needs to be replaced with “equal.” 	1504, 1507, 1508, 1510
Mitigation	<p>In establishing whether SLS numeric criteria are met, states/EPA should look at the edge of the mixing zone, not at the end of pipe. Enforcing strict temperature standards a the end of the pipe for municipalities and industries will mean a huge investment in equipment and energy costs, for little environmental gain.</p>	601, 603, 701, 705, 1306

Comment Category	Summary of Comments	Comment Number
Mitigation Inadequate	<p>Where TMPs allow point sources to exceed SLS numeric criteria after completing “all feasible steps” so long as they provide off-site mitigation, EPA should draft explicit rules in each state’s laws regarding this mitigation. Mitigation has generally been unsuccessful and does not compensate for the damage done to that particular stretch of water, the fisheries resources, and the water source.</p> <ul style="list-style-type: none"> • Where point sources have more control over the temperature from their sources and more adequate resources, mitigation should be the very last step in decreasing stream temperature standards for point sources. • After three decades of failures in using habitat restoration to mitigate the effects of wetland destruction permitted under Section 404 of the CWA, how can EPA justify proposing the same type of mitigation for temperature (see Zedler report on Mitigating Wetland Losses)? • Where have habitat restoration projects produced quantifiable and significant reductions in stream temperatures? • Any mitigation should aim to produce a net environmental benefit and thus be at a significantly greater ration than 1:1, given the inherent risks that the project will not be effective or deliver short-term benefits. • Mitigation efforts should be demonstrated to be successful before an allowance for temperature input above water quality standards is allowed. • EPA should clarify if it will allow the use of TMPs to justify new or increased discharges in water quality limited streams. • EPA should first require and fund demonstration projects over a significant range of landscape and stream conditions that are designed to develop and test hydro-geomorphic-based approaches to determining functionally equivalent mitigation sites and actions for stream temperature degradation affecting specific species and life stages. • The guidance states that implementing TMPs with the recommended safeguards, and implementing the provisions to protect existing cold water is a sound strategy for ensuring that the mitigation measures will offset any adverse effects, thus making development of new and additional mitigation measures in the ESA consultation process unnecessary. This statement cannot be scientifically validated. • Ability to measure mitigation can be difficult, if not impossible, at least suspect or hard to defend. 	810, 1502, 1504, 1509, 1201, 803
Mitigation	<p>The guidance should take a watershed approach regarding mitigative actions, including both point and nonpoint sources jointly developing water quality management plans that include best management practices to address temperature issues.</p> <ul style="list-style-type: none"> • TMPs should be linked to overall watershed planning efforts, and more explanation should be provided as to how a source would “offset the excess heat load through mitigative actions elsewhere in the sub-basin.” • Mitigation activities resulting in thermal reductions shall offset a source’s heat loading irrespective of the changed thermal potential created by the offset. • Nonpoint pollution sources and groundwater withdrawals should be held accountable for the protection of cold water refugia as such areas are strongly influenced by both. • Dividing responsibility of protecting cold water refugia among stakeholders would be difficult and costly. 	1303, 1306, 1311

Comment Category	Summary of Comments	Comment Number
Mixing Zone	<ul style="list-style-type: none"> The guidance treats the SLS numeric criteria as an effluent standard instead of water quality criteria, mandating point sources to cool their effluent down to the SLS numeric criteria. Failure to do so would necessitate providing equivalent thermal offsets. EPA has no basis to deny use of a mixing zone and is infringing on state's rights to determine means for implementing their standards. When background temperatures are lower than SLS numeric criteria, background becomes the effluent standard as the guidance requires offsets for any sources of heat in waters exceeding numeric criteria. EPA needs to clarify the guidance so that mixing zones are permissible. 	603, 820, 1300
Nonpoint Sources Ignored	The TMP provision appears to focus solely on point sources of discharge and seems to ignore nonpoint sources. EPA should clarify how TMPs apply to nonpoint sources.	702, 810, 820, 1160
Offset Management	<p>Offset provisions should be handled differently :</p> <ul style="list-style-type: none"> Mandatory offsets will be difficult for states to track and enforce. Voluntary offsets or offsets for new or increased discharges have promise. EPA's guidance should encourage the use of voluntary offsets and effluent trading arrangement with advanced disclosure requirements to state and federal agencies. Offsetting should be reserved for the situation where water temperatures must be cooled to allow a new or expanding source to occur without causing a violation of the water quality criteria. Arbitrary high mitigation ratios do not generally support offsite mitigation for temperature. The costs and complexity of creating and managing offsets as described in the draft guidance will be high for both the administering agency and the permittee. As a first hand method, mitigative actions should not be used elsewhere in the basin to offset a source's discharge. If after all feasible steps are taken and the discharge is still too high, then the discharge ought not to occur. Mitigation must be in addition to actions mandated or funded by existing regulations and programs. Another parameter to consider in mitigation activities is the time period in which the results of the activity will occur. Some mitigation efforts may take long time periods to have an effect, whereas pollution is immediate. Also, monitoring and analysis of consequences are essential. Off-site mitigation should be a last resort effort to recover losses that cannot be avoided; this approach should apply to both nonpoint and point source thermal pollutants. EPA should consider requiring off-site mitigation to be equivalent or more beneficial than meeting SLS criteria at the source; in addition, off-site mitigation should also be required to meet all SLS criteria appropriate for the body of water, the mitigation site should be connected to the impacted site, and mitigation should not have adverse impacts on other species utilizing the area proposed as a mitigation site. Furthermore, while mitigation in the same subbasin should be a first alternative, there may be instances where it is not feasible or possible and EPA should allow mitigation outside the same subbasin to be considered. 	1100, 1130, 1201, 1160
Offset Definition	<p>EPA needs to more clearly define "off-sets" - If they cannot be defined, they should not be allowed:</p> <ul style="list-style-type: none"> TMPs must be included as part of NPDES permits and must be completely enforceable. TMPs should not allow off-site mitigation under a TMP for more than 5 years, the life of the NPDES permit, to which it must be attached. Off-sets must completely mitigate for all temperature imports. 	1500-1503, 1508, 1622

Comment Category	Summary of Comments	Comment Number
Blockage	<p>EPA’s guidance that “a source’s discharge not contribute to a salmonid blockage...in more than 25% of the receiving water” is unacceptable:</p> <ul style="list-style-type: none"> • NPDES permits should not be allowed to create any thermal blockage in any of the receiving water • EPA needs to better define 25% as by volume, width or time. 	1506, 1507
Remove TMP Loopholes	<p>Remove TMP loopholes that can be used by point and non-point sources to avoid real temperature reductions:</p> <ul style="list-style-type: none"> • The use of the term “must require” and “must be enforceable” is still subject to state discretion. • EPA should require full compliance with all terms of the TMP at the 5 year renewal time by permit holders. If compliance is not met, the NPDES permit must be terminated and fines levied and collected in full. • EPA should clarify how and where excess heat load is measured when providing offsets for excess heat load remaining after “all feasible steps”. • The length of a mixing zone should be clearly defined. • Provide a time limit for when and how mitigation actions must occur. • Ensure mitigative actions relate to improving water quality for cold water species. • Mitigation should be on a greater than 1-to-1 basin, even for actions intended to be fully realized within the five year term of the permit to account for the cumulative temperature contributions to the water body from past activities. • TMPs should take into account the relative contributions of point and nonpoint sources • Address the circumstance where there are no mitigative actions that meet the conditions set forth. • Address the questions posed by effluent dominated streams where removal of flows from effluent, driven by the setting of WQBELs shall harm beneficial uses. • The guidance should set forth that any new or additional loading from NPDES permit holders or applicants must be prohibited in any stream that is listed on the 303(d) list or would contribute to loads that are causing impairment on listed streams. • The guidance should be clear as to what should happen with an NPDES holder following the development of a TMDL. • Clarify if NPDES sources do not have to comply with WQBELs until after TMDLs are developed. If so, this is not consistent with the CWA. • Address what happens if a TMDL calls for expensive fixes that are beyond that deemed necessary under the “all feasible steps” evaluation in the TMP. • EPA should clarify its authority to “take action” on TMPs for nonpoint sources and its ability to control certain types of nonpoint sources. 	1503, 1504, 1508, 1622
NPDES Permits	<p>Allow interim NPDES permits which preserve current permit requirements, require identification of economically feasible measures and set final effluent limits based on TMDLs. EPA’s proposed alternative means of complying with permit conditions based on SLS numeric criteria sets up an additional regulatory layer to current NPDES permittees. Having a point source address “all feasible steps” before going to “off-site measures” is very restrictive. EPA/states should allow sources to address both simultaneously.</p>	603, 559, 708, 807

Comment Category	Summary of Comments	Comment Number
Shade Credits	Recommend the following as a guideline, not binding on the states: Provide a formula that will give a credit for stream shading, taking into account the elevation, latitude, tree height, width, and shade density. Riparian areas could be purchased for mitigation purposes, trees planted and the land put in permanent “shade easements.” Once shade cover has exceeded the mitigation requirements, large trees that have ceased to grow could be removed for timber as long as the required shade density is maintained. However, attempting to recreate shade conditions that have never existed will be costly and counter productive.	1600
Measurement of Mitigations	The Guidance must clarify how mitigation is to be measured, preferably as a quantifiable number such as BTUs/time. The applicant should be responsible for finding a credible way to quantify this.	1508
All Feasible Steps	In identifying options for feasible steps to reduce thermal loading, the options analysis should be limited to the service area for the discharger, as well as the discharger’s facility. Revise the definition of all feasible steps to : “All management practices and treatment technologies that can be implemented by the source without causing undue hardship, or impacting the ability to effectively operate and maintain the treatment facility, as determined by the permitting authority.”	1306
Enforcement	Who will enforce TMPs?	1201
Criteria	EPA should clarify if the guidance is equating TMP with water quality criteria.	701
Enforcement	Requiring TMPs as an enforceable part of aquatic permits is unnecessary and will lead to confusion by the permittee and those seeking to enforce.	805
Exemption	Washington DOE’s new Aquatic Pesticide General Permits should be exempted from the NPDES TMP requirement.	805
Funding	We support the standard that mitigation cannot include any actions already mandated or funded by existing federal, state, or local programs. The guidance should clarify that partial funding by a state or federal program disqualifies an action as mitigation.	1508
Land Management	TMPs will likely be ignored as knowledge surrounding changes in temperature from land management decisions is undecided.	800
Land Use Activity	TMPs should identify and stratify numeric criteria by land-use activity at the subbasin scale. The TMDL TMP should distribute necessary reduction equally by land-use activity (i.e. forested portion should not have to mitigate for increases caused by agriculture and urban areas).	1160
NPDES Permits	NPDES requirements in the guidance (mitigation, incipient lethal temperature) appear draconian. If a point source discharge significantly alters temperature regime, it should be addressed as part of the current permitting process.	1308
Mitigation	Irrigators are concerned about buy-outs of water rights as a means to mitigate temperature impacts.	801
No Net Impact	The concept of “no net impact” should not be utilized until there is much stronger technical justification that the SLS numeric criteria is necessary and appropriate.	600

Comment Category	Summary of Comments	Comment Number
Permitting by Heat Load	Permit should be written in terms of heat load rather than absolute temperature discharge requirements. This could stifle advances in process efficiency that reduce water use and energy consumption.	603, 1301
TMPs	SLS numeric criteria should not be applied until a TMDL is completed. Further conflict between the two will occur when they are not done in parallel.	807, 810
Mixing Zones	In accordance with the CWA, the guidance should explicitly not permit the use of mixing zones in water quality limited streams that do not have any assimilative capacity.	1504
PROTECTION OF EXISTING COLD WATERS		
Outstanding Resource Water Designation	<ul style="list-style-type: none"> • “Cold water refugia” should not be automatically be designated and “outstanding resource water” as a matter of policy. • Water temperature is only one criterion a water segment cannot qualify for “outstanding resource” status without evidence that all indicators of water quality are better than applicable criteria. 	550, 552, 557, 601, 602, 803, 809
Outstanding Resource Water Designation	<ul style="list-style-type: none"> • Outstanding Resource Water is a designation meant to qualify the status of a water body on evidence that all indicators of water quality are better than applicable criteria, not just temperature indicators. • We do not support the directive for states and tribes to identify and provide non-degradation status to areas of cold water used as refugia. The guidance is too vague on what constitutes refugia and the expectation for what constitutes protection. Not adding thermal units anywhere above any locations where water is cooler than the surrounding ambient water is unworkable. At the very least the protection should be targeted towards waters significantly colder than surrounding waters which measurably exceed the chronic tolerances for indigenous T&E species. More appropriately, however, the establishment of any Tier 3 waters should remain under the state's discretion and EPA should not require such establishment for refugia. This would be consistent with the way the federal antidegradation policy is applied to all other waterbody types. • States should have flexibility in meeting the objective to protect cold-water salmonid refugia where necessary to protect this beneficial use. For example, the guidance should allow states and tribes to adopt narrative provisions or antidegradation protocols to protect existing cold water. 	807, 1100, 1130
Outstanding Resource Designations	The recommendation to the states to designate localized areas of cold water refugia as outstanding natural resource waters is unlikely to occur in the State of Idaho. Thus, we caution the EPA from incorporating the designation of outstanding resource water into any important water quality guidance, standards or regulations.	1201, 1512
Beyond CWA Authority	Further protecting “waters supporting salmonids that are currently colder than the SLS numeric criteria” seems beyond the scope of the CWA and is also beyond Idaho’s antidegradation policy. Asking states to designate areas for protection where no salmon are present may also be beyond protection of Beneficial uses under the CWA.	702, 803, 1160

Comment Category	Summary of Comments	Comment Number
Antidegradation	<p>Please adopt explicit and tightly drafted anti-degradation implementation guidance.</p> <ul style="list-style-type: none"> EPA should offer strong model language for antidegradation implementation plans, which emphasizes the use of a “no action” option and provides for broad public review of all projects, which would allow degrading the temperature fo waters currently below the criteria. Careful attention to unintended loopholes is important. EPA could designate a significant porter (1/3 - 1/2) of their Section 319 funding to establish “outstanding waters” aimed at protecting cold water refugia. EPA should support the state in clearly and protectively defining “overriding public interest” and not allow the state to avoid this concept in their current regulations. This section only recommends against allowing additional heat inputs to waters that support threatened or endangered salmonids; however, it should apply to areas where there is a reasonable potential for salmonid presence. 	1500-1502, 1504- 1506, 1508, 1510, 1511, 1622
Antidegradation	<p>State antidegradation rules already protect waters that currently are colder than temperature criteria.</p> <ul style="list-style-type: none"> Region 10 states already have antidegradation rules already apply. Guidance concerning "existing cold water areas" is not needed. State rules protect water quality for those waters at existing, better-than-the-criteria levels. Waters that currently exceed state water quality criteria for temperature are Tier 1 waters and existing beneficial uses of those waters (including endangered or threatened salmonids) are protected. 	552,553, 555, 557, 558, 559, 560, 562, 565, 601, 602, 702, 803, 809, 807, 820, 1307
No Offsets	<p>Existing antidegradation policies and allowing no net increase in thermal loading in salmonid waters is insufficient to meet the needs of the species. The guidance should discuss antidegradation plans, plans to ensure the policy is carried out, and plans for how groundwater can and should be protected.</p> <ul style="list-style-type: none"> The guidance acknowledges that numeric criteria are inadequate and TMPs could allow greater risk to species and concludes that provisions to protect existing cold water” will result in states “appropriately mitigating any adverse effects.” There are no suitable or sufficient provisions to protect existing cold water as antidegradation has not been employed by any of the Region 10 states. Offsets and mitigative actions in existing high quality waters are unsupportable. Leadership is needed on the matter of prohibiting additional heat loading to ordinary high quality waters and water quality limited waters, both on the basis that the waters of the state are already too warm. 	1503- 1505, 1512
Scientific Basis	<p>EPA relies upon the concept of cold water refugia but presents no information to demonstrate that it has a scientific basis upon which to rely on the concept. The guidance does not substantiate the extent to which salmonids may use behavioral means to avoid harmful temperatures and seek out cold water refugia.</p>	821, 819, 1161, 1503, 1505

Comment Category	Summary of Comments	Comment Number
Connectivity of Cold Water Refugia	<p>The guidance should address the connectivity of usable, high quality habitats in addition to the lack of cold water refugia.</p> <ul style="list-style-type: none"> • Such connectivity has been aggravated by periods of sub-optimal temperatures due to human caused heat loading, blockages of migration passages, and alteration of the hydrologic regime. • It is not acceptable for certain (significant) portions of rivers, streams and lakes to fail to support entire suites of species. The CWA needs to be applied to entire aquatic ecosystems, not simply portions when it is convenient. • Allowing cold water refugia separated by areas of warmer water will limit and/or alter the total biotic mass and diversity of the river (or lake) system, which, in turn, will limit the food available to salmonids. • Some means of quantifying the salmonid carrying capacity of the refugia and ensuring that this is consistent with a population large enough to be self-sustaining is needed. • Cold water refugia must be sufficiently connected both spatially, so that species can move between refugia, and temporally, so that there are significant periods of time throughout the year that the refugia allow inter-refugia migration. 	1201, 1307, 1506
Outstanding Resource Waters	State rules provide for an "outstanding resource water" designation; alleged "cold water refugia" should not be designated outstanding as a matter of policy.	552, 557, 601, 602, 803, 809
Impracticality of Designation	<p>Cold water refugia designations are not practical to implement and may be administratively impossible:</p> <ul style="list-style-type: none"> • EPA should not prescribe a water temperature standard for cold water refugia. • The designation of outstanding resource waters should be left to the states. • Eliminate provisions that attempt to protect tributary temperatures if they equilibrate to ambient conditions before they reach the targeted impaired mainstems should be eliminated. • Where the use for water and land surrounding designated "outstanding resource waters," will be severely limited, the Administrative Procedures Act (APA) will need to be followed to set such criteria. • Some watersheds are almost entirely developed and "no net increase" would be difficult to obtain. 	552, 553, 555, 557, 560, 562, 564, 565, 601, 602, 803, 809, 807, 1605
Protection During Seasons of Concern	Cold water refugia should only be protected during seasons of temperature concern. The "no increased thermal load" requirement of designated cold waters should not be applied during cold weather periods when water temperatures are well below water quality standards and irrigation waters typically used for cooling by point source dischargers are unavailable.	1306, 1301
Public Process	The process for the designation of cold water refugia should be made public.	805
Maintenance	Identify how cold waters will be maintained and protected, especially where cold water protection is used to justify less-than protective criteria and narrative loopholes.	1503
Integration with Existing Regulations	The guidance provisions on the designation of cold water refugia and outstanding waters should be integrated with existing regulatory and management processes.	1306

Comment Category	Summary of Comments	Comment Number
Off-setting	The no offsetting or non-degradation provisions for waters supporting threatened and endangered species are inappropriate. The requirement of offsetting offsite is a major policy decision that would cause point sources to pay for non-point source controls. This form of policy should be developed at a national level after appropriate discussion. Categorically establishing non-degradation status to waters that meet their water quality criteria is unprecedented, difficult to justify, and may exceed the authority of states and tribes. The criteria (interim and ultimate) will be sufficient to protect T&E species without adding this type of controversial provision.	1130
Thermal Diversity	The guidance should ensure that thermal diversity is maintained at various local spatial scales. Further degradation of water temperature regimes should be halted and the remaining high quality temperature regimes should be rigorously protected from threats of degradation.	1509
More Information Needed	Cold water provisions should be set aside until new information can be gathered to determine all the factors involved in heating cold water. EPA should have considered some of the other papers submitted April 2000 regarding the science laws that do allow precise determination of cold water areas.	800, 802
Heat Offsets	The draft provision requiring offsets for all effluent heat loading above the SLS criteria at the end of pipe is overly restrictive. The guidance should allow innovative approaches to this concern such as the use of temperature mitigation “banking” in the watershed.	1100
Habitat complexity	The technical work group should develop a rating scale for habitat complexity. The more well distributed and connected cold water refugia, the more complex the habitat, and the higher the score. The lower the complexity the more stringent the temperature criteria. Increases in complexity could be used as an offset for temperature issues described in a TMDL plan.	1303
General	EPA should spend less attention on appeasing language, such as “optimal temperatures do not have to occur everywhere all the time,” and more attention on the restoration of thermal regimes on a basin scale, reduction of additional thermal load, allowing for natural seasonal and annual variations, but limiting anthropogenic impacts.	1200, 1307
Extent	It appears that not every headwater stream would be declared a thermal refuge or exceptional cold water resource. The guidance precludes the areas above large, impassable dams as designated beneficial use areas, locations that may be unavailable to anadromous salmon in the short term and possibly occupied by other salmonid species. All available cold water is important and must, therefore, be included in order to maintain and restore the maximum geographic extent of cold stream flows.	1200
Economic Accommodation	EPA needs to provide criteria and guidance that clearly define “important economic or social development” and stipulates that such “important economic or social development” needs to fully utilize all best available management practices and technology to minimize thermal impacts.	1201, 1506
Ecologically Significant	EPA should define “ecologically significant” in reference to standards that would prohibit temperature increases.	807

Comment Category	Summary of Comments	Comment Number
Protection of Refugia Supported	Refugia should be protected from future degradation unless an overwhelming economic, social, or human health benefit from the proposed action can be demonstrated, and appropriate mitigation can be provided.	1160, 1512
Antidegradation Tier 2 Reminder	It is appropriate to remind states and tribes that Tier 2 of the federal antidegradation policy is designed to control the degradation of water quality constituents such as temperature.	1130
Costly	It will be a complex and costly process to map, identify, inventory, manage and protect cold water refugia. Resources may be more effectively directed at other projects with greater environmental benefit.	1306
Too Broad	The guidance provisions for the protection of cold water areas is too broad to be evaluated critically. Guidance regarding protection of cold waters is too vague to be implemented as permit conditions and are not necessary given state/tribal permit writers already have authorities to protect cold waters.	603, 1306
More Cold Water	Designation of outstanding national resource waters of special ecological significance for the support of T&E salmonids. EPA should also make cold water refugia designation in reaches where no other refugia exist even if the temperature values are not as good as desired. The fish need places to seek refuge, especially in the lower portions of watersheds.	1201
OTHER SPECIFIC ISSUES/CONCERNS		
Nutrients	EPA needs to address more critical water quality issues such as nutrient inputs. The magnitude of decline in stream nutrient levels is far greater than the magnitude of change in temperature. This suggests that the likely limiting factor will ultimately be found to be nutrients rather than temperature.	555, 559, 816, 817, 820
303(d) List Guidance	<p>EPA should provide guidance to states for determining which streams to place on the 303(d) list. EPA should guide the states to apply a three-sieve test for determining water impairment associated with temperature:</p> <ul style="list-style-type: none"> • Check whether the water's temperatures are within or beyond the biological optima for beneficial uses. If water temperatures are within the biological optima, the water is not impaired. • Check if water temperatures are within the naturally occurring temperature conditions (the thermal potential) for the stream. If the water temperatures are within the thermal potential, water is not impaired. • Determine fish health/response. If the fish are doing well, the water or stream is not impaired. If there is evidence that fish densities are OK, that fish communities are reproducing, and that all life stages are present, then the beneficial uses are being protected. No harm—no foul. 	552, 564, 601, 602, 803, 809, 816
Funding	EPA should clarify sources of funding for implementing these regulations, so that states and tribes can conduct temperature monitoring, habitat surveys, and spatial and temporal monitoring to determine species distribution.	703, 807, 1303, 1306, 1307

Comment Category	Summary of Comments	Comment Number
State Discretion	The guidance should allow the states to analyze individual stream needs and set site specific temperature standards. EPA's "guidance" must recognize current scientific data and uncertainty.	539, 553, 554, 555, 557
Existing Law	EPA should recognize that the states have tremendous experience and talent in implementing water quality standards. EPA should know about the federal laws and programs that specifically address protection of water quality and salmon habitat. With the passage of the Forests & Fish Law, all 22 million acres of forestland in Washington State are subject to a long-term federal ESA-based management plan. This includes local, state, tribal, federal and private land subject to the: Forests & Fish Law; Habitat Conservation Plans; Northwest Forest Plan; and Congressional and Administrative set-asides. In Washington State there are a multitude of existing laws, programs and processes with the specific goal of addressing water quality and salmon habitat.	551, 553, 555, 557, 560, 562, 565
Examine Current Situation	EPA should examine the anticipated effectiveness of ongoing protection strategies on all government levels. EPA should also recognize that most literature reflect watershed conditions affected by past activities conducted under old regulatory and management programs and does not reflect current activities.	553, 555, 557, 560, 562, 565
Narrative Statements	In providing temperature criteria adequately reflecting the biological requirements of salmonids, EPA should provide detailed narrative statements that explain how to interpret and apply these biological criteria. EPA should provide narrative statements in the guidance that emphasize the need for and implementation of on-the-ground watershed restoration for thermal restoration in the long term.	558, 1200
Violation of Federal Rules	EPA's guidance document violates NEPA, the Intergovernmental Cooperation Act, the Rural Environmental Conservation Act, the Resource Conservation Act, the Constitutional takings clause, the Unfunded Mandates Executive Order, and the Administrative Procedures Act. The proposal for the guidance has failed to complete a Regulatory Flexibility Analysis as required by the Small Business Regulatory Enforcement and Fairness Act.	563, 809
Misuse of Resources	Money should be expended on habitat protection and ensuring stream restoration results in increased smolt production. Culvert and blocked streams need to be restored for salmon to propagate as wild fish. Other efforts seem to be wasted efforts. Please see www.dev.apptechsys.com for a six-year documentation of temperature data and what local citizens have accomplished using WDF&G protocols.	1603
Other Pollutants	Pollutants that would increase water temperatures related to non-point sources using present techniques are not measurable and should be addressed through CWA Section 319.	803, 1307
Worthwhile Participation	The EPA-sponsored initiative to develop guidance for states and tribes on water quality temperature criteria for the Pacific Northwest involving the participation of representatives of the states of Washington, Idaho, and Oregon; the federal Fish & Wildlife Services; NMFS and several tribes has been well worth the participation of those agencies and has led to a much greater appreciation of the complexities of water temperature and salmonids in general, and Oregon's existing approach to the problem in particular.	1100, 1200

Comment Category	Summary of Comments	Comment Number
Latest Scientific Knowledge	Under CWA Section 304(a), water quality criteria information published by EPA must accurately reflect the latest scientific knowledge. Scientific knowledge must be presented, not idealized historical conditions. The guidance must identify effects on health and welfare, economic dislocation and hardship, economic impacts of pollutants and of the criteria, and effects on heat productivity. The guidance should provides states direction on evaluating the severe economic dislocation that unrealistic standards based on historical conditions will inflict.	1310, 1400
Implementation	<p>Development of a TMP for both point and nonpoint sources would be a logical fist step in laying out the technical and social framework for developing numeric standards and SLS criteria and detailing how they would be implemented:</p> <ul style="list-style-type: none"> • If readily available support the current numeric standards they can be used; otherwise the TMP could lay out how the criteria would be developed and incorporated into the standards over time. • Best Management Practices, when properly and consistently implemented, can address many of the known factors leading to elevated water temperatures in streams. • Focus on more intensive effectiveness monitoring of temperature and fish populations and allow adaptation of implementation strategies to suit specific situations 	1160, 1511
Climate Change	The guidance should consider climate change/clearly reflect the need for the reversal of warming of Pacific Northwest waters.	917, 818, 1200
Human Considerations	State and federal environmental bureaucracies need to consider the plight of humans as well as animal and aquatic species to ensure a secure future for all of nature's inhabitants.	181,182, 188
Beyond Temperature	The guidance does not discuss biological needs for salmonid species beyond temperature.	555, 702, 1506
Cumulative Impacts	The guidance needs to address the effects cumulative temperature increases over all. Lower river warming from temperature increases at headwaters should not be legally permissible. In addition, while it is unlikely that brief periods of slightly warmer than optimal water temperatures will result in precocious development as long as there is only on instance in one small area; if this happens consistently during smolt movement downstream, than cumulative effects could cause adverse conditions in smolt development. Thus temperature exceedances should be rectified to accommodate smolts and their survivability.	1503, 1507
Consultation	Streamline consultation on actions to protect and restore water quality with land management agencies. If optimal thermal conditions do not occur in sufficient quantity and distribution and during the times and in the places necessary to fulfill all salmon life cycles, the designated management agencies of many headwaters or other areas of refugia may be dealt an unfair burden of responsibility for maintaining these areas.	564, 810
Provide Complete Scientific References	EPA's technical issue papers, particularly #3, should be improved in several areas, by providing complete scientific references for potentially significant statements and conclusions, especially where references are lacking.	552, 557, 601, 602, 802

Comment Category	Summary of Comments	Comment Number
Steps to Fix Temperature	The guidance does not describe the steps states and tribes should take to establish temperature standards and to fix the temperature problem. It fails to make a distinction between temperature issues related to point sources and those associated with nonpoint sources.	800, 802
Scientific Defensibility	The guidance is not scientifically defensible and shows a fundamental lack of understanding of thermodynamics in water bodies.	701, 809
State Consultation	Temperature criteria should be based upon site-specific stream temperature data, such as that captured in statewide stream temperature collection and analysis conducted by the Idaho Department of Lands in conjunction with other state and federal agencies and industry. Even with the draft guidance, point-source discharge permits, because they are issued by EPA, would still have to go through a Section 7 ESA consultation	1160, 701
Water Law	EPA should focus not on the quality of water, but on the amount of water. Over development may be a more vital issues.	85
Best Available Technology	EPA should encourage states to rely on the best available data and technology to establish fish presence and life stage uses consistent with national EPA guidance.	550
Best Management Practices	Does the guidance include BMPs to achieve temperatures for stormwater discharges?	1602
Floods	What happens to the guidance in the times of flood? Regulatory constraint may promote flooding by prohibiting channeling.	13
Salmon Degradation	<p>Description of conditions needed for salmon must be holistic..</p> <p>Page 2, paragraph 4, line 3 should read “. . . with other factors such as ocean conditions, harvest, habitat loss, and disease.</p> <p>Page 2, paragraph 5, line 7 should read “One reliable reference point, however is the historical thermal conditions (along with unobstructed river flow, lower harvest pressure, and different ocean conditions) that once existed in the Pacific Northwest, which we know supported large, healthy salmonid populations.”</p> <p>Page 3, paragraph 4, line 2 should read “. . . support salmonids, while recognizing that some waters will be warmer than optimal thermal conditions, . . .” to recognize that streams will heat above ideal temperatures for salmonids.</p>	1624

Comment Category	Summary of Comments	Comment Number
TMDLs	<p>The guidance should require states to identify and relist those waters with TMDLs developed to inadequate revised temperature standards.</p> <ul style="list-style-type: none"> • EPA should give state clear direction as to whether or not to promptly update their 303(d) listings based on new criteria. • EPA should precisely clarify what is meant by the idea that pre-existing TMDLs should be reviewed to determine if they are sufficient to meet new standards. • 303(d) listing has implications on activities subject to NPDES permits, such as dredge mining and 401 certifications, as well as implications on TMDLs 	1503
Reporting Format	EPA should adopt a reporting format for water temperatures displaying the daily temperature profile with an overlay line showing the standard for that reach and another overlay line showing the maximum temperature above which mortalities or long-term negative effects occur. A side bar on the graph would report the amount of time per day the temperature exceeded the standard for that reach of stream.	1303
Second Draft	EPA should provide a second draft of this guidance for public comment.	803
Septic Systems	Pollution of groundwater, rivers, streams and the Puget Sound from the thousands of septic systems in place, and being planned for the future should be addressed.	93
Dams	Why is EPA focusing on water temperatures for salmonid recovery when it is obvious that the four lower Snake river dams have had the single most impact on the Snake River salmon runs?	1608
Dams	Numeric criteria should not be set for water bodies above dams that are scheduled to be removed.	805
Local effectiveness	Many issues including resource management are most effectively addressed and dealt with on a local basis.	168
Cumulative Effects	The guidance does nothing to incorporate the fact that temperature requirements to support salmonids and other cold-water species would likely be lower in waters that are impacted as a result of other stressors, such as the presence of toxic pollutants and/or habitat degradation. Under the CWA, water quality standards must be adequate to protect designated and existing beneficial uses, the establishment of a temperature standards for a given water body must account for the existence of non-temperature stressors.	1504

Comment Category	Summary of Comments	Comment Number
Limit Impacts on Industry	<ul style="list-style-type: none"> • Halt any further controls which limit activity, especially in the forestry industry. Salmon are abundant from California to Alaska. Current boundary limits on agriculture and silviculture near waterways should be continued and studies initiated to determine if some tightly controlled forestry practices may be resumed. Some of the restrictions pose flooding problems. Additional untaxed government set-asides overload already stressed taxpayers. • Heat discharged to streams by the pulp and paper industry is inconsequential to far-field stream temperature profiles – requirements for implementing costly controls will not yield any measurable benefit to reduce temperatures. Moreover, recent validation studies for stream temperature models show that the impact of pulp and paper industry point sources is well within the error associated with validated, well-performing temperature models. 	603, 181
Instream Flows	The guidance should take into account instream flows and state that temperature criteria necessary to protect salmon will be set and enforced through TMDLs and other mechanisms, respecting water rights to the extent practicable.	1510
Include Joint Memorial	Idaho wishes that the Joint Memorial be part of the public record of comment on the proposed new guidance (see 1161 comments).	1160
Focus on Human Degradation	The guidance should focus on protecting the thermal conditions that exist today and are being used seasonally by salmonids, while encouraging the restoration of stream habitats that have been seriously degraded by human activities.	1402
Fire	Guidance fails to consider long-term risks of catastrophic wildfire and fails to guide states in how to properly manage risks caused by human action/inaction.	554
Feedback Loop	EPA should work with tribes and states to develop water quality standards accountability mechanisms through existing vehicles (TMDLs, watershed plans) and to obtain feedback on its success and approach with water quality standards.	1510
Federal/State Partnership	A useful activity at some point would be a joint federal/state effort to simplify the multitude of laws, which regulate environmental activities.	171
Duplicative State Laws	The mechanisms and projects already in place ensuring compliance with the CWA should be used by EPA to generate data for the analysis envisioned in the guidance. This would (1) continue to utilize the scientific expertise of all Forest and Fish Rule constituencies in Washington, and (2) avoid duplication of state and federal workload and costs.	550, 811
Default Standard	EPA should adopt a default temperature standard for streams that currently do not support, nor historically supported salmonids, but that provide flows into streams that currently do support salmonids. This standard should be set no higher than what is needed to support salmonids or other more sensitive species in the receiving waters.	1160
Bureaucracy	Undeveloped landowners are fighting the battle to just be rightful owners of their own property. (Example: Commenter is in the process of selling 35 acres of our 42 acre parcel up the Entiat River Drainage, to the Chelan-Douglas Land Trust with salmon recovery funding. Its been a nightmare of frustration and cost (\$10,000) and we had no plans to develop the 7 acres of bench land. The 200 foot wetland boundary encompasses over half of the 7 acres.)	180, 490

Comment Category	Summary of Comments	Comment Number
Uncertainty	The guidance should recognize data limitations and uncertainty for “multiple lines of credible evidence.”	77, 1306
Bonneville Funding	In addition to state programs which all occur at a cost to the taxpayer, directly and indirectly, all users of Bonneville Power Administration power are supporting the salmon habitat issue with rates over and above the cost of producing the power, to fund fish problems.	132
Consistent Geographical Stringency	Water temperature standards should be imposed just as stringently upon reservoirs as upon headwater streams in order for water quality standards to be met.	1303
Use New Flow and Temp Data	The U.S. Forest Service has acquired long-term flow data and temperature data in waterbodies that historically supported bull trout, this data should be considered as part of temperature water quality standards. Such data should also be included as multiple lines of evidence.	1512

**TABLE TWO: COMMENTER IDENTIFICATION FOR
DRAFT COMMENT SUMMARY TABLE**

on Draft EPA Region 10 Guidance on State and Tribal Temperature Water Quality Standards

Letter	Organization	Last Name	First Name
ORGANIZATIONS - Sorted by Letter Number			
212	Lusnigan Forestry	Frost	Jim
267	Lusignan Forestry	Frost	Jim
30	Bandon Dunes Resort	Dow	Shorty
304	Lusignan Forestry	Frost	Jim
306	Washington Timberland Management, Inc.	Hanson	Gary A.
329	Lusnigan Forestry	Frost	Jim
363	Lusnigan Forestry	Frost	Jim
370	North Olympic Timber Action Committee	Johnson	Carol
400	Lusnigan Forestry	Frost	Jim
436	Lusnigan Forestry	Frost	Jim
455	Lusnigan Forestry	Frost	Jim
475	Natapoc Resources Inc.	Pohrt	D.
488	US Timberlands, LLC	Jones	Jeff
550	Boise Cascade Corp.	Vander Ploeg	Jim
552	Oregon Forest Industries Council	Jarmer	Chris
553	Washington Forest Protection Association	Goos	Amy
554	Boise Cascade Corp.	Danehy	Bob
555	Rayonier	Meier	Robert
556	West Fork Timber Co.	Swanson	Scott E.
557	Weyerhaeuser Co.	Kendall	Sara S.
558	Plum Creek Timber Co.	Light	Jeff
559	American Forest Resource Council	Partin	Thomas
560	Green Crow	Bell	Harry
561	Rural Technology Initiative	Zobrist	Kevin
562	Simpson	Gorman	John

Letter	Organization	Last Name	First Name
563	Idaho Women in Timber	Peterson	Mona
564	Three Rivers Timber, Inc.	Mulligan	Bill
565	Intermountain Forest Association	Gorsuch	Jane A.
566	Idaho Forest Owners Association	Pence	Arleen
600	Potlatch Corporation	Pratt	Kathy
601	Georgia-Pacific Corp.	Whitaker	Carol A.
602	Longview Fiber Company		
603	Northwest Pulp and Paper Association	Matthews	Llewellyn
700	Idaho Power	Tucker	James C.
701	J.R. Simplot Co.	Prouty	Alan L.
702	Idaho Association of Industry and Commerce	Rusch	Richard
703	Associated Oregon Industries	Ledger	John
704	Northwest Food Processors Association		
705	Chiquita Processed Foods, LLC	Burich	William
707	Idaho Council on Industry and the Environment/Idaho United for Fish & Water	Barclay	Pat
708	Association of Washington Business	Nelson	Greg
709	Oregon Metals Industry Council	Nelson	Mark
711	PacifiCorp		
800	Water for Life	Harper	Brad
801	Idaho Water Users' Association		
802	Oregon Cattlemen's Association	Larson	Pat
803	Oregon Farm Bureau Federation	Test	Peter
804	Yakima River Basin Commodity Coalition	George	Steven E.
805	Washington State Water Resources Association		
806	U.S. Forest Service, Region 1		
807	Oregon Water Resources Congress	Winkler	Anita
808	Idaho Cattle Association	Nelson	Dave
809	Washington State Farm Bureau		
810	U.S. Forest Service, Pacific Northwest Region	Freedman	Lisa E.
810	Oregon Bureau of Land Management	Shepard	Edward W.
811	Washington Farm Forestry Association	Hanson	Nels

Letter	Organization	Last Name	First Name
812	Malheur County Onion Growers Association	Saito	Reid
813	Fort Rock/Silver Lake Soil and Water Conservation District	Horton	LeeRoy
814	Lakeview Soil and Water Conservation District	Lucas	Don
815	Goose and Summer Lakes Local Advisory Committee	O'Keeffe	John
816	Yakima Basin Joint Board	Dieken	Rick
817	United States Department of Agriculture N.W. Watershed Res. Ctr.	Hardegree	Stuart
818	Bureau of Land Management Idaho State Office	Giannettino	Susan
819	Potato Growers of Idaho	Frank	Keith
820	Idaho Farm Bureau Federation	Priestly	Frank
821	Idaho Association of Soil Conservation Districts	Stutzman	Roger
1000	United States Senate, Committee on Environment and Public Works		
1001	U.S. Army Corps of Engineers, Northwestern Division		
1100	Oregon Governor	Kitzhaber, M.D.	John
1100	State of Oregon Governor's Office	Kitzhaber, M.D.	John
1101	Oregon 71 st Legislative Assembly Joint Interim Natural Resources Committee	Ferrioli	Senator Ted
1130	Washington State Department of Ecology	Fitzsimmons	Tom
1160	State of Idaho Species Conservation	Caswell	James
1160	Idaho Soil Conservation Commission	Nicolescu	Jerry
1160	Idaho Fish & Game	Huffaker	Steve
1160	Idaho State Department of Agriculture	Takasugi	Patrick
1160	Idaho Department of Lands, Coeur d'Alene Staff Headquarters	Tretter	Chris
1160	Idaho Department of Water Resources	Dreher	Karl
1160	Idaho Governor	Kempthorne	Governor Dirk
1160	Idaho Office of Species Conservation	Caswell	James
1161	Idaho State Legislature	Bruneel	Representati ve Frank
1200	Columbia River Intertribal Fish Commission	Sampson	Don
1201	Nez Perce Tribal Executive Committee	Penney	Samuel
1202	Skagit System Cooperative	Weber	Jim

Letter	Organization	Last Name	First Name
1300	City of Everett Public Works		
1301	City of Klamath Falls	Kuenzi	Michael
1302	Owyhee County Natural Resources Committee	Desmond	James
1303	Wallowa County Board of Commissioners	Hayward	Mike
1304	Seattle Public Utilities	Marquis	Sally
1304	Seattle City Light	Glaser	Nancy
1306	Oregon Association of Clean Water Agencies	Gillaspie	Janet
1307	Association of Idaho Cities	Harward	Ken
1308	King County Wastewater Treatment Division	Cooper, and Curtis DeGasperi	Betsy
1309	City of Weiser Public Works	Marvin	Nate
1311	City of Corvallis	Lamperti	Larry
1312	Tillamook County Commissioners	Hanneman	Paul
1400	Grant County, Public Utility District #2		
1401	Douglas County Public Utility District #1		
1402	Chelan Public Utility District	Hays	Steven
1450	Malheur Watershed Council	Pratt	Kathy
1451	Owyhee Watershed Council	Fenwick	Jennifer
1452	Oregon Department of Environmental Quality		
1500	Save Our Salmon	Beres	LeAnn
1501	Sierra Club, Cascade Chapter	Sumption	Patricia
1502	Mountaineers		
1503	Northwest Environmental Advocates	Bell	Nina
1503	Native Fish Society	Bakke	Bill M.
1503	Oregon Natural Resources Council	Heiken	Doug
1503	Columbia Deepening Opposition Group	Huhtala	Peter
1503	Oregon Natural Desert Association	Marlett	Bill
1503	Oregon Trout	Russell	Aubrey
1503	Northwest Environmental Defense Center	Riskedal	Mark
1503	Pacific Coast Federation of Fishermen's Associations Institute for Fisheries Resources	Spain	Glen H.
1504	Willamette Riverkeeper/ Columbia Riverkeeper	Foster	Brent

Letter	Organization	Last Name	First Name
1505	Alliance for the Wild Rockies	Sedler	Liz
1506	Idaho Conservation League	Hayes	Justin
1507	Puget Creek Restoration Society	Hansen	Scott
1508	Washington Environmental Council	Crooks	Joan
1509	Washington Trout	Gayeski	Nick
1510	Audubon Washington	Stevens	Naki
1511	Idaho Rivers United	Sedivy	Bill
1512	Kootenai Environmental Alliance	Mihelich	Mike
1602	Rosewater Engineering	Coop	Jeff
1603	SCORE	Wurden	Ed
INDIVIDUALS - Sorted by last name			
332		Abrams	Brenda
59		Abson, PhD.	Derek
32		Adams	Kelly
1601		Akehurst	Steve
236		Alderson	Natasha
437		Alexander	Alice L.
101		Alholm	A. J.
388		Alio	Tim
26		Allbritton	C. M.
8		Anderson	Bill G.
10		Anderson	Dick
9		Anderson	Phyllis
412		Arnan	M.
264		Arneson	Lance
375		Arneson	Mark
302		Arneson	Stephanie
341		Arnin	Mark J.
223		Arven	Mark J.
222		Ausland	Kirk
523		Bachelor	Harold and Juanita

Letter	Organization	Last Name	First Name
17		Bailey	James C.
143		Bailey	Virginia G.
71		Baker	Daniel G.
537		Bakke	Ronald
533		Baldwin	Robert L.
213		Baltar	Jean
120		Barnes	Edwin E.
290		Bass	Robert
80		Beckman	Joe
160		Bergstrom	Conrad
50		Bettuschi	Peter
262		Bevan	Ron
445		Billen	M.
512		Bingham	Charley
1610		Bishop	John
5		Bloom	Walter & Carly
152		Bolinger	Parker
511		Bolton	Sterling N.
167		Bonney	J. B.
1608		Boren	Stephen
68		Borglum	Donald W.
348		Boyd	Wade C.
91		Bradbury	James D.
74		Bridges	James
115		Britt	Bob
135		Britten	F. J.
163		Britton	Willard L.
527		Brooks	Casey
1613		Bruce	Anna M.
168		Brunstad	Harold B.
231		Brunstad	M. Jane

Letter	Organization	Last Name	First Name
117		Bulin	Edwin
96		Bullard	R.W.
419		Burenche	John
51		Burke	Eula R.
468		Calden	Trena
182		Caldera	Frank
469		Callen	Doris
516		Callison	Price
155		Carlson	Walter
92		Carnahan	Bert E.
219		Carter	Richard E.
1618		Case	Terry and Toni
447		Chambers	Charles J.
524		Chase	William
151		Childs	Chase
268		Clark	Jerry
366		Clarke	J.
41		Clem	Frank
188		Clem	Frank
479		Clem	Frank
331		Clinkenbeard	Jack
443		Clinkerbeard	Jack
495		Cody	Cheryl Lynn
376		Coleman	Terry L.
15		Concerned	Citizen
521		Cone	Wes and Kathe
140		Cook	Richard V.
67		Cooka	Greta
201		Coons	Stephen
175		Cooper	Don
547		Coplen	Lewis H.

Letter	Organization	Last Name	First Name
47		Cota	Elsee
187		Cox	Everett
189		Cramer	R. D.
549		Crisp	Kenneth P.
519		Crosby	H. Lance
369		Crow	Tyler
383		Dahl	Roger
384		Dahl	Roger
72		Dahlen	Byren
229		Daily	Roger
526		Dalsing	Bernard and Helen
433		Davenport	E.
24		Davis	Earl A.
183		Davis	George W.
270		Davis	John W.
111		Davis	M. Joyce
35		Deal	Leo F
371		Diers	Julie
273		Dixon	Dennis
484		Dixon	Joseph
284		Dluat	Plert
1612		Dover	Tom
450		Dulls	Roger
110		Dunlap	Larry
102		Dunlap	William W.
38		Dunn	Amy K.
514		Dunn	Robert
263		Earls	Mary A.
249		Eddings	Kevin
481		Elder	Emerson
464		Elliott	Harry J.

Letter	Organization	Last Name	First Name
425		Ericksan	Misty
214		Ernest	Latson
530		Ernst	Lowell E.
254		Evelt	Brye
542		Everest	Dick
312		Farm	Wynne
4		Fernandez	Jan & Barb
303		Finch	Charlotte
305		Finch	Gail W.
462		Fink	Daniel W.
45		Fisher	Donald J
1600		Fleming	Dick
1604		Fleming	Dick
178		Florez	Salvador Z.
157		Foister	Eugene
276		Ford	Mark
113		Fowler	Gary L.
510		Freedman	William E.
20		French	Ann
418		Fuchuicke	Randy
293		Fuhrman	Steve
79		Gades	Charles
156		Garratt	Rowland M.
546		Gates	Bill
409		Gehrkind	Jeff
90		Gipson	Kenneth L.
220		Glessner	David and La Rae
239		Goelzer	Patricia A.
335		Goodwin	Tami
265		Gorman	John
141		Green	Floyd J.

Letter	Organization	Last Name	First Name
6		Greene	Florence
48		Gritte	Olga
27		Gropp	Victor
541		Groth	G. D.
233		Gubry	John H.M.
250		Gubry	John H. M.
509		Hall	Russell D.
405		Hamcan	Stephen D.
1620		Hanley	Mike
119		Hansen	Joanne
310		Hanson	Kari
31		Harbey	
169		Harke Sr.	David E.
114		Harper	Douglas S. and Audrey G.
33		Harrington	Dorothy R.
179		Harris	Stephen T. and Flora C.
78		Harrison	Ben
136		Hayes	Frederick W.
130		Hayward	Harry
75		Heacox	E. J.
148		Healea, Jr.	Obe M.
3		Heath	Larry
1621		Hedglin	Lloyd S.
218		Hedlund	Ed
125		Henderson	Raymond D.
386		Hensley	E.
406		Henton	Ella
16		Hepps	Tom
392		Hester	Larry D.
183		Hines	Neill J.

Letter	Organization	Last Name	First Name
491		Hoffman	P. R.
146		Hole	Richard D. and Patricia G.
416		Holland	Jay
154		Holmes	Elisha
87		Hopkins	Donald J
272		Hopkins	Paul
466		Horton	Frank K.
378		Hosch	Christopher
536		Hoss	Bill
493		Howe	Walter
76		Hubbard	Harold
166		Hughes	Ellen
483		Hulse	Carl
191		Hunter	Claude
356		Huntz	Tamme C.
374		Hurley	Anne R.
190		Huston	Richard W.
538		Hyytinen	Ray
118		Jackson	G. J.
1607		Jackson	Paul G.
192		Jamison	Bob
173		Jarnett	Marie
13		Jernigan	Stanley
502		jkw20f23@pocketmail.com	
438		Johnson	Carol
137		Johnson	E. L.
482		Johnson	K. R.
184		Jones	Blanche
411		Jones	Zachory
12		Jordan	Thomas P.

Letter	Organization	Last Name	First Name
507		Junkin	Dr. and Mrs. Edward R.
255		Just	Mary A.
253		Just	Richard D.
25		Kelley	Fred
161		Ken	Roller
149		Keverline	J. S.
408		Kiknil	Danny E.
58		Kirschel	Calvin
28		Knepper	JoAnne
349		Knight	Greg
199		Knowles	Robert A.
103		Koch	Daniel H.
14		Kunhle	George M.
56		Landrum	Joyce E.
172		Landry	Pierre J.
442		Lang	Ryan
286		Lang	Trent
138		Langer	Edward A.
395		Larson	Lloyd H.
40		Lawhon	Frank
162		Lawrie	William J.
240		Lawson	Willard L.
435		Leavitt	Michael H.
44		Lippard	Everett and Evelyn
350		Little	Troy
116		Lomer	Allan
422		Luse	Greg
177		Machin	William
133		Malmquist	David
180		Malone	John
503		Marcella	Wayne A.

Letter	Organization	Last Name	First Name
494		Markland	Clara
237		Marshall	Josh H.
1617		Marton	Bill and Robin
7		Masterson	Annie M.
430		Mattingnen	Kim
504		May	John
1622		McCaffrey	Kelly
500		McCay	Bill G.
248		McColin	Russell C.
94		McCollum	W. W.
486		McDonald	Ted
106		McDonell	Norman R.
269		McDougall	Al
107		McEwen	John M.
501		McKee	Rex
181		McLaughlin	Edward G.
123		McNutt	J. W.
522		McNutt	J. W.
11		Menashe	Elliott
532		Menegat	Rolando
153		Menkens	Harve
498		Merritt	Marvin
352		Metcalf	M.
402		Metcalf	M.
287		Michaels	John H.
320		Michaels	John H.
346		Michaels	John H.
487		Middleton	Carl A.
330		Miller	Don
490		Miller	Ken and Bonnie
211		Miller	Kenneth

Letter	Organization	Last Name	First Name
256		Mitchem	Larry
291		Monahan	Betsy D.
251		Moraban	Robert E.
544		Moriarty	Robert E.
551		Moses	Owen
88		Moulton	Richard L.
225		Mulinak	Pete
440		Mulinak	Pete
334		Munes	Grant
100		Myhre	Glenn
18		N.M.	McCalden
105		Naas	Chris
142		Nance	Steve
185		Nearn	William T.
73		Nelson	Adrian M.
85		Nelson	George R.
198		Nelson	Ted W.
337		Nesgodu	Greg
365		Newman	Gene
109		Nicholson	David C.
98		Noble	Verda
321		Norman	Sean
274		Noyes	M.
497		O'Leary	Audrey
195		O'Leary	Bill
77		Odendahl	James P.
539		Odendahl	James P.
60		Ogden	John B.
150		Olson	Charlotte V.
228		Opp	Dwight C.
234		Orneson	Kevin M.
548		Orr	Thomas J.

Letter	Organization	Last Name	First Name
292		Palmer	Bill
458		Palmer	Clyde K.
338		Palmquist	Chris
478		Parks	Lawrence A.
235		Parr	Candace
463		Patillo	Gregory L.
534		Patten	Jack M.
508		Patterson	Thomas A.
398		Pattillo	Susan K.
492		Paul	John R.
444		Peach	Bill
300		Peach	William
215		Pedersen	Steve
57		Penry	Ernest O.
351		Perft	Thad
186		Peterson	David
22		Peterson	Lorraine M.
317		Pfeifle	Rod
451		Phillips	Frank
252		Picavet	Fred
145		Pierson	Betty Q. and Darrell E.
209		Piotrowski	Michael
232		Pitts	Floyd
372		Plancy	P. L.
221		Pobst	Dennis
122		Podawiltz	Allen J.
193		Porter	Keith
124		Porter	Mac A.
132		Post	Andrew J.
158		Post	Orvin A.
301		Potter	Richard

Letter	Organization	Last Name	First Name
93		Potts	John
194		Powell	Lois
1615		Price	Joel and Vikki
97		Price	Steve
364		Pursley	Ron
467		Pursley	Ron
210		Putnam	Nathan
104		Quigley	Mickie H.
66		Raff	Dale
520		Raleigh	Ben
340		Raynes	Lawrence M.
2		Reek	Arthor
404		Reid	Randall
63		Remak	Walter A.
52		Remmers	Bette J.
89		Renholt	Danel
485		Richards	Evelyn E.
513		Riedy	Helen
21		Ritting	Carl
126		Rodgers Sr., P.E.	James
313		Rogers	Michael
528		Rogers	RG
1310		Ross	Gordon
121		Ruhden	William C.
34		Russell	Charles F
134		Sadler	Richard
70		Schmidt	Verner N.
131		Schroeder	Dennis L.
1305		Schroeder	Walt
184		Schwartz	Gerald
205		Schwarz	Robert M.

Letter	Organization	Last Name	First Name
61		Scott	Kermit B.
280		Scott	Roger
423		Shakey	John H. M.
391		Shannon	David
382		Shaw	Elaine
456		Shekey	John H. M.
387		Shelley	John H. M.
499		Shelton	Gary
1616		Shenk	Bill and Florence
23		Shenk	Paul L. and C. Alyce
217		Shepherd	Steve
333		Shepherd	Steve
170		Shiels	Mary H.
1624		Shock	Dr. Clinton C.
241		Sidelauer	Wendell
246		Sidelauer	Wendell
144		Simmons	E. Keith
174		Singsaas	Conrad L.
29		Sivert	James R
515		Slater	Michael
54		Smith	Dom W.
147		Smith	Jim
171		Snare	Paul F.
531		Snyder	Edward
496		Snyder	Eleanor A.
389		Spradlin	Marilyn
390		Spradlin	Mark A.
271		Staley	Joe
112		Stancil	Clarence and Lola
36		Stanley	Ronald

Letter	Organization	Last Name	First Name
243		Steenkolk	Tony J. and Patrice R.
39		Steiger	Ralph P
69		Stevens	Duane L.
307		Stewart	James M.
1619		Stoddart	John L.
42		Sundt	Robert W
176		Susan	Richard
81		Swain	Larry
208		Swanson	Kenneth E.
428		Swanson	Scott E.
227		Tait	Brian
82		Taylor	Douglas
196		Taylor	Jim
434		Thomas	Daniel A.
480		Thomson	Stan
216		Throop	Clayton
1606		Throop	Wilbur
99		Tifft	Tom
204		Timmreck	Robert
368		Trault	Michael H.
46		Tupper	Laura M
207		Turner	Patricia J.
427		Tveit	Gina
426		Tveit	Steve
281		Vadnais	Jim
518		Valentine	Tom
159		Van Zandt	E. F.
55		Vandever	Alan P.
314		Varland	Daniel E.
506		Vashaw	Charles L
244		Vaugh	Tim

Letter	Organization	Last Name	First Name
62		Verret	Joseph U.
1623		Vimont	Mark
540		Vinyard	Wayne
83		Waechter	John H.
449		Waldron	Karen
401		Waldup	Peter R.
357		Walker	Paul
309		Walker	Sandie K.
127		Wanner	Frank N.
362		Waptz	Dale
129		Ward	Ruth
37		Warf	Raymond P
84		Warfle	Oliver
226		Warner	Cheryl
197		Warra	F. M.
328		Wassen	Wesley S.
505		Weathers	H. J.
86		Welch	Ruth
165		Welch	Ruth
543		Wend	R. C.
535		West	Donald
299		Westmark	Russ
322		Wheeler	Casey
529		Wheeler	Robert A.
1605		White	Bill
1611		White	Jesse and Pam
448		White	William D.
545		Whittig	Jerry F.
19		Wiener	Leonard J.
277		Wiggins	S.
64		Wilbur	Don

Letter	Organization	Last Name	First Name
1609		Williams	Jess
43		Williams	Walt
453		Williams	Wendell
275		Williamson	Maurice
517		Williscroft	Tom
128		Wilson	Betty J.
489		Wissing	Neil P.
53		Witt	Scott J.
139		Witter, Jr.	Robert N.
1		Wofford	Clarence
164		Wood	Bill G.
49		Woodhurst	George A
360		Woodward	James
95		York	Dwan
203		Young	D. M.
108		Young	R. W.
258		Zender	Dean
294		Zender	Doug
1614		Zwiener	Richard L.