Construction General
Permit – Stormwater
Deadline: 5/4/07 5pm

California Building Industry Association

1215 K Street
Suite 1200
Sacramento, CA 95814
916/443-7933
fax 916/443-1960
www.cbia.org

Comments on: National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated Construction and Land Disturbance Activities

RECEIVED
MAY - 4 2007
SWRCB EXECUTIVE

Prepared by

California Building Industry Association

Building Industry Legal Defense Foundation

Construction Industry Coalition on Water Quality

Construction Employers' Association

Submitted to the

California State Water Resources Control Board

Division of Water Quality

May 4, 2007

California Building Industry Association

1215 K Street
Suite 1200
Sacramento, CA 95814
916/443-7933
fax 916/443-1960
www.cbia.org

May 4, 2007

Ms. Song Her, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Dear Ms. Her:

Subject: Comments on National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated Construction and Land Disturbance Activities

The California Building Industry Association, the Building Industry Legal Defense Foundation, the Construction Industry Coalition on Water Quality, and the Construction Employers' Association appreciate the opportunity to comment on the release of the preliminary draft general construction permit dated March 2, 2007 (Preliminary General Permit). We particularly appreciate the opportunity to participate in this informal fact-finding process related to preparation of a more formal draft of the Construction General Permit, which will determine in significant measure the course of our industry over the next several years. We welcome every opportunity to help the State Water Resources Control Board shape the final Construction General Permit into a sensibly progressive permit and a model for other programs that "raises the bar" for storm water discharge control, while providing flexibility necessary to tailor discharge control approaches for variable construction phases, site and climatic conditions, and receiving water conditions in California.

The enclosed documents describe our policy, legal, and technical concerns with the current Preliminary General Permit. We establish a comprehensive alternative approach for addressing construction site storm water runoff, including our suggestions for an enhanced and pro-active approach to best management practice planning and implementation specific to construction site discharges across California.

Our documents are organized into two sections, each enclosed under separate cover: 1) Legal and Policy Comments, and (2) Technical Issue Memorandum. Within each section we have organized our comments into a table of contents, key contributors, executive summary, detailed memorandum, and attachments.

CBIA and its coalition partners must make clear to the State Water Resources Control Board our understanding that we are participating in informal fact finding at this time, and we are not obligated to make an election

California Building Industry Association

1215 K Street
Suite 1200
Sacramento, CA 95814
916/443-7933
fax 916/443-1960
www.cbia.org

of formal administrative procedures or to comply with any exhaustion requirements with respect to our participation in public workshops or the May 4, 2007 comment deadline or the submission of these legal, policy and technical comments. Accordingly, we reserve our rights to provide and submit additional legal, policy and technical comments and information and to avail ourselves in the future of all available procedural and due process protections provided by law to permittees and the regulated community.

As the principal stakeholder in this permit renewal process, we strongly urge the State Water Resources Control Board to reconsider and revise the approach presented in the Preliminary General Permit to emphasize an enhanced and pro-active approach to construction site BMP planning, installation, inspection, maintenance, and operation. As currently written, the Preliminary General Permit will not lead to improvements in water quality, but will have the opposite effect in creating a program with little chance for success. I can be reached at 916-443-7933 or tcoyle@cbia.org at any point during this process.

Sincerely,

Timothy L. Coyle
Senior Vice-President
California Building Industry Association

California Building
Industry Association

1215 K Street
Suite 1200
Sacramento, CA 95814
916/443-7933
fax 916/443-1960
www.cbia.org

Legal and Policy

Comments on: National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated Construction and Land Disturbance Activities

Prepared by

California Building Industry Association
Building Industry Legal Defense Foundation
Construction Industry Coalition on Water Quality
Construction Employers' Association

Submitted to the

California State Water Resources Control Board

Division of Water Quality

May 4, 2007

Acknowledgements

Preparers:

Nossaman Guthner Knox & Elliott, LLP
18101 Von Karman Avenue
Suite 1800
Irvine, CA 92612

Andrew R. Henderson, Esq.
Vice President and General Counsel
Building Industry Association of Southern California
1330 South Valley Vista Drive
Diamond Bar, CA 91765

Shanda Beltran, Esq.
Allen Matkins Leck Gamble & Mallory, LLP
1900 Main Street, 5th Floor
Irvine, CA 92614-7321

Contributors:

Paul Campos
Vice President of Governmental Affairs
Home Builders Association
200 Porter Drive, #200
PO Box 5160
San Ramon, CA 94583-5160

Nick J. Cammarota, Esq.
General Counsel
California Building Industry Association
1215 K Street, Suite 1200
Sacramento, CA 95814

Katharine Wagner
Downey Brand LLP
555 Capitol Mall, 10th Floor
Sacramento, CA 95814-4686

Emma T. Suarez
California Building Industry Association
1215 K Street, Suite 1200
Sacramento, CA 95814

Ella Foley-Gannon
Sheppard, Mullin, Richter & Hampton
Four Embarcadero Center
Seventeenth Floor
San Francisco, CA 94111

Paul N. Singarella, Esq.
Latham & Watkins LLP
Suite 2000
650 Town Center Drive, 20th Floor
Costa Mesa, CA 92626-1925

Roderick E. Walston, Esq.
General Counsel
Metropolitan Water District of Southern California
700 North Alameda Street
Los Angeles, CA 90012-2944

S. Wayne Rosenbaum
Foley & Lardner, LLP
402 W Broadway Ste 2300
San Diego, CA 92101-8579

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

I. PRELIMINARY STATEMENT

We appreciate the opportunity to provide the State Water Resources Control Board ("SWRCB" or "Board") with comments on the preliminary draft of SWRCB Order No. 2007-XX-DWQ National Pollutant Discharge Elimination System General Permit No. CAR000002 - Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity (March 2, 2007) ("Preliminary Construction General Permit" or "PCGP"). We thank you for the opportunity to participate in the overall process of developing the final Construction General Permit for discharges associated with construction activity (the "Final CGP"). We welcome every opportunity to help the SWRCB shape the Final CGP into a sensibly progressive permit and a model for all others. As an industry, we are committed to working with the SWRCB to develop a construction permit that both "raises the bar" for construction site water quality control for all sites in California, and provides flexibility necessary to allow tailoring of control approaches for differing construction phases and associated technologies, variable site and climatic conditions, and widely divergent receiving water conditions throughout the State.

A. Commenting Parties

These comments are submitted on behalf of the following parties:

- The California Building Industry Association ("CBIA"). CBIA is a non-profit trade association comprised of more than 6,700 member companies that employ more than 500,000 people engaged in all aspects of planning, designing, financing, constructing and selling approximately 70% of all new homes built in California each year.

- The Building Industry Legal Defense Foundation ("BILD"). BILD is a non-profit mutual benefit corporation and wholly-controlled affiliate of the Building Industry Association of Southern California ("BIA/SC"). BIA/SC is a non-profit trade association representing more than 2,050 member companies with more than 200,000 employees. The mission of BIA/SC is to promote and protect the building industry to ensure its members' success in providing homes for all Southern Californians. BILD's purposes are to monitor legal developments and to improve the business climate for the construction industry in Southern California. BILD's mission is to defend the legal rights of current and prospective home and property owners, and to accomplish this mission BILD participates in and supports litigation necessary for the protection of such rights. BILD promotes and supports important legal cases to secure favorable court decisions for private property owners and developers. BILD focuses on litigation and regulatory matters with a regional or statewide significance to its mission.

- The Construction Industry Coalition on Water Quality ("CICWQ"). CICWQ is comprised of the four major construction and building industry trade associations in Southern California: the Associated General Contractors of

California (AGC), the Building Industry Association of Southern California (BIA/SC), the Engineering Contractors Association (ECA) and the Southern California Contractors Association (SCCA). The membership of CICWQ, which is comprised of construction contractors, labor unions, landowners, developers, and homebuilders throughout the region, work collectively to provide the necessary infrastructure and support for the region's business and residential needs.

- The Construction Employers' Association ("CEA"). CEA is comprised of over 100 of the largest signatory commercial industrial contractors in California. CEA members perform over $10 billion in construction volume annually in California and build a significant percentage of all non-highway public works projects in the State.

B. Procedural Status of the PCGP

We understand that the SWRCB is currently engaged in informal fact finding regarding the concepts, principles and proposed requirements reflected in the PCGP, and, as such, it is encouraging non-adversarial and productive exchanges of ideas, issues and concerns. Accordingly, we understand that the current fact gathering is a prelude to a formal process under the Administrative Procedures Act that will commence at a later time, upon a specific notice to that effect. Given the nature of this current process, we understand that we are not obligated to make an election of formal administrative procedures at this time, and there is no exhaustion requirement involved in public workshops or the May 4, 2007 comment deadline. In other words, through these informal proceedings we can focus on providing the SWRCB with input that we hope will be of assistance in developing a future, formal tentative draft permit (the "Formal Draft CGP") and eventually the Final CGP. If our current understanding is incorrect, and the SWRCB is not engaged in informal fact finding at this stage, please instruct us as soon as possible regarding those provision(s) of the Government Code that the SWRCB is employing for its consideration of the PCGP.

Based on the informal nature of the instant process, we understand that a formal notice will be issued at a future time, which will explain the type of proceedings that will be used to provide for review, comment and consideration of a Formal Draft CGP, and specifying the statutes governing those proceedings. We currently anticipate that issuance of such notice and circulation of the Formal Draft CGP will collectively mark the beginning of adjudicatory proceedings. We further understand that these comments, and all appendices, attachments, letters, reports, studies, memoranda and other documents referenced in this letter, which are all submitted to assist the SWRCB with informal fact finding, will be included in the administrative record related to renewal and re-issuance of the CGP.

In light of these circumstances, the following comments are not exhaustive, but are those that we hope will best assist the SWRCB in assuring that the Final CGP is as sound as possible from a legal, policy and technical perspective. Because we primarily assess mixed legal, technical and policy issues in this comment letter due to the intent of the current informal proceedings, we adopt and incorporate by reference herein the Technical Issues Memorandum dated May 4 2007 and submitted herewith, along with all other attachments and references included in the Technical Memorandum (the "Technical Memo").

II. EXECUTIVE SUMMARY AND RECOMMENDATIONS

A. Executive Summary

1. Overview of agency action.

The SWRCB has issued a PCGP that departs markedly from the U.S Environmental Protection Agency ("EPA") federal stormwater general permit and the existing California General Construction Stormwater Permit. Both current permits rely on preparation of a Stormwater Pollution Prevention Plan ("SWPPP"), setting forth site, weather and activity specific Best Management Practices ("BMPs"), and inspection and maintenance requirements, enhanced by monitoring, sampling and analysis tailored to ensure detection of releases of non-visible pollutants, as well as protection of federal Clean Water Act § 303(d) listed waterbodies.

The PCGP includes unprecedented control strategies that have never been included in a stormwater construction general permit issued by EPA or any state administering the federally delegated program[1]. These new provisions include: Action Levels, ("ALs") (extensive monitoring and analysis); Advanced Treatment Systems ("ATS") (retention ponds, pumping, chemical treatment, extensive testing, and controlled effluent release); a 5-acre limitation on the total area under development; Numeric Effluent Limits ("NELs") (for pH, turbidity and toxicity with associated testing); and "one-size-fits-all" provisions for post-construction hydromodification control. Other unique provisions include: a 90-day "public participation" feature that allows individuals to "oppose" a project on the basis of comments that do not have to meet any specified standard for credibility when an applicant files a Notice of Intent ("NOI") at grading permit.[2]

2. The construction industry shares the SWRCB's goals, but has serious concerns about the control measures.

The stated purposes for the revisions are to improve water quality through "performance-based" programs,[3] impose consistent requirements throughout the State, address

---

[1] Although Washington State has imposed a limited advanced treatment system program, it was of a very limited and targeted application, the product of thorough study, and carefully crafted to meet specific receiving water needs.

[2] As justification for the permit revision, SWRCB cites to several recent court decisions – but these decisions do not mandate the action the Board is proposing. The Fact Sheet does not provide any analysis as why the Board believes these cases support the extraordinary departure from federal and state statutory public participation procedures.

[3] The Fact Sheet does not provide the SWRCB's definition of "performance based program." We understand a performance-based program is one that incorporates all statutory requirements and that compliance with its terms can be verified. We generally understand and support the efforts of California Stormwater Quality Association ("CASQA") with respect to development of guidelines and metrics to guide implementation and evaluation of performance-based stormwater quality control programs, but the PCGP does not follow CASQA's recommendations.

the costs of compliance over time, foster better performance, improve enforceability, and enhance public participation.[4] We share these goals.[5] As explained in these Comments, the strategies identified in the PCGP are not likely to achieve them, but are certain to harm the construction industry, limit development (especially infill projects and housing), and stifle economic growth throughout the State.

These Comments express our substantial concerns regarding the PCGP, which fall into three categories. First, it appears that many of the pollutant control measures proposed in the PCGP will not be appropriate when the SWRCB considers them in the future pursuant to statutory mandates that govern a determination of appropriate industrial stormwater permit effluent control limitations. Second, certain control measures, including ALs, ATS, the 5-acre limitation, NELs, and post-construction hydromodification requirements, are untested, technically unsupported and infeasible, and therefore "unavailable," for promulgation pursuant to governing law. Third, the PCGP contains provisions that should be revised or reconsidered to better effect good policy.

a) Even at this early stage, the SWRCB should consider proposed control measures pursuant to legally mandated processes and specific balancing requirements.

Congress and the State Legislature have articulated specific factors that the SWRCB must critically consider and balance when it adopts effluent limitations in a general industrial stormwater permit. The SWRCB may neither ignore the proscribed process nor disregard a specified factor. Although the Board enjoys discretion as to what weight to assign evidence, it must obtain sufficient and relevant technical data regarding each factor that it is required to consider in making its decision to promulgate each effluent control measure. In light of the rigorous process required for promulgation of general pollutant control measures, we submit that even at this early stage it is appropriate to consider proposed measures of the PCGP in light of applicable statutory mandates that must be fulfilled and factors that must be considered in properly establishing construction discharge pollutant control requirements.

The process that Congress established requires EPA, or an authorized state, to obtain and critically analyze certain technical data and to make specific findings that establish a clear analytical connection between technical and scientific information and effluent control limitations before proposing them for adoption. Specifically, under law applicable to establishing industry-wide pollutant control measures, the SWRCB must evaluate the specific pollutants and discharges at issue; evaluate the impact of discharges on receiving waters; quantify the pollution reduction possible considering a variety of control alternatives, including best management practices; assess and compare affects of control alternatives on industrial

---

[4] The Fact Sheet does not directly state the goals and objectives, but does include a "Problem Statement" and "Solution Approach." *See* Fact Sheet, pp. 19-21.

[5] We note that our constituents (developers, contractors, construction workers, and material suppliers-businesses) depend upon and greatly benefit from the enhanced environmental quality in our State. As individuals, we own property and live in the State and personally enjoy the beneficial uses of the waters. It is in this dual capacity, as parties directly regulated by the PCGP and as principal beneficiaries of clean water, that we submit these comments.

activities; and evaluate and compare cost-effectiveness and environmental effects of control alternatives. A grave concern is that the Fact Sheet lacks much of the data relevant and necessary to conduct this required analysis. For example, there is:

- no information showing a nexus between the proposed pollutant control limitations and the effect, positive or negative, on highly variable receiving water conditions throughout the State;
- no information assessing treatment control alternatives that may obtain the same or similar water quality benefit as the more costly, management intensive, and project disruptive measures that the SWRCB is suggesting; and
- no information regarding the effect that the proposed effluent control measures in the PCGP may have on the environment or the construction industry in California.

Without this fundamental data, it is impossible for the SWRCB to make the assessments *required* by statute *before* it proposes a Formal Draft CGP, let alone to consider and balance all of the factors state and federal law mandate the SWRCB to evaluate in adopting effluent control measures.

b) The PCGP includes untested effluent control measures that are not practically "implementable," or "feasible" or "available" control technologies from a regulatory perspective within the meaning of BAT/BCT regulations.

The new control measures in the PCGP discussed in these comments, for reasons specific to each, cannot be implemented, are cost-prohibitive, will not have a positive effect on receiving water quality, and/or are not demonstratively superior to other construction discharge control measures. Under applicable law, even a control technology that is capable of implementation may be "infeasible" from a regulatory perspective, and therefore, not "available" for promulgation as a general pollutant control measure for several reasons. Whether a control measure is "feasible" from a regulatory perspective requires an analysis of the *specific context* and *factual conditions* under which it will be implemented and balancing of the proposed measure in light of applicable statutory factors. For example, a control measure may not be "feasible" under the CWA because it does not function effectively under certain conditions, it may be economically unwarranted or cost-ineffective, it may have severe impacts on the regulated community or its industrial processes, it may be untested, it may have adverse environmental effects, or there may be insufficient information to make a determination one way or the other.

Section III.B below and the technical reports referenced therein, including the Technical Memo, address each of the following proposed effluent control strategies, which raise the most concern at this stage:

- **ATS.** Even the Blue Ribbon Panel found that, while ATS is a treatment process that can be implemented, it is likely not appropriate or advisable for general implementation from a water quality perspective. Specific factors militating against the regulatory feasibility of ATS include the toxicity of the chemical additives integral to the treatment process; the potential for ATS treated stormwater to adversely effect receiving waters and aquatic species in some circumstances; lack of current industrial capacity to support the technology; and high costs of implementation. Not only is ATS infeasible from a regulatory perspective, but the emphasis placed on its use is misguided; it is far easier and more cost-efficient to prevent erosion in the first place using appropriate BMPs than to treat the sediment "problem" once it is created.

- **5-Acre Grading Limit.** The 5-acre grading limit is an "alternative" to ATS under the PCGP. However, in identifying this measure as an "alternative" the SWRCB misunderstands just how unworkable the 5-acre limit is. This limitation is so restrictive that it simply cannot be physically implemented for all but the smallest projects. Therefore, the grading limit forces the vast majority of construction projects into ATS, which is also infeasible from a regulatory perspective. As a practical matter, the 5-acre limit even for small sites where it might be capable of implementation will greatly lengthen the construction cycle; constrain geotechnical remediation; prevent proper installation of infrastructure; drastically alter the project work-flow; and increase carry costs and construction costs. This limitation is not tailored to control pollution, but is aimed at the heart of construction industry "manufacturing methods and practices."

- **NELs.** The PCGP imposes NELs for pH at medium and high-risk sites, and at ATS sites it also adds NEL's for turbidity and toxicity. These NELs are infeasible from a regulatory perspective for several reasons, including that they: 1) are not linked to, and do not account for natural background precipitation, runoff characteristics, or receiving water conditions, and 2) are arbitrarily derived through inappropriate technical methods. The Blue Ribbon Panel also suggested further research and fact finding was necessary *before* NELs could be imposed as general pollutant control standards.

- **ALs**. As currently engineered, ALs are not well-suited for their intended purpose because they have not been derived using technically appropriate methods and they have not been established as "upset values" that would be reliable indicators of construction BMP "failures." Further, they do not reflect or provide for a mechanism to take into account the highly stochastic nature of stormwater and stormwater pollutant levels, or the widely variable background soils, precipitation and receiving water conditions in different regions of the State. A pollutant control measure incorporating ALs might be useful in enhancing BMP performance so long as it provides a method, formula or guidance for appropriate derivation of an AL that would take into account these fundamental factors, which were recognized by the Blue Ribbon Panel as impediments to widespread implementation of construction ALs. However, as currently proposed the ALs are infeasible from a regulatory perspective.

- **Hydromodification**. From a legal, policy and practical perspective, regulation of post-construction hydromodification impacts at the point of grading permit via the construction industrial stormwater permit is inappropriate. Further, the weight of available scientific and technical information indicates that the proposed control standards are unlikely to positively affect receiving water quality. The proposed measures address only a small number of the physical variables that cause hydromodification, but preclude implementation of many effective hydromodification control tools contrary to recommendations of available literature. In addition, certain of the hydromodification control standards, including preservation of drainage patterns and divides, are unnecessary for hydromodification control and incapable of implementation. As a result, the hydromodification measures are infeasible from a regulatory perspective because they are inconsistent with proper hydromodification control practices recommended by available scientific information, technically incapable of implementation, extremely costly, and would likely cause as many adverse environmental impacts as they might remedy.

c) The PCGP conflicts with other regulatory programs and raises public policy concerns.

We urge the SWRCB to consider the adverse policy implications of the PCGP. Several of the control strategies, such as post-construction hydromodification controls, NELs, and the 90-day public review, may be intended to address perceived regulatory needs, but should only be implemented after SWRCB consults and coordinates with other affected regulatory agencies. Where an effluent control measure has the potential to conflict, undermine or duplicate other regulatory programs, the SWRCB should develop a statewide policy guideline before undertaking to implement a new program in a general permit. In section IV below, we raise several policy concerns, some of which follow.

- **Improper regulatory vehicle and conflicting standards.** Post-construction hydromodification should be, and under Phase I and Phase II MS4 Permits currently is or can be, regulated during the land use planning and CEQA review and approval processes, not as an element of the CGP applicable at grading permit. Rather than serving as appropriate "minimum" standards for hydromodification control, the PCGP requirements conflict with, and undermine important MS4 program and watershed planning approaches to prevention of hydromodification impacts. In addition, post-construction hydromodification is beyond the scope of industrial stormwater permits – the Board is not regulating control of *pollutants from industrial construction activity*, but rather adding design requirements to the "thing" being manufactured or constructed.

- **Unproven technologies**: The ATS, ALs and NELs are premature and require additional data collection and analysis to establish their water quality benefit and regulatory feasibility. The Blue Ribbon Panel only considered “technical” capability of implementation, and concluded that these measures should not be generally promulgated as effluent control measures, expressly recommending additional data development, research and analysis before the SWRCB employed them.

- **The Monitoring Program is deficient and costly**. As proposed, the PCGP emphasizes effluent monitoring. The proposed program, although comprehensive in scope, will not provide *any* water quality benefit. More importantly, the testing is not necessary to prove compliance, because there are other simple alternatives that prevent pollutant discharges and/or provide results in real time. The PCGP’s costly and extensive monitoring has little practical use, because laboratory turn time precludes their use for adjusting BMPs to prevent pollutant discharge, and the PCGP fails to identify other purposes of, or questions to be answered by, the monitoring program. However, the expansive monitoring program proposed will impose huge compliance costs. As proposed, the monitoring program is not feasible from a regulatory perspective and will not improve or control construction site storm water quality.

- **90-day public review is neither mandated nor reasonable**. The proper venue for public participation on storm water discharge requirements is when a water board issues a general permit, not when a property owner or developer submits a NOI to comply with the terms of a permit already in force. As currently envisioned, the 90-day process is not reasonably tailored to encourage meaningful public participation, but rather provides a new opportunity for an undefined challenge, without requiring any credible evidence of a potential construction water quality problem, at the point of grading permit issuance, long after land use planning, CEQA, and environmental review and approvals have been completed and obtained.

B. RECOMMENDATIONS

Pollution prevention is the cornerstone of a construction stormwater permit that will enhance water quality. To achieve this goal, the Final CGP should focus on minimizing pollutants in construction site discharges through (i) enhanced pollution prevention planning, (ii) more diligent inspection, and (iii) stricter requirements for the design and maintenance of Best Management Practices (“BMPs”).

As the foundation for this pro-active approach[6], the SWRCB should strengthen CGP requirements[7] to, among other goals, enhance stormwater pollution prevention plans (“SWPPPs”) to ensure that every construction site achieves the following five major objectives:

[6] We characterize our recommended approach as “pro-active” because it has as its principal aim pollution prevention, rather than “after the fact” pollution treatment and/or control. We note that the SWRCB wishes to create a “performance based” construction stormwater permit. We believe the pro-active approach, based on proven effluent control measures and explicit implementation guidelines is not only consistent with “performance based permitting,” but is the best way to achieve it.

- Limit exposed surfaces to the area that can be controlled effectively, and provide erosion control BMPs to all disturbed areas during the rainy season;
- Provide properly designed drainage facilities to control concentrated flows;
- Provide sediment control practices to complement erosion controls around the perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season;
- Reduce the tracking of sediment off site all year; and
- Properly control non-sediment and non-stormwater discharges.

With regard to soil and sediment, the primary pollutants of concern at construction sites, these objectives may be met through a comprehensive system of BMPs that include measures from four categories: runoff controls; erosion controls, sediment controls, and non-storm water management controls. As explained more fully in the accompanying Technical Memo, a wide variety of BMPs in each of the four categories have been tested and analyzed, both in the field and in the laboratory, demonstrating that pollution prevention BMPs are effective when deployed individually. When used together, however, as a system of complementary BMPs or a "treatment train," they are even more effective in controlling construction site pollutants, including soil loss and sediment delivery.[8]

Based on the collective experience of the construction industry observing construction sites throughout California, the majority of sites can be well protected with good SWPPP design, more diligent and proper application and maintenance of BMPs, as well as use of a "hierarchy of complementary BMPs" from the four categories identified above. This pro-active approach is one that contractors can successfully implement, if given appropriate permit-driven guidelines. Moreover, this approach is consistent with the Clean Water Act and supported by EPA.[9]

---

7 *See, e.g.*, suggested PCGP provision changes Technical Memo Appendix C.

8 *See, e.g.*, Technical Memo Appendix D.

9 The relevant statutes, EPA regulations and case law all provide that NPDES permits may rely on BMPs as opposed to NELs and other prescriptive measures. 40 C.F.R. § 122.44(k)(2); 33 U.S.C. § 1342(p)(3)(A); 33 U.S.C. § 1311(b)(1)(C); 40 C.F.R. § 122.44(k)(2); *Citizens Coal Council v. United States EPA*, 447 F.3d 879, 896 n.18 (6th Cir. 2006) (EPA has a "longstanding interpretation of the CWA as allowing BMPs to take the place of numeric effluent limitations [in permits issued under] 40 C.F.R. §122.44(k).") EPA continues to utilize BMPs as both BAT and BCT for construction sites, expressly finding that NELs for construction sites are cost prohibitive with little demonstrative results. *See* Effluent Limitation Guidelines and New Source Performance Standards for the Construction and Development Category, 67 Fed. Reg. 42644, 42658 (proposed June 24, 2002) (to be codified at 40 C.F.R. pt. 122 and 450) ("EPA did not consider numeric pollutant controls a viable option" for construction storm water discharges). Further, EPA concluded that there are a number of difficulties associated with imposing and enforcing NELs that should be addressed before they are implemented in general construction stormwater permits. These include the substantial variability of storm events and pollutant constituents and levels, which make it difficult to formulate numeric effluent limits that bear a reasonable relationship to natural runoff characteristics and receiving water quality. In addition, a lack of relevant monitoring data also makes derivation and implementation of NELs difficult. *See* Meeting Notice, 61 Fed. Reg. 43761

In addition, the Final CGP should provide clear and explicit guidance to assist contractors and SWPPP designers in deciding which types of BMPs should be used under the many and diverse site, climate and receiving water conditions in the State. As recommended in Section IX and Appendix C of the Technical Memo, such guidance should accurately reflect the actual risk category of a construction project provide more detailed direction and standards regarding appropriate BMP selection, design ,and implementation and should enhance inspection and maintenance requirements. Thus, the SWRCB should specify enhanced SWPPP measures for appropriately defined 'high-risk' sites, while allowing less restrictive measures at medium and low risk projects. By establishing a range of solutions, construction water quality controls can be tailored to the specific project, site, construction phase, climate, soils and weather conditions, ensuring appropriate and protective water quality control.

For the many reasons explained in these Comments and in the accompanying Technical Memo, the effluent control measures currently emphasized in the PCGP, including ATS, NELs, ALs, and post-construction hydromodification controls, should be removed. Other measures, such as REAP and the risk-based site determination method, should be revised to more accurately accomplish their intended purposes. In their place, the PCGP should be refocused to emphasize the pro-active approach outlined above and more fully in the accompanying Technical Memo.

We believe that the legal, technical, practical and policy considerations support a CGP that emphasizes a pro-active, comprehensive BMP approach, which recognizes that BMPs work to reduce the risk to water quality associated with discharges from construction sites, and that enhances construction site planning, implementation, and maintenance of BMPs.

In addition, based on these considerations, post-construction hydromodification control standards should not be promulgated as part of the CGP. Instead, the SWRCB should promulgate a post-construction hydromodification policy that, as recommended by the Southern California Coastal Water Research Project ("SCCWRP"), (1) addresses hydromodification control in the land use planning and CEQA processes; and (2) allows for implementation of a suite of management measures addressing the wide array of geomorphically relevant variables that can contribute to hydromodification impacts.[10]

(August 26, 1996). The Construction Water Quality Coalition has offered to assist the SWRCB in obtaining monitoring data to provide information regarding methods that might enhance a BMP-driven compliance approach.

[10] SCCRWP 2005b. Managing Runoff to Protect Natural Streams: The Latest Development on Investigation and Management of Hydromodification in California. Technical Report 475. December 2005 (Stein, Eric D. and Susan Zaleski).

III. LEGAL AND TECHNICAL CONSIDERATIONS AND BALANCING

A. SWRCB Should Follow Mandated Processes and Rules for Establishing Permit Requirements to Ensure that the PCGP Effluent Limits Will Meet Statutory Requirements

1. During the fact finding phase the board should focus on the rules and procedures under which the PCGP will be issued.

Although SWRCB enjoys substantial discretion when establishing permit requirements, that discretion is not unfettered. The Final CGP will establish "effluent limitation guidelines" for the construction industry in California.[11] Because California is authorized to administer the Federal Water Pollution Control Act (the "Clean Water Act" or "CWA") NPDES program as well as the State Porter-Cologne Water Quality Control Act ("Porter-Cologne") program, the SWRCB must consider the requirements imposed by both federal and state law.[12] The heart of both federal and state law is "reasonable regulation," and to ensure this result, the CWA and Porter-Cologne set forth mandatory factors that regulators are directed to consider, weigh and balance when issuing effluent limitation guidelines. Cal. Water Code §13000 paragraph 2; CWA § 1314. Inherent in the obligation to consider and balance these factors is an obligation to obtain the facts and technical information necessary to do so.

As a threshold matter, the PCGP may only regulate the discharge of "pollutants" caused by or attributable to construction activities – not "natural" flows. 33 U.S.C. § 1311(a) (prohibiting "pollutant" discharges by any person); 33 U.S.C. § 1362(19) (federal definition of "pollution"); Cal. Water Code § 13264(a) (prohibiting "waste" discharge); Cal. Water Code § 13050(d) (definition of "waste"). Stormwater discharges from construction sites are regulated as a subset of the industrial stormwater NPDES permit category, and as such, effluent limitation guidelines must be established subject to specific processes and rules mandated under governing statutes and regulations. 40 C.F.R. §§ 122.26 (b)(14)(x); 123.25(a). Significantly, the term and

---

11 The PCGP is not self-enforcing. Instead, the effluent limitation guidelines become enforceable limits when a contractor applies for a site specific NPDES permit at the beginning of construction activity. *EPA v. California Ex Rel. State Water Resources Control Bd.*, 426 U.S. 200, 205 (1976) (General permit effluent limitation guidelines transform into obligations of the individual discharger when a NPDES permit is issued).

12 On May 14, 1973, the United States Environmental Protection Agency ("EPA") expressly recognized the Porter-Cologne legislative scheme (as then amended) as sufficient to protect the waters of the United States under the intervening federal Clean Water Act. *EPA v. California ex rel. State Water Resources Control Board*, 426 U.S. 200, 209 (1976). In September 1989, EPA completed an exhaustive review of the Porter-Cologne regulatory framework and restated the authorization to the State to administer the federal NPDES program to the extent that it does so in a manner that ensures that effluent limits established under the state program are not "less stringent" that those imposed by EPA under federal law. (EPA Memorandum of Understanding dated September 20, 1989.) *See also* Cal. Water Code § 13377. Based upon these conditions, EPA left the administration of the NPDES program in the hands of the SWRCB, its subordinate regional counterparts, and the respective staffs of each – subject to EPA reactive oversight and potential re-involvement. *See Mianus River Preservation Committee v. Administrator, Environmental Protection Agency*, 541 F.2d 899, 906-907 & n.21 (2d Cir. 1976).

duration of a stormwater construction permit commences at the onset of construction activity and ends with final stabilization. *See* SWRCB NPDES General Permit No. CAS000002, Waste Discharge Requirements for Discharges of Storm Water Runoff associated with Construction Activity, pp. 5-6. This general understanding of the context in which the PCGP will be adopted may also assist the SWRCB to focus the initial investigation and technical data review necessary to fashion legally appropriate general construction pollutant control guidelines.

Currently, the Board is engaging in fact finding to develop appropriate stormwater effluent guidelines for the construction industry. To organize our suggestions during this phase, we begin by summarizing the applicable statutory and regulatory framework. With this structure in mind, we discuss the proposed pollution control measures, the technical data needed to support them, and technical and practical information required to be considered in evaluating them. In the context of the applicable legal framework, we explain our concerns with certain proposed pollution control measures, and suggest additional data and findings that should be made or potential revisions to, or replacements for, pollutant control measures that appear to be warranted before the Formal Draft CGP is issued for public comment.

2. Congress and the legislature mandated that regulators balance specific factors when setting effluent limitations and established a rigorous process to ensure balancing is done.

Under both state and federal law, the SWRCB is required to collect substantial factual and technical information, and then to consider, evaluate and balance that information in light of appropriate statutory factors, in order to arrive at a proper determination of appropriate pollutant control guidelines. For reasonable clarity at the standard setting stage, the SWRCB should adopt pollution control standards, measures and methodologies with the same degree of fact finding and technical analysis that EPA uses to adopt its own General Industrial Permit standards for specific industries. *See generally* Best Conventional Pollutant Control Technology; Effluent Limitations Guidelines, 51 Fed. Reg. 24974 (July 9, 1986) (to be codified at 40 C.F.R. pt. 405, 406, 407, 408, 409, 411, 412, 418, 422, 424, 426 and 432).

a) Federal law.

When SWRCB sets pollutant control guidelines in the PCGP, it is establishing a general industrial stormwater permit for the construction industry in California as a category of industrial activity. Under federal law, the distinction between the regulator's promulgation of general permits (and associated development of effluent limitation guidelines contained in them) and its writing of individual permits is extremely important: different procedures and more rigorous fact finding and analysis applies to promulgation of general permits and their effluent limitation guidelines. Because the SWRCB is adopting industry-wide pollutant control standards in a "General Permit," a rigorous federally prescribed process must be used to determine appropriate control strategies and guidelines. 33 U.S.C. §§ 1342, 1314. The SWRCB may not "short cut" this process, by exercise of "best professional judgment" ("BPJ"), because BPJ does not apply to apply when adopting pollution control standards for a general category of industrial stormwater in a General Permit.[13]

The BAT/BCT Effluent Limitation Development Process. The CWA classifies pollutants into two broad categories: 1) conventional pollutants (CWA § 304(a)(4), 33 U.S.C. § 1314(a)(4); and 2) toxics and non-conventional pollutants (CWA § 307(a); 33 U.S.C. § 1317(a)(1)). Conventional pollutants include the most significant pollutants of concern from stormwater runoff at construction sites, including pH, turbidity and total suspended solids (TSS), biological oxygen demand (BOD), and certain petroleum hydrocarbons, including oil and grease. 40 C.F.R. § 401.16. Toxics and non-conventional pollutants are less likely to be discharged as a consequence of construction activity and are listed at 40 C.F.R. § 401.15. Effluent standards for conventional pollutants are set using Best Conventional Pollution Control Technology ("BCT"), while standards for toxics are established using Best Available Technology Economically Achievable ("BAT"). To establish pollutant control guidelines or measures based upon either the BAT or the BCT standards requires a rigorous assessment of several factors, which are set forth in the CWA and EPA's implementing regulations. 33 U.S.C. § 1314(b)(2)(B); 40 C.F.R. § 125.3(d); and 51 Fed. Reg. 24974 (July 9, 1986) (explaining how EPA determines BCT).[14]

In order to properly establish effluent limitations under either BAT or BCT, EPA typically:

[13] Best Professional Judgment ("BPJ") is a legal term of art to describe the exercise of discretion that EPA or the state acting under federal authority may use *when writing an individual permit* under two circumstances - where the Agency has not yet adopted industry wide pollution control standards applicable to the facility and the discharge at issue, or where existing performance in an industry is inadequate. *See* 33 U.S.C.A. § 1342(a)(1)(B); 40 C.F.R. § 125.3(c)(2). *Natural Resources Defense Council, Inc. v. United States EPA*, 859 F.2d 156, 199 (D.C. Cir. 1988), ("BPJ limits constitute case-specific determinations of the appropriate technology-based limitations for a particular point source. In what EPA characterizes as a "mini-guideline" process, the permit writer [exercising BPJ], after full consideration of the factors set forth in CWA § 304(b), 33 U.S.C. § 1314(b), which are the same factors used in establishing effluent guidelines, establishes the permit conditions "necessary to carry out the provisions of [the CWA]. 33 U.S.C. § 1342(a) (1).") *See also National Resources Defense Council v. United States EPA;* 863 F.2d 1420, 1425 (9th Cir. 1988); *Natural Resources Defense Council v. United States EPA*, 822 F.2d 104, 111 (D.C. Cir. 1987); *American Petroleum Inst. v United States EPA*, 787 F.2d 965, 971 (5th Cir. 1986). Under these authorities, EPA may base a BAT/BCT determination upon technology transferred from a different industrial category, using its BPJ, *but only on a permit by permit basis – not as a short cut to promulgating industry-wide pollutant control standards or guidelines*. The Fact Sheet appears, however, to suggest that SWRCB may use BPJ to establish pollutant control measures in the General Construction Permit. *See* Fact Sheet, p. 37 (discussing the mechanism SWRCB proposes to use to establish BAT/BCT effluent limits). Although SWRCB enjoys considerable discretion in its consideration of the many factors required to establish effluent control measures in the PCGP, it may not short cut the required balancing and discernment process by identifying control measures adopted in other contexts and importing them into the PCGP uncritically.

[14] The requirements for setting pollutant control standards using BAT are much the same as for establishing pollutant control standards using BCT. Because pollutants from construction sites are primarily conventional pollutants, for simplicity we will focus our analysis on BCT requirements.

(i) gathers extensive information on the industry (through questionnaires, sampling and monitoring, literature reviews, and other methods);

(ii) performs detailed qualitative and quantitative analyses of this information;

(iii) develops sets of proposed control options for the industry;

(iv) estimates the effluent reductions, costs, economic impacts, and environmental effects of those options;

(v) shapes the options into a proposed set of limits;

(vi) explains the proposed limits in a Federal Register publication and additional supporting documents;

(vii) reviews comments on the proposed limits; and

(viii) incorporates those comments into a final regulation (again with considerable supporting documentation).

The Clean Water Act Handbook 24 (Mark A. Ryan, ed. 2003).

This procedure is an iterative process, which (i) assures critical and in-depth assessment of available scientific and technical information regarding pollutant control technologies available *from the regulated industry*; (ii) provides the factual data necessary for EPA to determine if a potential pollutant control technology is "available," or "feasible" from a regulatory perspective considering industrial activities and economic and technical feasibility of the control technology;[15] and (iii) compares the benefits of the control technologies available in light of receiving water quality conditions, cost-effectiveness affects on the regulated industry affects on the environment, and other applicable factors. A similar process should be followed here because the State is performing the function of creating industry pollutant control guidelines for the construction industry. As SWRCB has recognized, the first step is to review and evaluate the information provided during this fact finding period before formally proposing pollutant control measures.

BCT and BAT Standards. In the CWA, Congress specified the steps that regulators must follow and the factors they must use when issuing industry-wide pollutant control measures or "[e]ffluent limitation guidelines." 33 U.S.C. § 1314 (b).[16] The initial task is to identify pollutants to be regulated in the industrial discharge at issue and determine if they are conventional or nonconventional. Here, pollutants from construction activity are primarily

---

[15] A given technology may be "unavailable" or "infeasible" for many reasons, including economic and technical viability, and non-water quality environmental impacts. *BP Exploration & Oil, Inc. v. United States EPA*, 66 F.3d 784, 796 (6th Cir. 1995) (EPA's determination of an infeasible control measure was appropriately based on "high economic and non-water quality environmental impacts").

[16] The effluent limitation guidelines for toxics and non conventional pollutants using BAT are found at 33 U.S.C. § 1314(b)(2), and the guidelines for conventional pollutants using BCT are found at 33 U.S.C. § 1314 (b)(4).

conventional—sediment/TSS/turbidity, pH, and oil and grease—so BCT is the primary methodology that should be used. Once the nature of the pollutants is determined, the federal statutory scheme stages the regulatory process into three steps.[17]

First, the regulator must make finding concerning (i) the characteristics of the discharged pollutants, and (ii) the degree of pollution reduction attainable through use of best management practices.[18] 33 U.S.C. §§ 1314(b)(2)(A), (b)(4)(A).

Second, the regulator must "identify control measures and practices available to eliminate the discharge of pollutants from categories and classes of point sources, taking into account the cost of achieving such elimination of the discharge of pollutants." 33 U.S.C. § 1314(b)(3). EPA determines the economic achievability on the basis of the total cost to the industrial subcategory and the overall effect of the rule on the industry's financial health.

Third, Congress further specified factors that a regulator must consider with respect to each control measure it promulgates for an industry (collectively, the "Federal Factors"):

1. The reasonableness of the relationship between the costs of attaining a reduction in effluents and the effluent reduction benefits derived;[19]
2. The age of equipment and facilities involved;
3. The treatment process employed;
4. The engineering aspects of the application of various types of control techniques;
5. The [industrial] process changes required to implement the control measures selected;
6. Any non-water quality environmental impacts, including energy requirements; and
7. Such other factors as the Administrator or the state acting under federal authority shall deem appropriate.[20]

---

[17] These steps and associated factors apply when developing both BAT and BCT standards. As a practical matter, the iterative process described in the text supported by The Clean Water Handbook (Mark A. Ryan, ed. 2003) and is used to stage and fully evaluate the data pertinent to a determination of appropriate pollutant control measures for an industry.

[18] "Such regulations shall … identify in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, the degree of effluent reduction attainable through the application of the best control measures and practices achievable including treatment techniques, process and procedure innovations, operating methods, and other alternatives for classes and categories of point sources." 33 U.S.C. §§ 1314(b)(2)(A); 1314(b)(4)(A).

[19] In addition to other factors specified in CWA § 304(b)(4)(B), the CWA requires that EPA establish BCT limitations after consideration of a two- part "cost-reasonableness" test. In 51 Fed. Reg. 24974 (July 9, 1986), EPA explained its methodology for the development of BCT limitations and issued a detailed guidance document to govern the cost benefit analysis that is required to promulgate BCT effluent standards. (*BCT Cost Test Guidance*, September 1980.)

[20] Although the list of statutory factors expressly states that "the [EPA] Administrator" may take into account "such other factors as [he or she] deems appropriate," the discretion extends as well to any state

33 U.S.C. § 1314(b)(4)(B); 40 C.F.R. § 125.3(c); s*ee also*, 33 U.S.C. § 1314(b)(2)(B) for BAT.

When adopting pollutant control standards for industrial discharge categories, including stormwater discharges from construction sites, EPA follows these steps in order to comply with these requirements. *See* 51 Fed. Reg. 24974 (July 9, 1986); *see also*, EPA, NPDES General Permit for Storm Water Discharges from Construction Activities, effective January 2005 ("EPA Construction Permit"). As is evident from a review of EPA's own stormwater guidance, a regulator may base effluent standards on effluent reductions attainable through changes in a discharger's processes and operations. *See generally* 40 C.F.R. § 125.3, which sanctions BMPs as favored pollution control mechanisms that qualify as BAT/BCT. In addition, as evidenced by EPA's general construction permit, BMPs may be promulgated as effluent control measures when authorized under CWA § 402(p) for control of municipal (§ 402(p)(3)(B)) or industrial (§ 402 (p)(3)(A)) discharges. 40 CFR § 122.44(K).

b) State law (Porter-Cologne).

Significantly, the federal BAT/BCT process required to promulgate General Permit pollutant control standards or effluent limits is fully consistent with and subsumes the requirements for issuance of Waste Discharge Requirements in Cal. Water Code §§ 13241 and 13263. EPA recognized the State's authority to administer the federal clean water program in reliance upon all provisions of Porter-Cologne at the time of granting authorization, and thus authorized California to administer the NPDES program recognizing that effluent limits would be imposed using § 13241 balancing factors. Further, the CWA recognizes that "such other factors as [the Administrator's authorized representative] deems appropriate[,]" such as the § 13241 balancing requirements, should be considered when effluent standards are established. 33 U.S.C. § 1314(b)(4)(B); 40 C.F.R. § 122.2. In sum, SWRCB is required to fully consider proposed pollutant control standards in light of the many factors specified to arrive at reasonable and appropriate effluent limitations guidelines for general industrial stormwater permits.

In adopting Porter-Cologne, the legislature expressly stated the Act's goal: "to attain the highest water quality which is *reasonable, considering all demands being made and to be made on those waters, and the total values involved, beneficial and detrimental, economic and social, tangible and intangible*." (Cal. Water Code § 13000 (emphasis added)). Inherent in this fundamental goal is the concept of weighing pollutant control standards and measures in light of the many competing factors to arrive at a "reasonable" balance.

Within Porter-Cologne, the ways to reach the goal of reasonable balance as set forth in Cal. Water Code § 13000 *et seq.*, is articulated in more detail within §§ 13241 and 13263. These sections require the SWRCB to consider a number of carefully prescribed balancing factors whenever fashioning waste discharge requirements. *See, City of Burbank v. State Water Resources Control Bd.*, 35 Cal. 4th 613, 624-28 (2005) (confirming that the Cal. Water Code § 13241 balancing factors must be applied when waste discharge requirements are established pursuant to Cal. Water Code § 13263, except where the agency is merely meeting

---

that is acting as an authorized representative of the Administrator, such as the State here. 40 C.F.R. § 122.2.

and not exceeding *non-discretionary,* federally-prescribed *minimum* requirements). The Porter-Cologne § 13241 balancing factors are:

(a) Past, present, and probable future beneficial uses of water.

(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

(d) Economic considerations.

(e) The need for developing housing within the region.

(f) The need to develop and use recycled water.

Importantly, the Porter-Cologne § 13241 balancing factors (the "State Factors") reflect the California Legislature's most substantive instructions to the water boards concerning the means by which effluent limits or pollutant control measures should be adopted. The State Factors also reflect the Legislature's insistence upon water quality regulation and policymaking that considers and evaluates local and regional differences in physical, water quality, anthropogenic and societal characteristics. We note that the need for housing within each region was specifically identified as an important consideration; this factor is particularly important to establishing pollutant control standards in the construction industry general stormwater permit.

3. Technical, scientific and industry data are crucial to following federal and state statutory mandates when issuing the PCGP.

Among other things, technical, scientific and industry data must provide support for the pollutant control standards mandated in a general industrial stormwater permit, to assure that the proposed pollutant control requirements are both "feasible" or "available," and have a demonstrable and direct link to water quality benefit. Throughout the CGP process, the SWRCB should evaluate and balance all Federal Factors and State Factors (collectively, the "Balancing Factors").

a) Additional fact finding is needed.

Recognizing that the SWRCB is only in an initial fact gathering phase, additional fundamental investigation and data collection groundwork is needed to support advancement of many of the proposed pollutant control measures set forth in the PCGP. Under the BAT/BCT process explained above, the SWRCB should i) gather extensive information on the industry and water quality through questionnaires, sampling, literature reviews, and other methods, and ii) perform detailed qualitative and quantitative analyses of the information. Only then, based on this industry consultation and evaluation and consistent with the results, should SWRCB issue the pollutant control measures for a general permit. (*See* Clean Water Handbook, pp. 22-24, discussed above at § II.A.2.) Among other things, SWRCB should:

- Engage in additional fact finding before formally proposing new control measures;

- Critically consider expert and technical information, including that submitted by and with these Comments and the Technical Memo, pertaining to a number of the control technologies proposed by the PCGP, as well as control technologies emphasized by the existing EPA and California General Construction Permits (source control BMPs, emphasis erosion and sediment control); and

- Compare available construction discharge water quality control technologies, and make a final determination as to the efficacy of the PCGP proposed control measures in light of available scientific and technical information and the Balancing Factors, including comparative water quality benefits, costs of implementation, and environmental effects.

Only after these steps are completed can a final determination be made as to the propriety of the PCGP's proposed control guidelines in light of available scientific and technical information and the Balancing Factors. By following this robust and rigorous process, SWRCB will ensure that the proposed control strategies are appropriate to impose under federal and/or state law.

b) Unless substantial data gaps are filled, the formal draft CGP should not include several of the control measures proposed in the PCGP.

There are three categories of information that currently suffer from critical data gaps[21]:

1) No information has been provided regarding the impacts that the proposed effluent control measures in the PCGP may have on the construction industry in California. In our view, the PCGP as presently proposed would have extremely adverse economic impacts on the California construction industry. All activity from large scale construction projects to small remodels on lots just over one acre all be greatly impacted by several of the PCGP proposed pollutant control requirements. As explained in Sections III and IV.B below, the adverse impacts of the proposed pollutant control standards are not limited to the high cost of the construction period control measures specified, but also flow from the additional carry costs of projects, and the fact that the PCGP as proposed forces contractors and landowners to change the way that they work and construct projects fundamentally, for example, by radically limiting the area that can be subject to active construction at any one time, and by prohibiting all impacts, even those otherwise permitted under applicable law, to drainage divides and drainage patterns. Because these impacts on the construction industry will be many and severe, to comply with the state and federal law Balancing Factors, SWRCB is required to engage in reasonable fact finding to show that the measures proposed are "achievable" and "feasible" technically, economically and from a regulatory perspective, without crippling the construction industry.

21 See Technical Memo Appendix F.

2) No technical information or other specific factual data has been provided showing a nexus between the proposed pollutant control limitations and the effect, positive or negative, on receiving water quality. Most construction stormwater will not discharge directly into surface waters, but rather to municipal storm drain systems (MS4s). The "fate and transport" of such discharges is extremely variable, based on local factors and differences in highly-variable rain events. The receiving water characteristics for MS4s differ substantially from those of natural systems, and the SWRCB should take this into consideration when accessing the potential for a variety of adverse water quality impacts from construction activity, including potential adverse impacts related to Advanced Treatment System technologies and hydromodification control. Without a substantial demonstration that their will be a real – measurable and quantifiable -- benefit to receiving water quality, which can only be determined by considering individual receiving water characteristics, the proposed pollutant control measures cannot be adequately assessed or justified.

3) The PCGP does not provide or analyze any technical assessment of treatment control alternatives that may obtain the same or similar water quality benefit as the more costly, management intensive, and project disruptive measures that SWRCB is suggesting in the PCGP. This technical information is particularly important because the CWA expressly directs a regulator to evaluate and make findings regarding specific alternative treatment processes and BMPs and their efficacy as a first step to imposing effluent limits. 33 U.S.C. § 1314(b)(2)(A), (b)(4)(A).

In addition to these categorical data gaps, which affect the entire permit, the SWRCB needs to develop additional facts and data concerning certain specific proposed pollutant control measures, in order to make a well-reasoned decisions about their propriety. As is explained more fully below, we are particularly concerned about grading limits, ATS, NELs, ALs, and hydromodification control measures. We believe that they are not appropriate technologies for controlling stormwater discharges from the overwhelming majority of construction sites – and there is insufficient information and data available currently to support a decision to include them in the Final CGP.

c) Effluent limits may be deemed invalid if all Balancing Factors are not considered and/or supported by evidence in the administrative record.

Although the SWRCB retains considerable discretion in assigning the weight to be accorded to the Balancing Factors set forth in 33 U.S.C. § 1314(b) and Porter-Cologne § 13241, the agency's decision must be supported by substantial evidence in the administrative record. *Riverkeeper, Inc. v. United States EPA*, 475 F.3d 83, 95-96 (2d Cir. 2007) (citation omitted) ("we measure the regulation against the record developed …"). Full consideration of each of the Balancing Factors is mandatory. *Waterkeeper Alliance, Inc. v. United States EPA*, 399 F.3d 486, 498 (2d Cir. 2005) ("[W]e must deem arbitrary and capricious an agency rule where "the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.") At the fact finding stage, the

SWRCB should proactively identify any technical and factual data that it needs to consider all of the Balancing Factors that Congress and the Legislature have mandated. After full and careful consideration of all evidence submitted and available, the SWRCB will be able to evaluate specific pollutant control measures and balance them against one another to determine which are appropriate to regulate pollutants and to establish general effluent limitation guidelines in construction industry stormwater permits.

B. Technical Considerations Regarding 5-Acre Grading Limit/Active Treatment System (ATS) Requirement

The PCGP requires that "[i]f the soils to be exposed contain more that 10% (by weight) particle sizes smaller than 0.02 mm (medium silt)" the discharger must either deploy an ATS or comply with grading limitations and other enhanced source control procedures ("Grading Limits"). PCGP sections VIII.B.1, VIII.E.1, VIII.G, VIII.H. In light of the technical and scientific information discussed in the Technical Memo §§ VI and IX, we urge the SWRCB to reconsider this proposed pollutant control requirement because, as currently drafted, the requirement is not generally capable of implementation during the construction process, and/or is not reasonably designed to achieve significantly improved water quality benefits in a cost-effective manner and without potentially significant adverse environmental impacts. Pursuing the following technical considerations will be integral to a proper determination of whether the proposed requirement at issue is an appropriate industry-wide pollutant control measure.

1. Soils Test. The Fact Sheet, p. 39, and recent staff presentations at the SWRCB Workshops indicate that the soils test is proposed to identify those sites where it is particularly important to assure that source controls *or* treatment controls are implemented due to a "significant risk that fine particles will be released into surface waters and cause unacceptable downstream impacts." As a threshold matter, as explained in the Technical Memo § V, Executive Summary and Appendix C, appropriate source controls should be implemented to control all soils, and when soils yielding fine sediments will be exposed, implementation of appropriate *erosion* source controls, combined with complementary sediment controls, have been demonstrated in the field to be extremely effective in controlling mobilization of smaller soil particles and fine sediments.

With respect to the soils test proposed to identify those sites posing a "significant" risk of releasing fine sediments, there are substantial questions the SWRCB should resolve regarding whether available technical and scientific information supports the use of the proposed soils test for its intended purpose. Technical Memo §§ IV and VI.

a) Soils Test Derivation Is Unclear.

As discussed in the Technical Memo, it is not clear how the soils test was derived, and the relationship between the test and information regarding sedimentation basin design (which was discussed at the Workshops as the basis for the test) is not apparent.[22] Technical

---

[22] The Fact Sheet does not indicate the basis or method used to derive the soils test proposed. While the Fact Sheet, p. 36, discusses the Williams 1977 and Fifield 2004 studies as the basis for using the Modified Universal Soil Loss Equation as part of the method to distinguish high, medium and low risk

Memo §§ VI and IX.1. Details regarding the derivation of the soils test need to be provided so that the technical and scientific evidence supporting its use can be further evaluated because the test does not appear to be reasonably suited to its purpose.

b) Soils Test Does Not Properly Identify High Threat Sites.

In addition, the weight of available scientific and technical information indicates that the soils test as currently proposed is not appropriate for its intended purpose for at least two reasons. First, the Fact Sheet indicates that the current soils test is based on the principle that more conventional measures for erosion and sediment control cannot effectively control discharges of soils with more than 10% by weight of particles smaller than 0.02 mm. Fact Sheet, p. 39. However, available technical and scientific information indicates that erosion controls are effective to control fine sediments. Technical Memo § V.2 and Attachment A. Because, among many other anecdotal factors, soil erodes heterogeneously with respect to particle size, products effective at preventing erosion and reducing soil loss are expected to retain fine as well as larger particles in place. Technical Memo § IX.2. Further, even some sediment controls other than ATS (such as properly designed sedimentation basins designed to provide sufficient detention and treatment time) can effectively control medium silt, and sometimes finer particle sizes. *See* Technical Memo § VI.6. The proposed soils test, however, does not allow for adjusting the risk profile of a construction site, and thereafter reconsidering the need for prescriptive control measures, based on proper implementation of effective erosion and sediment controls at the site. Nor does the requirement take into account implementation of BMPs proven to be effective in controlling soil erosion and sediment discharges at sites meeting the soils test. Technical Memo § VI.1.

Second, using available soils mapping, it can be established that the vast majority of construction sites (approximately 96% of all mapped soils in the State), will trigger implementation of ATS facilities or the Grading Limits based solely on their soils characteristics. Technical Memo § VI.3. Further, despite the large arid and semi-arid regions of the State, the soils test does not have any element that considers background sediment loads, the variety of soils conditions throughout the State or receiving water characteristics. Nevertheless, the proposed soils test is purportedly intended to identify those sites that present a particularly significant risk of fine sediment discharges that will adversely impair receiving waters. Available literature and information indicates that the proposed "one-size-fits-all" soils test is not an appropriate construction industry permit pollution control requirement, because it is not reasonably tailored[23] to identify those construction sites with a significantly higher risk of contribute fine sediment load that would impair receiving waters, and that would therefore benefit from extraordinary control measures, such as ATS or Grading Limits. Technical Memo § VI.

---

sites, it is not clear if this study is also the basis of the separate "10% by weight of medium silt" test. PCGP § VIII.G.1, p. 19.

[23] California Water Code § 13263(a).

c) Recommended Revisions.

For these reasons, we ask the SWRCB to reconsider and revise the soils test in light of available information, including the following information which is addressed in more detail in the Technical Memo § VI:

- the demonstrated effectiveness of existing conventional treatment processes traditionally employed (namely properly implemented erosion and sediment BMPs) to control fine sediments, and particularly the effectiveness of combined and complementary erosion and sediment controls,[24] which supports adjustment to the risk profile of construction sites based on proper implementation of appropriate erosion controls;
- the typical and variable physical soils characteristics of various units or regions of the State to be regulated by the Final CGP,[25] and the likely implications of the soils test for identification of construction sites posing a significant threat to receiving water quality in light of that information;
- the practical need to incorporate an element that addresses natural receiving water and runoff sediment loads into any test intended to identify sites that may pose a significant threat to impairment to receiving waters due to fine sediment loads discharged from construction sites;[26]
- the water quality conditions that could reasonably be achieved through appropriate erosion and sediment controls, as compared to those that can be achieved by mandating ATS or Grading limits;[27] and
- the cost-effectiveness of mandating ATS or Grading Limits for almost all construction sites throughout the State, which supports tailoring of the test to identify those sites that truly will benefit from those extraordinary water quality control technologies.[28]

2. Grading Limits. The Grading Limits are proposed as an alternative to ATS to control sediment in discharges from sites presenting a significant risk of discharge of small particles to surface waters. Fact Sheet, p. 39. The Grading Limits option requires, *inter alia*, that all sites meeting the soils test and proposing discharge (which, as discussed above, will constitute most construction sites in California as proposed in the PCGP) must limit areas of active construction, throughout the entire period of construction and at all times during the year,

[24] 33 U.S.C. § 1314(b)(4)(B) (consider treatment processes employed); Cal. Water Code § 13241(c) (consider water quality conditions that can be reasonably achieved through coordinated controls).

[25] 33 U.S.C.S § 1314(b)(4)(A) (consider physical characteristics of pollutants regulated); Cal. Water Code § 13241(b) (consider environmental characteristics of hydrographic unit under consideration).

[26] California Water Code §§ 13241(b) (consider environmental characteristics … including the quality of water available thereto) and (c), 13263(a)-(b)

[27] 33 U.S.C. § 1314(b)(4)(B) (consider effluent reduction benefits); Cal. Water Code § 13241(c) (consider water quality conditions that can reasonably be achieved).

[28] 33 U.S.C. § 1314(b)(4)(B) (consider reasonableness of costs of attaining reduction in effluents and the effluent reduction benefits derived); Cal. Water Code § 13241(c)-(d) (consider water quality benefits to be derived and economic considerations).

to no more than 5 acres at any one time, and must provide 100 percent soil cover for all areas of inactive construction within the site. PCGP §§ VIII.H.1.b. and c.

From a practical construction standpoint, this limitation effectively eliminates effective erosion source control BMPs as a viable compliance option for the construction industry.

a) Grading limits are generally not "implementable" given construction processes and requirements.

The impacts on, and changes to, the existing construction 'processes' and methods imposed by the unprecedented[29] Grading Limits would be so substantial as to preclude development of a vast majority of construction projects.[30] Technical Memo § IX.2. As described in greater detail in the Technical Memo § IX.2, mandated compliance with the Grading Limits approach would render the industrial activity for which stormwater discharges are permitted (namely construction and development) infeasible for all but very unusual sites or very small sites (*i.e.* sites that are smaller than five acres in total area) for a number of reasons, including the following::

- For any construction project, it is paramount for public health and safety to assure that geotechnical constraints are addressed by appropriate remedial soils and grading measures. Proper implementation of remedial soils and grading measures typically involves cut and fill patterns requiring more than 5 acres in area to implement, and requires remedial grading techniques that are determined not by the size of permissible impact, but by the geotechnical characteristics of the construction site. An arbitrary 5-acre limit on active construction area generally will not accommodate implementation of necessary remedial soils and grading measures during construction. Technical Memo § __.
- The PCGP recognizes the importance during construction of infrastructure development, and discussed this phase of as the "Streets and Utilities Stage." PCGP section I.25.c. For all sites, infrastructure must be installed in a construction stage designed to efficiently assure proper connection, fall, and grade for infrastructure elements. Therefore, generally, even for smaller sites, infrastructure development must be accomplished on a tract-wide basis, as a discrete phase of construction, and infrastructure development requirements often define tract limits and tract phasing. An arbitrary 5-acre limit on active

[29] Neither EPA nor any other U.S. state has such a small grading area restriction. Technical Memo § IX.2.

[30] 33 U.S.C. § 1314(b)(4)(B) (consider industrial process changes required); Cal. Water Code § 13241(c) (emphasis added) (consider water quality conditions that could *reasonably* be achieved through *controllable* factors). Court's have invalidated effluent control measures that were aimed at forcing "manufacturing" process changes *FMC Corp. v Train*, 539 F.2d 973, (4th Cir. 1976) (BAT "standards are to rely principally upon treatment of industrial wastewater … expensive internal alterations in production should not be mandated … ; in-process control measures may be required, *however, if they are considered normal practic*e within the industry.") (emphasis added).

construction area generally will not permit proper installation of infrastructure. Technical Memo § IX.2.

- Although the PCGP Grading Limits may be intended to permit active construction to occur on up to five acres, the practical reality is less permissive. Because the PCGP mandates 100 percent soil cover for all areas except five acres of active construction, much of the five acres where soil cover disturbance is allowed is required for activities *other than* actual construction, such as pre-staging, vehicle, equipment and materials storage, stockpiling, the provision of power and water supplies, de-vegetated buffers for required construction site fire protection, and the like. As a result of these necessary, but ancillary, construction-related uses of land areas temporarily without soil cover, the five-acre Grading Limits effectively limit the truly active construction site to far less area – perhaps less than two acres. The resulting loss of economies of scale would therefore be all the more practically prohibitive. Technical Memo § IX.2.

b) Construction that might proceed in compliance with Grading Limits would not be cost effective and would have potential adverse environmental impacts.

To the extent that any particular site might be able to feasibly proceed with construction in compliance with the Grading Limits, the restrictions imposed would significantly lengthen overall construction schedules. Technical Memo, § IX. By way of simple example, making the assumption that there is a direct relationship between project size and construction schedule, a 10-acre project that might take 6 months to develop could realistically take a year or more to develop in compliance with the Grading Limits. As discussed in the Technical Memo § IX, the costs of delay in recovery of preconstruction expenses alone (not taking increased construction costs into account at all) associated with extending construction schedules are so significant as to render this treatment control measure cost-ineffective.[31]

The cost-ineffective nature of Grading Limits will be especially evident if the SWRCB directly compares the engineering aspects, including treatment efficiencies, and implementation costs, of traditional erosion and sediment controls versus those of Grading Limits.[32] Evidence discussed in the Technical Memo indicates excellent fine sediment control can be achieved by erosion BMPs, and this performance can be further improved by use of complementary sediment control BMPs, without huge costs associated with delay, carry, and construction infeasibility of Grading Limits. Technical Memo §§ V, IX and Appendix D. By comparison, the relationship between the costs and benefits of attaining a reduction of fine sediments in construction site discharges by implementation of Grading Limits rather than by implementation of traditional erosion and sediment controls indicates that Grading Limits are not

[31] 33 U.S.C. § 1314(b)(4)(B) (consider reasonableness of costs of attaining reduction in effluents and the effluent reduction benefits derived); Cal. Water Code § 13241(c)-(d) (consider water quality benefits to be derived and economic considerations).

[32] 33 U.S.C. § 1314(b)(4)(B) (consider reasonableness of costs of attaining reduction in effluents and the effluent reduction benefits derived); Cal. Water Code §§ 13263, 13241(c)-(d) (consider water quality benefits to be derived and economic considerations).

a reasonable approach to construction industry water quality control because the direct costs of Grading Limits as a "treatment technology," not to mention the indirect costs in terms of adverse affect on provision of housing[33] within the State, will exceed the speculative, and as yet undefined, water quality benefits that might be attained over and above those already provided by appropriate traditional sediment and erosion controls. *Id*.

In addition, CICWQ is currently preparing information that would evaluate the air quality impacts associated with the significant extensions to construction time periods that would result from compliance with Grading Limits. Though construction might occur within a more limited area under the Grading Limits, construction emissions would occur over a longer time period, raising the potential for significant, adverse air quality impacts.[34] Technical Memo § IX.

In practice, the Grading Limits impose a significant constraint on the way that contractors conduct and manage their projects. Because this measure is not aimed at, and tailored to accomplish pollution control, but aimed at the heart of the way contractors build their projects, this measure is inappropriate.[35]

3. ATS. ATS is the other option provided by the PCGP to control sediment in discharges from sites identified by the soils test (as noted above, almost all construction sites in California). Because the Grading Limits are generally infeasible to comply with, under the current draft of the PCGP, ATS becomes the primarily mandated pollutant control requirement for sediment for the vast majority of construction sites in California. Because ATS is a sediment control, rather than an erosion control, that requires collection of construction site runoff, chemical injections, coagulation and settling, filtration and polishing of runoff prior to discharge, and all without regard to background receiving water sediment loads and conditions, a number of technical considerations indicate that it is unlikely that ATS is an appropriate industry-wide pollutant control measure for several reasons, including the following.

At the outset, there is no technical or other data that industry experts have access to supporting the PCGP's suggestion that ATS chemical treatment for sediments will result in better water quality for receiving waters than that achieved by proper implementation of comprehensive and complementary BMPs. Technical Memo § IX. In this regard, it is critical in setting industry-wide pollutant control measures to distinguish between a technology that achieves the best effluent reductions, and the technology that is most appropriate to improve receiving water conditions based upon consideration of all appropriate Balancing Factors, including indirect water quality impacts, non-water quality environmental impacts, cost-effectiveness, and a comparison of engineering aspects and water quality benefits provided by various treatment processes. *Citizens Coal Council and Kentucky Resources Council v. United States EPA*, 447 F. 3d 879 (6th Cir. 2006) (addressing application of BAT standard, which is a

---

33 California Water Code § 13421(e).

34 U.S.C. § 1314(b)(4)(B) (consider non-water quality environmental impacts).

35 Court's have invalidated effluent control measures that were aimed at forcing "manufacturing" process changes *FMC Corp. v Train*, 539 F.2d 973, (4th Cir. 1976) (BAT "standards are to rely principally upon treatment of industrial wastewater … expensive internal alterations in production should not be mandated … in-process control measures may be required, *however, if they are considered normal practic*e within the industry.") (emphasis added).

stricter standard for water quality control than the BCT standard applicable to sediment). The federal Clean Water Act's requirement that EPA (or in this case the State administrator) must choose the "best" water quality control technology does not mean that the chosen technology must be the best at pollutant removal; instead the chosen technology must be acceptable on the basis of numerous factors, only one of which is pollution control. *Id*. at 903. So while the Fact Sheet, p. 38 states that ATS technologies can consistently produce discharges with turbidity less than 10 NTU, the key question is whether that level of pollutant reduction makes ATS the best treatment control technology for construction sites taking into account all appropriate factors.

A number of additional technical issues and concerns integral to establishing industry-wide pollutant control measures designed to implement BAT/BCT indicate that ATS is not the best treatment technology nor an appropriate pollutant control measure, including the following:

- **Potential Toxicity of ATS Discharges.** As concluded in the Blue Ribbon Panel Report,[36] and acknowledged in the Fact Sheet, p. 38, there are serious technical concerns regarding the ATS treatment process.[37] The concerns include the potential acute and chronic toxicity effects that may be associated with long-term, widespread (or in this case, given the soils test and Grading Limits, ubiquitous) use of polymers and chemical additives as a part of the ATS. *See also* Technical Memo § IX.1. Similarly, serious concerns arise with respect to inevitable accidental or improper releases of ATS chemicals and copolymers. Id. As set forth in Technical Memo Appendix G, toxicity testing of ATS discharges conducted concurrently with implementation of ATS methods as proposed in the PCGP cannot effectively preclude the potential for adverse and significant toxic effects associated with use of the technology. The potential for significant adverse toxicity impacts may adversely affect beneficial uses and the many sensitive aquatic species that inhabit California waters. Therefore, water quality benefits of the ATS technology are highly questionable, particularly because traditional erosion and sediment controls do not carry toxicity risks.[38] Technical Memo § IX.

[36] Storm Water Panel Recommendations to the California State Water Resources Control Board, *The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities*. (June 19, 2006) available at http://www.swrcb.ca.gov/stormwtr/docs/numeric/swpanel_final_report.pdf. ("Blue Ribbon Panel Report").

[37] 33 U.S.C. § 1314(b)(4)(B) (consider treatment processes employed); Cal. Water Code § 13241(c) (consider water quality conditions that can be reasonably achieved through coordinated controls).

[38] 33 U.S.C. § 1314(b)(4)(B) (consider environmental impacts); Cal. Water Code § 13241(c). *See*, *Citizens Coal Council and Kentucky Resources Council v. United States EPA*, 447 F. 3d 879 , 900-02 (6th Cir. 2006).

- **Adverse Affects of ATS Sediment deprivation.** An additional technical concern regarding the treatment process[39] identified by the Blue Ribbon Panel Report, p. 17, is the concern that sediment would be *too* greatly reduced in discharges from ATS facilities, creating sediment-deprived "hungry water" that would have adverse environmental effects[40] due to hydromodification within receiving waters related to erosion induced by the discharge of water that does not have a sufficient sediment load. Technical Memo §§ I and IX.1. In addition, because sediment plays an ecological role in many of California's drainage systems, runoff substantially deprived of sediment by ATS facilities may have adverse environmental affects on beneficial uses and species that are sediment dependent. Technical Report §§ I.3 and IX.1. As a result, the Panel recommended a thorough evaluation of background receiving water conditions[41] before mandating those construction sites that should be controlled with ATS technologies. Blue Ribbon Panel Report, pp. 17-18. These concerns regarding the engineering aspects of the treatment process and associated potential adverse environmental effects on receiving waters related to hydromodification and sediment deprivation caused by flows with a substantially lower sediment load than exists under background or natural conditions call into question the water quality benefits of prescriptive ATS requirements as proposed in the PCGP.[42] Technical Memo § I.3 and IX.

- **Inconsistency of ATS and Hydromodification Control.** In addition to the technical concerns related to the potential adverse environmental effects that may be caused by ATS treatment, particularly in alluvial systems in California, the currently inconsistent PCGP provisions regarding ATS and hydromodification control should also be reconciled. The hydromodification effects of ATS treatment, which can be avoided by flexible implementation of BMPs, are plainly inconsistent with the intent of prohibitions against hydromodification. Further, the PCGP omits reference to any defined point in time during construction at which ATS may be discontinued. The inconsistency in PCGP approach should be eliminated.

- **Traditional MBPs Can Be More Effective and Beneficial for Receiving Water Quality.** A comparison of the available information comparing engineering aspects and sediment reductions of traditional erosion and

---

39 33 U.S.C. § 1314(b)(4)(B) (consider treatment processes employed); Cal. Water Code §§ 13263, 13241(c) (consider water quality conditions that can be reasonably achieved through coordinated controls).

40 33 U.S.C. § 1314(b)(4)(B) (consider environmental impacts); Cal. Water Code § 13241(c). *See, Citizens Coal Council and Kentucky Resources Council v. United States EPA*, 447 F. 3d 879 (6th Cir. 2006).

41 California Water Code §§ 13263, 13241(b) (consider hydrographic unit under consideration).

42 *See*, *Citizens Coal Council and Kentucky Resources Council v. United States EPA*, 447 F. 3d 879, 901 (6th Cir. 2006) (upholding EPA's conclusion *not* to mandate certain sediment control BMPs that, due to climactic and geomorphological conditions in the arid and semi-arid west, would discharge sediment-free water likely to actually accelerate channel erosion).

sediment control BMPs[43] indicates that BMPs can be more effective and beneficial for receiving water quality because they can be tailored to site, hydrographic unit soils and receiving water conditions.[44] *See* Technical Memo §§ V, IX and Appendix C. Whereas ATS is rigid and inflexible, BMPs are tailored to site conditions, soils, precipitation and runoff characteristics and receiving water and background conditions**.** In addition, there are no concerns regarding potential acute or chronic toxicity effects due to widespread or long-term use of traditional erosion and sediment control BMPs. Technical Memo § IX.1.

- **ATS Is Not Cost-Effective.** Serious technical concerns also arise with respect to the cost-effectiveness[45] of the ATS technology. As set forth in the Technical Memo § IX, the typical or average costs of ATS are significant, ranging from $26,000 to $115,000 per acre depending on site specific and local conditions but, as noted above, the receiving water benefits are not clearly evident -- particularly in the alluvial and more arid and semi-arid regions of California. The typical costs of ATS are also likely to be understated due to implementation requirements set forth in the PCGP, which add expense. The PCGP indicates that an ATS must be engineered and designed to capture and treat 1.5 times the 10-year, 24-hour storm event and to provide a 48-hour treatment period. To achieve that design capacity, particularly in the "flashy" precipitation and flow conditions of California's more arid regions, and taking into account the possibility of treating multiple day rain events requires substantial area and runoff treatment capacity devoted to ATS implementation. Technical Memo § IX.1. In addition, the PCGP indicates that an ATS must be established for every drainage area within a construction site, requiring the implementation of multiple systems by larger construction sites. Finally, as noted by the Blue Ribbon Panel, ATS costs for smaller sites (less than five acres) are likely prohibitive. Blue Ribbon Panel Report, p. 16. Based on estimated costs, ATS technology is not a cost-effective industry-wide pollutant control measure, particularly when compared to properly implemented, comprehensive and complementary erosion and sediment control BMPs. Technical Memo §§ V. and IX.1.

---

[43] 33 U.S.C. § 1314(b)(4)(B) (consider treatment processes employed); Cal. Water Code §§ 13263, 13241(c) (consider water quality conditions that can be reasonably achieved through coordinated controls).

[44] California Water Code §§ 13263, 13241(b) (consider hydrographic unit under consideration), including the quality of water available thereto).

[45] 33 U.S.C. § 1314(b)(4)(B) (consider reasonableness of costs of attaining reduction in effluents and the effluent reduction benefits derived); Cal. Water Code § 13241(c)-(d) (consider water quality benefits to be derived and economic considerations).

- **Insufficient Capacity to Implement ATS.** To assure technical feasibility of implementation,[46] the Blue Ribbon Panel Report recommends phased implementation of ATS, commensurate with the capacity of the dischargers and support industry to respond to and implement the approach. Blue Ribbon Panel Report, p. 17. However, the PCGP provides no phasing for proper development and implementation of ATS. Currently, according to CICWQ research, there are not enough trained personnel or equipment suppliers to implement the ATS requirements, making compliance technically infeasible. Technical Memo § IX.1.

- **ATS Results in Potential Non-Water Quality Environmental Impact.** In addition to the burdensome costs, limited benefit in comparison with the efficacy of BMPs, ATS results in potential non-water quality impacts related to additional energy usage associated with pumping requirements.[47] Further, because ATS treatment requires operation of pump systems and similar active implementation, as a practical matter, the PCGP needs to take into account local ordinances that prohibit or restrict the operation of construction equipment at night and on weekends. Local operating restrictions may preclude operation of ATS as envisioned by the Permit, making the technology infeasible to attain water quality benefits.

In light of these concerns, we request thorough consideration of information pertinent to Grading Limits and ATS pollutant control requirements. As set forth in the Technical Memo §§ V and IX, we request that the SWRCB consider replacing these proposed control measures with control measures designed to establish pro-active approach to implementation of comprehensive and complementary BMPs emphasizing erosion and source control.

C. Technical Considerations Regarding Numeric Effluent Limits

The PCGP proposes to prematurely and inappropriately mandate construction site compliance with several numeric effluent limits ("NELs"), as follows:

- **pH—All High and Medium Risk Non-ATS Sites.** Within 18 months of adoption, all medium and high risk construction sites (which constitute practically all sites in California; *see* Technical Memo § XI) must comply with a pH NEL of 5.8 to 9.0 pH units (PCGP § IV.3.a), and the PCGP receiving water limitations

[46] 33 U.S.C. § 1314(b)(4)(A) (consider effluent reduction attainable through the application of, and engineering aspects of the control technology); Cal. Water Code §§ 13263, 13241(c) (consider water quality conditions that can be reasonably achieved through coordinated controls).

[47] *BP Exploration & Oil v. U.S. E.P.A.*, 66 F.3d 784, 796 (6th Cir. 1995) (EPA's determination of an "infeasible" control measure was appropriately based on "high economic and non-water quality environmental impacts" *Hooker Chemicals & Plastics Corp. v Train*, 537 F.2d 620, 635-36 (2d Cir. 1976) (a technology may be "unavailable" if there is no data in the administrative record that it may reasonably be expected to yield effluent reduction mandated when applied to particular industry).

also specify that that discharges from these sites shall not be more than 0.2 standard units higher or lower than the pH of receiving water. PCGP § VI.6.[48]

- **pH—All ATS Sites.** ATS discharges shall at all times be within the ranges of 6.5 and 8.5 pH units (PCGP § IV.4.c), and shall not be more than 0.2 standard units higher or lower than the pH of receiving water (PCGP § VI.6).
- **Turbidity—All ATS Sites.** Turbidity of all ATS discharges shall be less than 10 NTU. *See* PCGP § IV.4.d.
- **Toxicity—All ATS Sites.** Acute toxicity shall have no significant difference, at the 96.5% confidence level, between the control discharge and the 100% effluent (a-test), applied as a monthly median of pass-fail tests. Chronic toxicity shall be equal to 1.0 TU_c where TU_c = 100 NOEC. *See* PCGP sections IV.4.a. and b.

As with the Grading Limits/ATS requirements, consideration of technical factors integral to a proper determination industry-wide control measures constituting BAT/BCT reveals that the proposed NELs are overly broad, do not take into account important technical constraints with respect to implementation, and require additional analysis to determine an appropriate numeric value. Technical Memo § II. See also Technical Memo §§ I, VII, VIII and IX. As a result, NELs are not appropriate for inclusion in the CGP. In lieu of NELs, the SWRCB should include requirements in the CGP that refocus permit emphasis on requirements mandating that SWPPP. contain, and projects plan for, implement, and maintain a comprehensive system of BMPs to control construction site pollutants and protect water quality. Technical Memo § V. If a numeric approach is desired, the approach should be focused on setting appropriate Action Levels ("ALs"), by, for example, specifying a formula to calculate ALs that are appropriate in light of background natural runoff, soils, precipitation and water quality conditions as recommended by the Blue Ribbon Panel Report. Such ALs could guide and enhance BMP implementation and control consistent with our recommended emphasis.

In light of the technical and scientific information discussed in the Technical Memo, we urge the SWRCB to reconsider the proposed NELs due to a number of technical concerns and issues. These concerns and issues are described in more detail in the Technical Memo, and include the following summarized below.

- **NELs Are not Feasible Absent Treatment.** As acknowledged by the PCGP,[49] the SWRCB's expert panel stated in the Blue Ribbon Panel Report that it deemed NELs feasible only in connection with implementation of ATS. However, contrary to the findings of the Blue Ribbon Panel, the PCGP proposes a general pH NEL for non-ATS sites on the basis of a staff's Best Professional Judgment.[50] The industry is not aware of any available technical

[48] Note an effluent discharge limitation appears to have been improperly placed in the receiving water limits §of the PCGP.

[49] PCGP § 1.10; Fact Sheet, p. 8

[50] Fact Sheet, p. 37. We note that this is an improper determination of the role of Best Professional Judgment ("BPJ") in setting numeric effluent limits. BPJ cannot substitute for a proper determination of BAT/BCT, nor is it appropriate for use in setting industry-wide pollutant control measures in a General Permit.. *Natural Resources Defense Council, Inc. v. United States EPA*, 859 F.2d 156, 199 (D.C. Cir.

data establishing that compliance with NELs for pH is consistently feasible, absent application of treatment processes[51] like that associated with implementation of ATS. (Technical Memo § II) As discussed, ATS is a treatment process plagued by a number of technical issues making it an inappropriate industry-wide pollutant control standard. The PCGP recognizes that treatment is necessary to consistently achieve a pH NEL, stating that "[t]he General Permit includes a NEL for pH because it is feasible, regardless of storm event size, to isolate, contain, and, if necessary treat storm water that comes into contact with any of the construction materials [that create high or low pH]." PCGP § I.11. The PCGP also appears to recognize the potential infeasibility of construction site compliance with the general pH NEL, stating that "the [general] pH NEL shall become effective 18 months after the adoption of this General Permit, unless the State Water Board finds prior to that time that a NEL for pH in storm water discharges from construction sites is not feasible at that time." Id. Before imposing the general pH NEL on non-ATS sites, it must be shown by a substantial body of technical evidence that it is feasible to achieve the water quality standard absent ATS or treatment to meet the NEL.[52] In light of the Blue Ribbon Panel's conclusions, the PCGP findings, and the issues detailed in §§ I and II of the Technical Memo, it is unlikely that a pH NEL can be met absent treatment.

- **Treatment and Compliance With NELs Are Not Feasible For All Runoff Conditions.** The PCGP generally finds that all NELs are technically feasible to meet because it is feasible to treat stormwater to comply with numeric limits regardless of storm event size or flow conditions.[53] However, there is no evidence cited or provided to support that determination. In fact, the Blue Ribbon Panel determined that NELs, should not be implemented without first studying and taking into account stormwater flow conditions, including runoff volume, seasonality, and the substantial natural pollutant level variability that characterizes stormwater quality. Blue Ribbon Panel Report, p. 16. In fact, the Blue Ribbon Panel recommended that NELs should not be mandated or enforced for construction sites for flow conditions generated by events greater than a certain storm size, which the Panel recommended should be determined

1988), ("BPJ limits constitute case-specific determinations of the appropriate technology-based limitations for a particular point source. Moreover, even where BPJ is appropriate, the permit writer, after full consideration of the factors set forth in §304(b), 33 U.S.C. §1314(b) (which are the same factors used in establishing effluent guidelines), establishes the permit conditions necessary to carry out the provisions of [the CWA]" through what EPA characterizes as a "mini-guideline" process. § 1342(a)(1)). *See also* discussion footnote 3 above.

[51] 33 U.S.C. § 1314(b)(4)(B) (consider treatment processes employed); Cal. Water Code §§ 13263(a), 13241(c) (consider water quality conditions that can be reasonably achieved through coordinated controls).

[52] 33 U.S.C. § 1314(b)(4)(A) (consider effluent reduction attainable through the application of the control technology); Cal. Water Code §§ 13263(a), 13241(c) (consider water quality conditions that can be reasonably achieved through coordinated controls).

[53] PCGP §§ I.10-11.

by reference to studies reviewing the relationship between local stormwater quality variability and flow conditions because it is likely infeasible to meet NELs in high flow conditions. Blue Ribbon Panel Report, p. 18. The studies needed to evaluate these parameters have not yet been conducted, but the PCGP prematurely promulgates NELs applicable in all flow conditions without establishing feasibility of implementation to effect effluent reductions.[54] *See* Technical Memo § II.2.

- **Toxicity NELs Are Required For ATS, Not Construction Site Pollutants, and Are Not Prophylactic.** The toxicity NELs are mandated by the PCGP not to control discharges of pollutants or waste associated with the industrial activity being permitted, but rather due to the identified potential for toxic discharges from ATS, which constitutes the primary treatment method mandated by the PCGP. Promulgation of an industry-wide NEL to address toxicity of discharges from ATS facilities is not an appropriate method to *control construction site* pollutants, but rather to control the ATS discharges. Further, toxicity testing of discharges as proposed in the PCGP will occur concurrently with implementation of ATS, which essentially assures that we can measure when, or how toxic an ATS discharge may be, but provides no prophylactic control preventing adverse water quality effects from ATS discharges. As a result, toxicity NELs are not reasonably designed to result in ATS toxic pollutant discharge reductions as required for industrial discharge pollutant standards,[55] but rather will only provide evidence of the degree to which toxic pollutants are being discharged. A more appropriate approach to pollutant control would be, as recommended by the Blue Ribbon Panel and as conducted in the State of Washington, testing to evaluate potential toxicity impacts of ATS effluent *before* that control standard is mandated. Such testing would assess the potential for toxic ATS discharges and prescribe methods to prevent such discharges, eliminating the need for toxicity NELs in the final CGP.

- **Due To The Relationship of ATS and NELs, NELs Are Not Appropriate Industry Wide Pollutant Control Standards.** The Blue Ribbon Panel Report indicates that NELs are technically feasible for construction sites solely in connection with implementation of ATS technology, and then only if certain precursor studies are conducted to properly consider potential adverse environmental affects of ATS and NELs. Blue Ribbon Panel Report, pp. 15 and 17. Importantly, the Blue Ribbon Panel did not state that NELs were

---

54 33 U.S.C. § 1314(b)(4)(A) (consider effluent reductions attainable through the application of the control technology); Cal. Water Code §§ 13263(a), 13241(c) (consider water quality benefits to be derived).

55 33 U.S.C. § 1314(b)(4)(A) (consider effluent reduction attainable through the application of the control technology); Cal. Water Code § 13263(a) (set discharge requirements reasonably required to prevent waste discharges).

appropriate as industry-wide pollutant control standards,[56] despite being capable of attainment based on ATS technical performance, in part because of the Panel's concerns regarding promulgation of ATS on a long-term, widespread basis. Id. The precursor studies on effects of ATS that were determined necessary by the Panel before mandating NELs and ATS have not yet been conducted. Based on current information, without additional studies as recommended by the Panel, the PCGP's requirements related to ATS are inappropriate in light of several technical factors, including, without limitation, cost-ineffectiveness, potential adverse environmental impacts, failure to consider background sediment loads and conditions, and unclear water quality benefit. Technical Memo §§ II and IX. Accordingly, as a practical matter, because NELs are inextricably linked to ATS and can only be achieved through implementation of ATS technology, NELs are likewise inappropriate industrial pollutant control standards.

- **Under The Balancing Factors, NELs Are Not Appropriate Industry-Wide Pollutant Control Standards.** If, for the sake of full technical evaluation, one considers the sediment and pH NELs apart from ATS, no evidence has been cited or provided indicating that NELs are the most appropriate industry-wide pollutant control standards based on technical considerations applicable to BCT determinations, including, without limitation, cost-effectiveness of implementation, water quality benefit, and potential for adverse environmental effects. As noted above, numeric standards that achieve the best effluent reductions are not necessarily the standards that are best to implement for industry-wide pollutant control, depending on the evaluation of other applicable factors to be considered in determining BCT standards.[57] Available technical information indicates that NELs are inappropriate industry-wide pollutant control standards in light of several BCT factors, including the following. *See* detailed discussion, Technical Memo § II.

  - ➢ Technical information indicates that pH NEL may not be appropriate or beneficial to receiving waters in light of background rainfall, soils and water quality conditions, particularly in light of the fact that the NEL was not derived from data that is representative of background pH conditions

---

[56] The Blue Ribbon Panel did not determine feasibility of ATS or NELs in the context of, or in accordance with the legal requirements applicable to setting pollutant control standards that comply with BAT/BCT. For example, the questions asked and answered by the Blue Ribbon Panel were related purely to whether certain types of measures, including NELs, were physically cable of implementation. The Blue Ribbon Panel clearly did not do the regulator's job of considering various pollutant control measures in light of all applicable Balancing Factors. In fact, many of the Blue Ribbon Panels caveats to their conclusion of technical feasibility pertain to the need to fully evaluate various Balancing Factors, and therefore provide a partial roadmap for the SWRCB in conducting their evaluation of potential pollutant control requirements prior to their promulgation.

[57] *Citizens Coal Council and Kentucky Resources Council v. United States EPA*, 447 F. 3d 879 (6th Cir. 2006).

throughout the State.[58] As discussed the Technical Memo §§ I.1., II.1. and 3., pH of rainwater and soils varies by region within the State and influences pH levels in runoff and receiving waters in natural systems. As a result, pH NELS are likely to be inappropriate industry-wide pollutant control standards for many regions of the State due to the failure to consider regional background conditions prior to promulgating NELs contrary to the recommendations of the Blue Ribbon Panel. Technical Memo §§ I.1., II.1. and 3.; Blue Ribbon Panel Report, p. 16.

- Technical information and PCGP § I.11. indicate that pH NELs are designed to control runoff water quality related to stormwater contact with certain types of construction materials that can change the pH of runoff. These types of materials are only used on construction sites during certain stages of construction, and generally can be shielded from contact with runoff through appropriate application practices and BMPs. Technical Memo § II.2. For example, avoiding application of certain soil amendments or pouring of concrete during periods of predicted rainfall, and shielding these materials from rainfall can eliminate the possibility of runoff contact with materials that might induce detrimental pH changes in runoff. Federal regulations require consideration of exclusions from regulation for runoff that will not be exposed to industrial activities and materials that can cause degradation of runoff water quality due to shelter or material handling restrictions.[59] As a result, runoff from construction sites that will not be exposed to materials that can induce an adverse change in runoff water quality should not be subject to a NEL. Technical Memo § II.2.

- Technical information also indicates that the portion of the pH NEL that appears to be based upon receiving water quality limits has been inappropriately derived. Technical Memo §§ II.2. and 4. The proposed pH NEL states that effluent from construction sites shall not be more than 0.2 standard pH units higher or lower than the pH of the receiving water.[60] However, it is not clear how this limitation was derived, or why the particular numeric limit is necessary to prevent receiving water quality standard exceedances. Id. Pursuant to federal regulations, certain procedures must be followed when determining permit requirements and effluent guidelines necessary to achieve receiving water quality standards.[61] These procedures require consideration of the narrative or numeric receiving water quality standards to be protected, a determination regarding the potential for the regulated discharge to cause or contribute to

[58] 33 U.S.C. § 1314(b)(4)(A) (consider physical characteristics of pollutants regulated); Cal. Water Code §§ 13263, 13241(b) (consider environmental characteristics of hydrographic unit under consideration, including influent and receiving water quality).

[59] 40 C.F.R. § 122.26(g).

[60] PCGP § VI.6, p. 12.

[61] 40 C.F.R. § 122.44(d)(1)(ii).

an *in-stream* excursion of above the water quality standard, the variability of the pollutant in effluent regulated, and the dilution of the effluent in the receiving water. If these factors are evaluated in assessing the proposed pH receiving water NEL, it appears that the NEL is inappropriate. For example, as proposed, the NEL limits pH change more stringently than the typical receiving water pH water quality standard does. As a result, the proposed effluent control standard is more stringent than typical receiving water quality standards themselves. Technical Memo § II.4. Further, the proposed NEL does not properly consider the potential effect of the discharges on the *in-stream* pH of the receiving water. Id. The NEL solely considers the difference between discharge pH values when compared to in-stream values, without assessing the potential affect of the discharge pH on the receiving surface water pH. Id. Technical considerations related to mixing and receiving water buffering capacity have not been considered in setting the proposed NEL, though buffering capacity and affect on in-stream conditions should be taken into account.[62] If buffering capacity and/or natural receiving water pH values are considered, the numeric limitation prohibiting discharge pH values from differing by more than 0.2 pH units is not required. Technical Memo §§ II.2. and 4. For these reasons and others detailed in the Technical Memo, the proposed pH NEL is inappropriate as an effluent control standard to protect receiving water quality standards.

- Technical information indicates that the turbidity NEL limiting sediment in runoff to 10 NTU may not be beneficial to receiving waters[63] and may have adverse environmental impacts due to the ecological role that sediment plays in the State's drainage systems, particularly in more arid and semi-arid areas of the State.[64] Technical Memo §§ I.3. and II.5. Sediment plays an important ecological role not only with respect to geomorphic channel stability as discussed above with respect to ATS requirements, but is also critical to support of aquatic life in certain naturally turbid systems. Technical Memo § I.3. For example, in several areas of both northern and southern California, aquatic organisms, including fish, depend upon naturally high turbidity levels for protection from predators and to support feeding due to the role of sediment in the food web. *Id.* Severely limiting discharges of sediment to comply with the NEL of 10 NTU (about as clear as green tea) will result in sediment deprivation in naturally turbid systems creating not only adverse hydromodification impacts as discussed above with respect to ATS, but also nutrient and predator protection deficiencies adversely affecting

62 40 C.F.R. § 122.44(d)(1)(ii); Cal. Water Code § 13263(b); Technical Memo §II.4

63 California Water Code §§ 13263, 13241(b) (consider environmental characteristics of hydrographic unit under consideration, including water quality).

64 33 U.S.C. § 1314(b)(4)(B) (consider environmental impacts); Cal. Water Code § 13241(c); *see*, *Citizens Coal Council and Kentucky Resources Council v. United States EPA*, 447 F. 3d 879, 900-02 (6th Cir. 2006).

sensitive fish species. Technical Memo §§ I.3. and II.5. For reasons such as these, the Blue Ribbon Panel specifically cautioned that sediment NELs should not be adopted without consideration of background sediment loads in receiving waters and runoff. Blue Ribbon Panel Report, pp. 16 and 17. In light of these technical concerns, mandated statewide and industry-wide compliance with the sediment NEL based solely on the ATS sediment reduction capabilities is not appropriate.

- The PCGP proposes a chronic toxicity NEL due to concerns about toxicity of ATS discharges, but there is no information provided discussing the potential for short-term ATS discharges to cause chronic, as opposed to acute, toxicity in receiving waters. The ATS discharges targeted for "control" by the NEL are short term discharges resulting solely from capture, treatment and then limited duration discharges of stormwater runoff. Technical Report § II. As a result, ATS discharges could not be expected to create the potential for chronic toxicity in receiving waters. Therefore, chronic toxicity testing is not reasonably representative of potential impacts caused by ATS discharges to receiving waters.[65]

- **Discharge Monitoring Required for Use of NELs as Pollutant Control Standards is not Technically Well Designed or Cost-Effective.** Serious technical concerns also arise with respect to the monitoring requirement and the cost-effectiveness of the monitoring required by adoption of a general pollutant control strategy dependent upon NELs.[66] Technical Memo §§ II.6. and VII. Limitations on timing for return of test results and lab capacity raise concerns about testing feasibility and preclude test results from being useful to guide adjustments to prevent pollutant discharge. Technical Memo § II.6. Further, the poorly defined relationship between NEL values and receiving water protection as described above limits usefulness of monitoring data. Technical Report § VII. In addition, significant concerns regarding monitoring costs arise under the PCGP. Technical Memo §§ II.6. and VII. Toxicity tests alone typically run between $2,000 and $3,000 per sample (Technical Memo § II.6.), and as discussed in the Technical Memo § VII, an unnecessarily large number of samples must be collected and tested under PCGP monitoring methods, multiplying these costs. Based on monitoring limitations and estimated costs and questionable water quality benefit of implementing NELs, reliance on NELs as industry-wide pollutant control standards is not an appropriate regulatory strategy. NELs are particularly inappropriate when compared to properly implemented, comprehensive

---

65 40 C.F.R. § 122.41(j) (requiring monitoring results to be representative of the monitored activity); Cal. Water Code § 13267(b)(1) (requiring monitoring programs to "bear a reasonable relationship" to the discharge requirements to be evaluated by the program).

66 33 U.S.C. § 1314(b)(4)(B) (consider reasonableness of costs of attaining reduction in effluents and the effluent reduction benefits derived); Cal. Water Code §§ 13267, 13241(c)-(d) (consider water quality benefits to be derived and economic considerations).

and complementary BMPs—an approach with a proven record for construction industry discharge water quality control (Technical Memo § V and currently considered cost effective for construction sites by EPA[67] and pursuant to the existing California General Construction Permit.

In light of the many technical issues and concerns integral to the determination of whether NELs are appropriate industry-wide pollutant control standards, we urge the SWRCB to reconsider the inclusion of NELs in PCGP. Instead, the CGP should emphasize a pro-active approach for enhanced implementation of traditional BMP-based control strategies as recommended in the Technical Memo.

D. Technical Considerations Regarding Action Levels (ALs)

The Blue Ribbon Panel Report concluded that ALs for sediment and pH, if appropriately derived as true action or upset levels that take into account relevant local conditions, background water quality conditions, and flow conditions, can be a useful tool to deal with discharges associated with construction activities.[68] Blue Ribbon Panel Report, pp. 8, 9, 16 and 17. To the extent that properly derived ALs might be proposed in the CGP to enhance the performance of an industry-wide pollutant control strategy focused on implementation of comprehensive and complementary BMPs by requiring modification of BMPs when sediment of pH ALs are exceeded, the approach would be consistent with the pro-active approach for controlling construction discharges recommended in the Technical Memo §§ V and IX.

However, with respect to the total petroleum hydrocarbon (TPH) AL and the specific pH and turbidity AL values proposed by the PCGP, consideration of technical factors integral to a proper determination of BAT/BCT reveals that the proposed ALs are not appropriate. Technical Memo § I. As a result, the ALs as currently proposed are not appropriate for inclusion in the CGP. The following are among the technical concerns and issues, generally described in greater detail in Technical Memo §§ I and II, that indicate the values proposed for ALs are not appropriate in light of factors and information to be considered when establishing BAT/BCT control measures.

ALs as currently engineered are not well-suited for their intended treatment control purpose for at least three reasons.[69]

---

67 40 C.F.R. § 122.44(k)(2) (provides that BMPs may be used in NPDES permits "to control or abate the discharge of pollutants. . . under § 402(p) of the CWA for the control of storm water discharges".); s*ee also, Citizens Coal Council v. United States EPA*, 447 F.3d 879, 896 (6th Cir. 2006).

68 To assure ALs that are appropriately derived and consider background conditions, which vary substantially throughout the State, it is unlikely that a single numeric value can be set as an industry-wide AL. Technical Memo § II. Instead, it will be necessary to establish a formula of methodology that should be used to derive an appropriate AL for a particular site, considering background conditions, such as local stormwater soils, rainfall, flow and pollutant monitoring data, and "upset" value ranges, given stormwater pollutant variability.

69 33 U.S.C. § 1314(b)(4)(A) (consider the chemical and physical characteristics of pollutant in determining the appropriate level of reduction to be attained), and § 1314(b)(4)(B) (consider the engineering aspects of the treatment control technique and the benefits of effluent reductions attained);

- First, ALs are not currently designed as "upset values" that will reliably indicate a problem with construction BMPs that should be corrected by mandated adjustments in response to AL exceedances. For example, the pH AL is derived based upon assumptions that do not assure that the AL is represents a value clearly above the normal observed stormwater pH variability. Technical Memo § I.1. Similarly, a turbidity AL of 500 NTU does not represent an "upset" value, given the range of typical stormwater turbidity levels. Technical Memo § I.3.[70] As recommended by the Blue Ribbon Panel ALs should be set considering both average pollutant discharge levels for various pollutants and the significant natural variability in stormwater pollutant levels based on local stormwater quality data to assure that values are chosen that consistently represent upset values. Blue Ribbon Panel Report, pp. 17 and 18. Since these factors were not considered in the proposed PCGP AL values, the values should be reviewed and revised according to the Panel recommendations.

- Second, a single set of ALs cannot reliably indicate for all flow conditions a problem with BMPs warranting correction. The Blue Ribbon Panel found that ALs would not be a useful indicator of BMP performance, and should not apply to storms of unusual event size and/or pattern because they do not reliably indicate the need for BMP corrections in those conditions. Blue Ribbon Panel Report, p. 18. The ALs are not derived taking into account flow conditions and substantial stormwater pollutant variability. For example, the turbidity AL applies in all flow conditions, but turbidity and total suspended solids levels in stormwater runoff often vary considerably (even within a single project site in the undeveloped condition) in response to different storm conditions (*e.g.*, rainfall intensity and amount). Technical Memo § I. The PCGP should be revised to relate ALs to appropriate flow conditions to achieve reliable reports of exceedence and useful BMP modifications.

- Third, as recommended by the Blue Ribbon Panel Report, ALs should be set taking into consideration the site's climatic region, typical soils conditions, slopes, and natural background conditions, including receiving water quality conditions.[71] Blue Ribbon Panel Report, pp. 16 and 17. For example, with respect to the pH AL, although soil alkalinity varies widely by region and constitutes an important influence on local pH levels of stormwater runoff and receiving waters, the data set used to derive the AL is likely not representative of the various conditions in differing regions of the State. Technical Memo

---

Cal. Water Code § 13241(c) (consider water quality conditions that could reasonably be achieved through controls).

[70] Per the PCGP § I.13, natural stormwater turbidity values range up to 16,000 NTU, and actual monitoring data shows stormwater turbidity levels in natural and even developed watersheds ranging up to tens of thousands of NTU. Technical Report § I.3.

[71] 33 U.S.C. § 1314(b)(4)(A) (consider physical characteristics of pollutants regulated; Cal. Water Code §§ 13263, 13241(b) (consider environmental characteristics of hydrographic unit under consideration, including influent water quality).

§ I. Similarly, observed values for pH of rainfall are inconsistent with the proposed ALs and the "midpoint" value chosen to measure compliance, depending upon location and quality of the rainfall. Id. Likewise, the turbidity AL is likely not representative of, or appropriate for use in regions with naturally high levels of turbidity and total suspended solids, and application of an inappropriately low turbidity AL is likely to result in significant adverse environmental impacts to receiving waters, channel stability and species as discussed in more detail above. Blue Ribbon Panel Report, pp. 16 and 17; Technical Memo § I.3. Background conditions and the recognized and wide differences among the environmental characteristics of the State's hydrologic units were not considered in establishing the proposed PCGP ALs. Technical Memo §§ I.1. and 3. Therefore, the ALs should be revised to consider these factors as recommended by the Blue Ribbon Panel Report, to assure that the ALs reliably indicate BMP corrections and exceedence reports needed, rather than simply reflecting typical water quality conditions for the region.

If properly designed as a formula or method to identify upset pollutant values for appropriate flow conditions and taking into account local water quality conditions, ALs may be a useful tool in enhancing BMP performance and construction site discharge quality control. Technical Report § I. As proposed, however, the "one-size-fits-all" – ALs are not properly designed to achieve improvement in water quality control.

In additional to concerns regarding AL values, to assure technical feasibility of implementation,[72] the Blue Ribbon Panel Report recommends phased implementation of ALs, commensurate with the capacity of the dischargers and support industry to respond to and implement the approach. Blue Ribbon Panel Report, p. 17. However, no phasing is proposed for development and implementation of ALs. The PCGP should be revised to allow an appropriate implementation period to assure feasibility of compliance.

Further, The Blue Ribbon Panel Report concludes that monitoring required to implement an AL program is likely to be costly. Blue Ribbon Panel Report, p. 18. In considering potential use of properly derived ALs as an industry-wide pollutant control standard, cost-effectiveness of implementing each AL as a control standard is paramount.[73]

Finally, while appropriately tailored monitoring requirements as recommended in the Technical Memo for pH and sediment ALs, if properly set, may allow improved water quality control, there are serious questions regarding the cost-effectiveness and water quality benefit of the TPH AL. Technical Memo § I. 4. TPH testing and analysis is significantly more complicated, takes longer so cannot be accomplished in the field at the time that BMPs need to be evaluated, and is substantially more expensive than pH and turbidity testing. Id. Such testing

---

[72] 33 U.S.C. § 1314(b)(4)(B) (consider effluent reduction attainable through the application of, and engineering aspects of the control technology).

[73] 33 U.S.C. § 1314(b)(4)(B) (consider reasonableness of costs of attaining reduction in effluents and the effluent reduction benefits derived); Cal. Water Code §§ 13263, 13241(c)-(d) (consider water quality benefits to be derived and economic considerations).

cannot be conducted in a manner that enhances pollutant discharge control, in the field. In light of these factors, visual observations of sheen will be a more effective indicator of the presence of hydrocarbons in stormwater and the need for corrective BMP action. Id. As a result, the TPH AL is likely not a cost-effective or beneficial water quality control measure and should be eliminated in favor of required observations for sheen. Id.

AL values as proposed are not appropriate based on a variety of technical issues and considerations. However, revised and properly derived ALs may serve a useful role if the CGP is revised to focus on enhanced implementation of comprehensive and complementary BMPs. Technical Memo § I.

E. Technical Considerations Regarding Hydromodification Control Requirements

The PCGP proposes mandatory pollutant control standards intended to assure that all development sites within the State disturbing more than one acre will control post-development hydromodification impacts on receiving waters. PCGP section IX. K. In light of the technical and scientific information discussed in the Technical Memo, we urge the SWRCB to reconsider the inclusion of hydromodification control requirements in CGP, or, at a minimum, to revise them substantially.

As a threshold matter, while we understand potential post-development hydromodification impacts that can result from new development are important to address and mitigate, the *construction industrial stormwater permit* is not the appropriate mechanism for regulating post-construction hydromodification impacts for a variety of legal, policy and practical reasons. These concerns are discussed in detail in §IV of these Comments.

Further, if the SWRCB were to adopt post-development hydromodification control standards as construction phase industrial stormwater permit pollutant control measures, the regulatory framework pursuant to which the SWRCB would be adopting these standards is not at all clear. In adopting hydromodification control standards as a part of the construction industrial stormwater permit, the SWRCB could be operating under legal principles applicable to development of BAT/BCT pollutant control standards for industrial stormwater permits,[74] or those applicable to development of maximum extent practicable ("MEP") controls (which are more properly applicable to post-construction urban runoff),[75] or those applicable under Porter-

---

[74] *See* discussion of considerations applicable to development of BAT/BCT water quality control standards in § III.A of these Comments above.

[75] With respect to urban runoff, the Clean Water Act requires that permits for discharges from municipal storm drains (MS4s) must be issued, and that the permits must "require controls to reduce the discharge of pollutants to the maximum extent practicable ["MEP"], including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants." 33 U.S.C. § 1342(p)(3)(B)(iii). In adopting § 1342(p) of the Clean Water Act, Congress intended to provide the EPA, or the regulatory agency of an approved state (and in California, that responsibility resides with the Regional Boards), with broad, but not unfettered discretion in determining the permit requirements necessary to meet MEP. *Building Industry Ass'n. of San Diego County v. State Water Resources Control Bd.*, 124 Cal. App. 4th 866, 883 (4th Dist. 2004); *City of Abilene v. United States EPA*, 325 F.3d 657,

Cologne.[76] Consequently, we must request that the SWRCB clearly and expressly indicate the legal framework that it intends to apply in developing post-development hydromodification control standards for the CGP.

Nevertheless, in comparing the three types of potentially applicable legal principles that may be applicable to the adoption of hydromodification related pollutant control standards, it is clear that the SWRCB will need to evaluate certain technical issues, information and concerns when exercising its discretion to appropriately craft post-development hydromodification requirements regardless of the legal framework within which the SWRCB operates. The SWRCB's determination of appropriate hydromodification control standards will involve evaluation of technical information, issues and concerns developed and identified during this fact finding period that are related to many of the same balancing factors including, without limitation:

1. The nature of a discharge, *i.e.*, the amounts of constituents and chemical, physical, and biological characteristics of pollutants in a discharge;[77]

660-61 (5th Cir. 2003); *Defenders of Wildlife v. Browner*, 191 F.3d 1159, 1166-67 (9th Cir. 1999). For the reasons discussed under § III.A of this Letter above, in exercising discretion to establish MEP water quality control measures pursuant to the approval of the Porter-Cologne statutory scheme encompassed in EPA's delegation of the federal water quality program, the water boards must consider the factors expressly set forth in Cal. Water Code §§ 13241, 13263 and 13377. These statutory sections, approved by EPA, provide instructions to the water boards for exercising their discretion in issuing federal permits. In addition, the State Water Board has provided guidance with respect to factors to be considered in establishing MEP water quality control standards and permit conditions. The State Board recommends consideration of several factors, including, *inter alia*:

- Effectiveness: Will permit conditions address a pollutant of concern?
- Public Acceptance: Will permit conditions call for BMPs that have public support?
- Cost: Will the costs of implementing permit conditions be reasonably related to the pollution control benefits to be achieved?
- Technical Feasibility: Will permit conditions be technically feasible considering soils, geography, water resources, etc.? Elizabeth Jennings, Senior Staff Counsel, Memorandum, *Definition of Maximum Extent Practicable*, State Water Resources Control Board (February 11, 1993.)

[76] Under Porter-Cologne, §§ 13241 and 13263 require that when the water board considers waste discharge requirements (WDRs) and permit conditions they should consider (i) the nature of any proposed discharge, existing discharge, or material change in an existing discharge; (ii) the relationship of the discharge to conditions existing in the disposal area or receiving waters upon, or into which, the discharge is made or proposed, (iii) requirements necessary to implement any relevant water quality control plans, beneficial uses to be protected, and water quality objectives, (iv) other waste discharges, (v) the need to prevent nuisance, and (vi) the provisions of § 13241, which, in addition to the factors already named, require consideration of: (a) past, present, and probable future beneficial uses of water; (b) environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto; (c) water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area; (d) economic considerations; (e) the need for developing housing within the region; and (f) the need to develop and use recycled water.

[77] 33 U.S.C. §§ 1314(b)(2)(A), (b)(4)(A); Cal. Water Code § 13263.

2. The effectiveness or degree of effluent reduction attainable through the application of the proposed control measures;[78]
3. The characteristics of alternative treatment processes employed and available, including engineering aspects of various types of control techniques;[79]
4. The technical feasibility of implementing proposed pollutant control measures considering, among other factors, soils, topography, geography, water resources;[80]
5. The practical impacts, including impacts on construction methods and processes, and economic effects on the industry related to compliance with pollutant control measures proposed;[81]
6. The reasonableness of the relationship between the costs of attaining a reduction in effluents via proposed pollutant control measures and the effluent reduction benefits derived (cost-effectiveness);[82] and
7. Environmental conditions and potential environmental effects related to implementation of alternative pollutant control measures, including conditions within and effects on receiving waters and the hydrographic unit under consideration, as well as non-water quality environmental effects.[83]

Although hydromodification standards should not be promulgated in the construction stormwater permit, if the SWRCB determines to retain post-development hydromodification controls, we request that, at a minimum, the SWRCB reconsider and revise the proposed hydromodification control standards substantially to address several scientific and technical issues and concerns relevant to assessing the propriety of those standards under the foregoing factors. These scientific and technical issues and concerns include those described more fully below and in the Technical Memo § X.

1. Factors 1, 2 and 3: Nature of the pollutant of concern and the characteristics of alternative treatment processes employed and available.

As a threshold matter, although no information is provided in the Fact Sheet with respect to the waste or pollutant of concern addressed by the proposed post-development

[78] 33 U.S.C. §§ 1314(b)(2)(B), (b)(4)(B); 40 C.F.R. § 125.3(c); Elizabeth Jennings, Senior Staff Counsel, Memorandum, *Definition of Maximum Extent Practicable*, State Water Resources Control Board (February 11, 1993); Cal Water Code §§ 13263, 13241(c).

[79] 33 U.S.C. §§ 1314(b)(2)(B), (b)(4)(B); 40 C.F.R. § 125.3(c); Cal Water Code §§ 13263, 13241(c).

[80] 33 U.S.C. §§ 1314(b)(2)(B), (b)(4)(B); 40 C.F.R. § 125.3(c); Elizabeth Jennings, Senior Staff Counsel, Memorandum, *Definition of Maximum Extent Practicable*, State Water Resources Control Board (February 11, 1993.); Cal Water Code §§ 13263, 13241(c).

[81] 33 U.S.C. §§ 1314(b)(2)(B), (b)(4)(B); 40 C.F.R. § 125.3(c); Elizabeth Jennings, Senior Staff Counsel, Memorandum, *Definition of Maximum Extent Practicable*, State Water Resources Control Board (February 11, 1993) (consider public acceptance); Cal Water Code §§ 13263, 13241(c)-(e).

[82] 33 U.S.C. §§ 1314(b)(2)(B), (b)(4)(B); 40 C.F.R. § 125.3(c); Elizabeth Jennings, Senior Staff Counsel, Memorandum, *Definition of Maximum Extent Practicable*, State Water Resources Control Board (February 11, 1993); Cal Water Code §§ 13263, 13241(c)-(d).

[83] 33 U.S.C. §§ 1314(b)(2)(B), (b)(4)(B); 40 C.F.R. § 125.3(c); Cal Water Code §§ 13263, 13241(a)(b).

hydromodification pollutant control standards, we presume for purposes of informal fact-finding only that, based on existing scientific information and other Regional Board regulatory efforts, the goal of these standards is flow control to avoid erosion and sedimentation processes in natural channels that impair beneficial uses. It is important, however, to consider specific factual information related both to the character and degree to which flow may be a "pollutant" or "waste" and the receiving waters protected. Not all post-development runoff has the potential to de-stabilize receiving waters resulting in adverse hydromodification affects to beneficial uses. For example, controlled flows or discharges to concrete-lined flood control channels may not have the potential to adversely affect water quality, and therefore would be inappropriate to regulate.

With respect to hydromodification impact characteristics, based on a review of applicable scientific studies and literature, including the work of Lane and Rosgen cited in the Fact Sheet, pp 26-27, but also later studies refining that work, including SCCWRP, 2005b Managing Runoff to Protect Natural Streams: The Latest Development on investigations and Management of Hydromodification in California. Technical Report 475, December 2005 (Stein, Eric D. and Susan Zaleski ("SCCWRP 2005b"), GeoSyntec Consultants, 2002. Hydromodification Management Plan Literature Review, Santa Clara Valley Urban Runoff Pollution Prevention Program ("Geosyntec Study"), and GeoSyntec Consultants, 2004. Hydromodification Management Plan, Santa Clara Valley Urban Runoff Pollution Prevention Program ("SCVURPPP Report"), it is well established that when hydromodification impacts that adversely affect stream stability occur, they are a result of the interplay between several geomorphically relevant characteristics, including: local channel characteristics (*e.g.*, bed and bank materials, and slope or grade); sediment loads, size and supply; critical channel thresholds for sediment transport; and volume, velocity and duration of discharges to and flows within the channel. Technical Memo § X. Without hydromodification controls, development typically changes a number of these characteristics, and a change in any one of these variables sets up a series of mutual adjustments in companion variables with resulting potential for adverse impacts to the physical characteristics and stability of natural channels. Fact Sheet § III.B.2.

These critical and geomorphically relevant characteristics can be subsumed into three categories: sediment load characteristics, discharge flow characteristics and in-stream channel characteristics. As alluded to above, with respect to in-stream channel characteristics, it is particularly important to consider the existing condition of channels in determining the potential for hydromodification impacts. Some surface waters, particularly channels to be preserved in a natural condition, may be susceptible to hydromodification impacts, and in such cases hydromodification controls should be considered. But other types of surface waters including hardened flood control channels, large lakes, bays, the ocean, and certain large drainage systems subject to reset events) may not be susceptible to adverse effects on beneficial use due to hydromodification impacts (as distinguished from other types of pollutant impacts). Such surface waters may not need a substantial level of protection from hydromodification impacts because in those types of systems, hydromodification does not adversely affect beneficial use. Technical Memo § X. To be appropriate, any hydromodification standards adopted should take into account all geomorphically relevant characteristics identified by scientific and technical literature as relevant to the adverse affect on receiving water beneficial uses.

Because there are several physical variables that determine the degree to which development and construction of impervious surface will result in hydromodification impacts, there is today a correspondingly wide array of hydromodification control tools (or treatment processes) available to control development related hydromodification impacts. Technical Memo § X. A substantial number of tools exist to address each of the three categories of characteristics, and often any particular tool will address more than one of the relevant characteristics. Id. For example, development project design features that cluster development, leaving natural open space, and that avoid concentrating flows and/or managing sediment loads in runoff from natural open space areas, all assist in reducing hydromodification impacts by managing volume and duration of flows, and retaining sediment load characteristics. Id. In addition, a wide menu of controls, including cluster development, other smaller scale low impact development strategies, as well as regional volume reduction and flow control BMPs, and combined treatment and flow control BMPs, are all useful for preventing hydromodification impacts by addressing flow characteristics,--not only velocity of flows, but also volume and duration of flows. Id. Finally, in-stream geomorphically referenced controls can also be used to address in-stream characteristics in a manner that prevents hydromodification impacts. Id.

The most scientifically sound studies (See, *e.g.*, SCCRWP 2005b) have all involved hydromodification plans employing a comprehensive set of management options addressing the many different geomorphically relevant characteristics that determine degree of potential impact, which can be applied flexibly, but in accordance with performance standards, to reduce hydromodification effects in natural channels. Measures and standards include control measures from several different categories, including :

Geomorphology/Terrains:

- recognize and account for the hydrologic response of different terrains and soils at the sub-basin and watershed scale.
- recognize and measure pre-project v. post-project erosive potential to assist in demonstrating that increased flows will not accelerate stream erosion.

Hydrology:

- control of hydrology to mimic, to the extent feasible, existing runoff and infiltration patterns in consideration of specific terrains, soils types and ground cover.
- minimize alteration in timing of peak flows while controlling duration of flow.
- use continuous simulation modeling to compare post- to pre-project flows to assist in demonstrating increased flows will not accelerate stream erosion.

Sediment Sources, Storage and Transport:

- Maintain coarse sediment yields, storage and transport processes.
- design of geomorphically referenced in-stream solution that protect or enhance habitat.

Project Design:

- Reduce percentage of directly connected impervious area using cluster design of development as well of low impact development techniques where feasible in light of soils, groundwater and geotechnical conditions.
- Use of regional and combination treatment and hydromodification source control BMPs.

Despite the wide array of geomorphically relevant characteristics that determine the degree to which potential hydromodification impacts may occur as a result of development, the PCGP mandates four hydromodification control strategies[84] that take into account and address only one of the three categories of relevant variables (*i.e.*, the flow characteristics category). As set forth in available scientific literature, these pollutant control measures are too simplistic to effectively address the array of environmental variables related to the hydromodification impacts targeted for regulation. Technical Memo § X.

Equally as troublesome is the fact that, because the PCGP hydromodification control standards solely address flow characteristics, compliance with these standards precludes the use of the wide range of other hydromodification control tools available that address and control other characteristics relevant to hydromodification. Limiting or precluding the use of many available hydromodification control tools in favor of mandating tools designed to preserve pre-development flow characteristics is not consistent with scientific literature regarding prevention of hydromodification. Technical Report § X. In addition, it is inappropriate for general, industry-wide pollutant control standards to limit or preclude the use of available and effective control technologies that are currently being employed to successfully avoid, minimize and mitigate adverse hydromodification effects. While this approach has been justified at the Workshops as setting a "minimum standard" for hydromodification control, in fact compliance with these flow related standards[85] requires use of a single method or tool for addressing hydromodification control and actually precludes use of other hydromodification control tools in the manner recommended by available scientific literature. Technical Memo § X. Because the proposed standards preclude implementation of effective and available treatment controls, they are inappropriate as proposed to include in the CGP.

Moreover, because the proposed hydromodification control standards both address only one category of the physical variables related to causing hydromodification impacts, and, at the same time, preclude the use of many effective hydromodification control tools, inappropriate outcomes will result from adoption of the standards as proposed. First, as discussed in § E.2. of the Comments, compliance with the proposed hydromodification control standards related to preservation of drainage divides and drainage patterns is technically infeasible to accomplish based on existing construction industry methods and processes, which will adversely affect the development industry as a whole. Further, these two standards are not directly related to, and are unnecessary for protection of water quality, particularly in light of

[84] The four standards generally address preservation of drainage divides, preservation of drainage patterns, preservation of pre-development runoff volume, and preservation of pre-development time of concentration.

[85] Compliance may not be feasible; please see § D.2 of this letter below.

other effective, and more appropriately targeted hydromodification control strategies available for implementation. Technical Memo § X. In addition, industry-wide mandated compliance with the proposed hydromodification pollutant control standards requiring maintenance of runoff volume and time of concentration will result in one or more of three equally inappropriate outcomes:

- Technical infeasibility. Technical Memo § X. *See* § E.2. below;
- Costly, but unnecessary over-control of project runoff characteristics. Technical Memo § X. *See* § E.2. below; and/or
- Insufficient control of hydromodification impacts. Technical Memo § X.

Because the proposed hydromodification pollutant control standards fail to address the majority of relevant pollutant characteristics, preclude the use of effective and available pollutant control technologies, and will result in inappropriate outcomes, they should not be adopted as proposed. Instead, if the SWRCB were to proceed with the inclusion of hydromodification control standards in the CGP, the standards should be developed based on comprehensive consideration of all factors causing hydromodification, should not undermine or conflict with implementation of available and effective hydromodification control tools and strategies, and should be designed to avoid the inappropriate outcomes associated with the currently proposed standards. As the Technical Memo § X discusses, it is feasible to develop appropriate hydromodification pollutant control standards that are flexible enough to allow consideration of all factors contributing to hydromodification impacts, many of which will vary by region within the State, and that will allow use of all available hydromodification control tools. If the SWRCB were to promulgate hydromodification standards, we encourage the SWRCB to consider the recommended approach to developing such standards.

Finally, we should note that the uncritical application of hydromodification control standards that are not reasonably tailored to address substantial environmental effects throughout the State conflicts generally with certain fundamental principles of California land use and environmental law. First, the proposed standards are not reasonably focused on preventing environmental harm as generally required by environmental law principles. Second, the proposed standards do not allow for any *balancing* of environmental quality with other public benefits as generally provided for by principles of environmental law. For example, the California Environmental Quality Act (CEQA) and the Porter-Cologne Act exhort decision-makers to *balance* environmental quality against other considerations, such as the need for housing. Finally, principles of environmental law generally require serous consideration of local conditions and promote flexibility to accommodate and address environmental issues in light of local conditions. Far from constituting appropriate minimum environmental standards, the blunt hydromodification control requirements set forth in the PCGP do not comport with general principles of environmental law.

2. Factors 4, 5 and 6: Technical feasibility, cost-effectiveness and impacts to the development industry of implementing proposed standards.

a) Preservation of drainage divides.

PCGP requires that projects exceeding two acres must preserve the post-construction drainage divides for all drainage areas serving a first order stream, (PCGP § IX.K.2), and projects whose disturbed project area exceeds 50 acres must preserve the pre-construction drainage patterns. PCGP § IX.K.3.

Compliance with these requirements is not technically feasible for the vast majority of construction projects given that construction must result in post-development projects that provide geotechnical stability, sufficient flood control protection and drainage systems that meet applicable local agency storm drain improvement and flood control ordinances. Technical Memo § X. Volume, duration and peak flow controls, including controls to achieve proper dispersion of runoff required to avoid both localized flooding, erosion impacts at discharge points, and broader hydromodification impacts, cannot be constructed for the vast majority of project sites without some changes to drainage patterns and/or first-order streams. Technical Memo § X. Due to technical infeasibility of compliance with the proposed standards in light of existing development construction processes and methods, these standards should not be adopted.

In addition, compliance with these requirements is technically unnecessary to protect surface waters from hydromodification impacts. Technical Memo § X. Alteration of drainage patterns and divides is not a direct cause of hydromodification impacts, and patterns and divides may be modified, permitting construction of development projects, without causing adverse hydromodification to natural streams and channels. Id.

It should also be noted that impacts related to physical alteration of drainage patterns and divides related to first order streams are already regulated. Such impacts would necessarily require review under CEQA,[86] and local hydromodification control regulations typically enacted in MS4 permits. Further, drainage divide or pattern changes involving physical alterations to jurisdictional surface water require Clean Water Act § 404 permits, and Regional Water Quality Control Board (RWCB) § 401 water quality certifications, as well as California Department of Fish and Game Streambed Alteration Agreements.[87] Currently, development projects must analyze the potential for hydromodification impacts under section 404/401 processes, CEQA, and MS4 permits. As a trustee agency under CEQA, [88] and as the issuing agency for MS4 permits and § 401 water quality certifications, RWQCBs currently have the authority to require sufficient avoidance, minimization and mitigation as necessary to address potential hydromodification impacts that may result from impacts to drainage divides and patterns. *See also*, SCRWP 2005b. However, under the PCGP as proposed, even permitted alterations in drainage patterns and divides that are fully minimized and mitigated would violate

[86] California Pub. Res. Code § 21000 *et. seq.*

[87] California Fish & Game Code § 1600 *et. seq.*

[88] California Pub. Res. Code § 21070.

the construction permit, preventing construction of even approved, permitted and/or vested development projects.

Mandating hydromodification controls standards that are technically infeasible for a vast majority of the industry to implement, and that would preclude development of approved, and/or vested projects otherwise legally permitted and approved, minimized and mitigated will have serious and adverse economic effects on the construction industry as a whole, and the ability of the industry to provide housing will be severely compromised.[89]

b) Maintaining runoff volume and time of concentration.

The PCGP requires that all projects impacting greater than one acre shall, regardless of site slopes, soils or receiving water conditions, ensure that post-development runoff volume approximates pre-project runoff volume specifically for each of the areas covered with impervious surfaces. PCGP § IX.K.1. Further, all projects impacting greater than two acres shall, regardless of site, soils or receiving water conditions, ensure that pre-development runoff time of concentration is essentially maintained. PCGP §§ IX.K.2.,3., and 4. These standards may be under-protective, as discussed in section E.4 below, but if implemented in a manner that attempts to protect receiving waters, at a minimum will be cost-ineffective and may, depending on site soils conditions and other geomorphically relevant characteristics, be technically incapable of implementation. Technical Memo § X.

Volume and time of concentration are two flow characteristics related to hydromodification impacts that, if controlled, can help to reduce impacts. However, adjustments to control changes in other geomorphically relevant characteristics, including flow rates, flow duration, sediment loads, and in-stream channel characteristics, can also effectively control such impacts. Technical Memo § X. In addition, implementation of regional flow controls for not only volume, but also duration and velocity, can be a very effective component of a hydromodification control strategy, and can provide cost efficiencies, both in implementation and in later operation and management. Technical Memo § X. Because the PCGP requirements do not allow for regional BMPs or use of tools that address other geomorphically relevant characteristics, if hydromodification impacts can be controlled sufficiently at all via compliance with PCGP standards, such control will be very expensive and technically difficult to achieve. Technical Memo § X. In fact, contrary to the proposed standards, available technical information shows that runoff volumes can increase and runoff time of concentration can change to some extent without causing hydromodification impacts, so long as other appropriate BMPs are implemented in a manner that prevents an increase in erosive work done on the channel. Id. As a result, strict compliance with these standards is not necessary or appropriate for protection of water quality, and the standards certainly do not represent "minimum" standards appropriate for implementation as industry-wide pollutant control standards. Id.

In addition, maintaining runoff volumes may be technically infeasible to achieve. The PCGP standard as proposed requires that post-development runoff volumes must approximate pre-development runoff volumes "from the impervious area" of the project, without

[89] The potential of these standards to invalidate and prevent construction of not only future, but existing approved and vested projects also creates serious property rights issues.

consideration or offset for other project areas that may be left in and open space or pervious condition due to clustering of development. Technical Report § X. Appropriately planned development can cluster development on less pervious soil types, and leave more porous soils in landscape or open space treatments to offset impacts of impervious development. But the PCGP standard as proposed does not allow runoff volumes from the project area as a whole to be considered, undermining the clustering approach as a tool for runoff management. Id. Similarly, runoff volumes can be controlled effectively in regional infiltration facilities, but the PCGP precludes use of these tools to address hydromodification impacts. Id.

Further, maintaining volume or runoff, without taking into account regional BMPs or controls for other geomorphically relevant factors may be infeasible because site soils conditions, groundwater levels, or geotechnical constraints preclude sufficient infiltration opportunities. Technical Memo § 10.

In the event that any particular development project could comply with the hydromodification standards as proposed, the methods of complying will not be nearly as cost-effective as implementation of a combination of available hydromodification tools can be, and therefore should not be mandated. Technical Memo § X.

In light of these and other issues regarding technical feasibility, cost-effectiveness and impact on the development industry as a whole, the hydromodification standards should be reconsidered for inclusion, or should be revised substantially. The key policy concern is protection of natural drainages from hydromodification, rather than control of post-development runoff characteristics. Control of runoff characteristics is only one tool of many to achieve the policy goal. Therefore, a standard that provides sufficient flexibility to address the range of geomorphically relevant characteristics comprehensively, via a full set of available hydromodification tools, should be considered as recommended in the Technical Memo § X.

3. Factor 7: Environmental conditions and potential environmental effects of proposed standards.

a) Maintaining runoff volume and time of concentration.

The proposed hydromodification control standards requiring maintenance of pre-development runoff volume and time of concentration also present concerns that they are under-protective, and will not prevent adverse hydromodification impacts in receiving waters. As noted above, runoff time of concentration and volume are only two aspects of the hydrograph, which, in turn, comprises only one category of geomorphically relevant characteristics that can be affected by development (*i.e.* flow characteristics). Technical Memo § X. Even if one considers only controls focused on changes to the pre-development hydrograph, focusing solely on controlling runoff volume and time of concentration is too simplistic an approach and could result in hydromodification impacts in the receiving waters due to under-control of surface discharge rates and durations. Id. For example, even if site soils, groundwater, and geotechnical conditions allow implementation of an infiltration basin that meets the stated criteria, a more erosive flow regime could be produced due to failure to control the rate at which permissible discharges are released. Id. Given that these standards are not sufficient to prevent adverse receiving water environmental impacts, but will be very expensive or potentially infeasible to implement, they should not be adopted as proposed.

b) Preservation of drainage divides and patterns.

In addition to being poorly suited to control hydromodification impacts as discussed above, the proposed hydromodification control standards requiring preservation of drainage divides and patterns may have adverse environmental impacts with respect to creation and restoration of wetlands and riparian habitat areas, particularly if applied at the project specific rather than watershed scale. Wetland and riparian habitat creation and restoration projects are the only means of redressing historical habitat losses and/or complying with the state and federal "no net loss" policies applicable to CWA § 404 permits and Cal. Fish and Game Code § 1602 streambed alteration agreements. Some alteration of drainage divides and patterns at a project scale is absolutely required to provide hydrology necessary to implement wetland and riparian creation and restoration projects, whether as environmentally beneficial projects or as mitigation. Technical Memo Appendix H. As a result, these hydromodification standards as proposed are likely to have direct, adverse environmental affects on wetland and habitat creation and restoration, and indirect adverse environmental affects on the species that would use and/or occupy those habitats.

In light of these and other potential adverse environmental affects, the hydromodification standards, if included in the CGP as pollutant control standards, should be substantially revised as recommended in the Technical Memo § X.

IV. MAJOR POLICY CONSIDERATIONS

In addition to the serious technical, practical and scientific issues and concerns with respect to of proposed pollutant control standards in light of factors to be considered in establishing BAT/BCT measures, there are a number of legal and policy issues that the SWRCB should consider in evaluating CGP requirements. This section, IV addresses some of the most pressing of these legal and policy issues.

A. The Construction General Permit Is Not the Legally Appropriate Nor the Most Effective Manner in Which to Regulate Post-Construction Hydromodification Impacts

As discussed in detail below, regulation of post-construction hydromodification impacts are misplaced in a CGP, for several reasons, including the following:

- As industrial activities stormwater general permits, CGPs are intended to regulate discharges of waste or pollutants associated with the industrial activities themselves subject to the permit, in this case. construction activities – not discharges occurring after construction activities have ceased and which result from the completed product.

- The water boards can regulate, and in fact have regulated, post-construction discharges through the Phase I and Phase II MS4 permits being issued throughout the State.

- The water boards may most effectively regulate post-construction hydromodification impacts by participating in local land use planning and CEQA processes.

- The SWRCB acknowledges that the process for developing appropriate hydromodification standards is incomplete and that a "coherent and defensible statewide approach" has not yet been developed. Fact Sheet, at p. 20. By including hydromodification control standards in the PCGP before a comprehensive policy or set of standards, and the development of the necessary data upon which such standards are based, is established the SWRCB is "putting the cart before the horse." This puts the water boards in the unproductive position of promulgating hydromodification control standards and requirements that conflict with those established at the local level, via, *e.g.*, MS4 permits, and puts the regulated community in the untenable position of having to comply with inconsistent regulations that cannot be satisfied simultaneously.

- The hydromodification control standards set forth in the PCGP will discourage environmentally beneficial projects and approaches to water quality protection including wetlands creation and restoration, and regional and sub-regional water quality planning.

It is important to appreciate that achieving regulatory hydromodification control requirements in the post-construction condition requires reaching back to local land use planning, project design, and environmental permit and approval stages of development, which are completed years in advance of applications for grading permits. Under existing MS4 permits and CEQA, hydromodification impacts and controls must be analyzed and addressed as a part of project planning and design, as well as local land use and environmental review and approvals. At that stage of project development, appropriate hydromodification controls can be designed and specified as a component of larger projects, consistent with CEQA and properly derived MS4 permits or other local regulatory conditions. By regulating post-construction hydromodification impacts at the point of grading permit, the PCGP creates the inevitable result that project design, land use planning and project land use and environmental approvals would have to be re-analyzed and re-assessed, and potentially changed, requiring redesign and retrofit. Project delays and associated carry costs, re-design and retrofit expenses, lost output, and project development uncertainty associated with re-visiting project design and approvals at the grading permit stage will be substantial and will adversely affect the development industry as a whole, as well as housing production. Moreover, some projects may be placed in the position of complying with CEQA and existing local/MS4-based hydromodification requirements, but then not complying with CGP requirements—requirements that are not established with local or site-specific considerations in mind. These effects are compounded by the fact that these requirements apply to all projects, even those impacting only one acre, and by the 90-day public review period, which gives project opponents a new opportunity, after the CEQA-related statute of limitations has run, to challenge an aspect of project design, namely hydromodification controls, that can require re-design and re-issuance of project land use and environmental approvals. *See* § IV.E. below for a detailed discussion of the proposed 90-day review period.

To the extent the SWRCB is intent upon regulating post-construction hydromodification impacts through the CGP, then the hydromodification control measures contained therein should grandfather projects with existing land use and environmental approvals. For example, when imposing hydromodification controls and low impact development ("LID") requirements in its recently approved MS4 Permit, the San Diego RWQCB included a grandfathering provision exempting projects from the new hydromodification and LID requirements that have already obtained planning approvals and/or that are vested.[90]

1. Hydromodification impacts are more properly regulated as "post-construction" impacts – not as "construction activities."

Hydromodification control regulates a post-construction condition. Nonetheless, the SWRCB has chosen to "solve" the issue in the CGP, which by definition deals with discharges associated with construction activities – not post-construction discharges. *See* 40 C.F.R. § 122.26. The relevant industrial storm water permit regulations properly focus NPDES permit requirements on discharges associated with the industrial activity serving as the basis for the regulation – here construction activities - and exclude those activities and/or conditions that do not constitute the regulated activity. 40 C.F.R. § 122.26(b)(14). Regulating post-construction impacts through the CGP, which is specifically focused on construction activities, goes beyond the intent and purpose of this permit—much as regulating discharges associated with the operation of non-industrial areas of a site would go beyond the permit regulating discharges from industrial activities.[91]

[90] The San Diego County MS4 Permit provides: "Updated SUSMP and hydromodification requirements shall apply to all priority projects or phases of priority projects which have not yet begun grading or construction activities at the time any updated SUSMP or hydromodification requirement commences. If a Copermittee determines that lawful prior approval of a project exists, whereby application of an updated SUSMP or hydromodification requirement to the project is infeasible, the updated SUSMP or hydromodification requirement need not apply to the project. Where feasible, the Copermittees shall utilize the SUSMP and hydromodification update periods to ensure that projects undergoing approval processes include application of the updated SUSMP and hydromodification requirements in their plans." California Regional Water Quality Control Board San Diego Region Order No. R9-2007-0001, NPDES No. CAS 0108758, Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cites of San Diego County, the San Diego Unified Port District and the San Diego Regional Airport Authority, p. 17, fn. 3 (January 24, 2007).

[91] To illustrate, in the statewide industrial general permit, the SWRCB expressly excludes from the definition of "stormwater associated with industrial activities" non-industrial discharges from the site. SWRCB Order No. 97-03-DWQ, Attachment 4, at p. 2 (excluding non-industrial areas such as "office buildings and accompanying parking lots.").

In its General Construction Storm Water Program, EPA specifically made this determination with respect to the regulation of post-construction impacts by choosing not to regulate hydromodification impacts. *See* 69 Fed. Reg. 22480 (proposed April 26, 2004) (to be codified at 40 C.F.R. pt. 450); 67 Fed. Reg. 42644 (June 24, 2002) (to be codified at 40 C.F.R. pt. 122 and 450). In this General Permit, EPA noted the responsibility and authority of local government over land use planning "to protect infrastructure and achieve local resource goals" as one of the reasons that it was not appropriate to regulate post-construction hydromodification impacts as part of its construction program. 69 Fed. Reg. 22480 (proposed April 26, 2004). EPA also noted the high costs associated with such controls and the "lack of data that indicates that such provisions would result in notable improvements" in the existing construction stormwater program. *Id*.

As discussed in more detail in Section III.E. above, the SWRCB has yet to provide adequate data to show that notable water quality improvements would result from hydromodification controls under the auspices of the CGP. Hydromodification impacts comprised of changes in flow or drainages are, and should continue to be, regulated through those processes through which land use planning and design are regulated, namely the Phase 1 and 2 MS4 Permits, and through local general and specific planning, watershed management planning, 401 certification processes, and CEQA. As SCCWRP recognized in its 2005 report on hydromodification management,

> A variety of regulatory programs and tools exist to help in the regulation of hydromodification effects, including: CWA Section 401 certifications, total maximum daily loads, MS4 permits and associated SUSMP requirements, Watershed Urban Runoff Management Plans and the Watershed Management Initiative which encourage municipalities to work cooperatively to manage issues such as hydromodification. In addition, [CEQA/NEPA] processes can be used to better address hydromodification issues, especially with regard to cumulative effects.

SCCWRP 2005b.

2. Hydromodification impacts can and should be regulated by the water boards through the appropriate land use planning processes.

The water boards can efficiently, effectively, and equitably regulate post-construction hydromodification impacts at the general land use and project-specific planning stages, including General Plans, Specific Plans, watershed management planning, CEQA, and when they issue CWA § 401 water quality certifications. Re-regulating hydromodification impacts at multiple stages of the land use planning and development processes with different pollutant control standards only creates inconsistency, uncertainty, and inability to comply with all applicable requirements. It will not lead to the greatest possible water quality benefit.

As a practical matter, hydromodification controls must be "built in" to the project at the design stage. It is exceedingly poor public policy to address this in a permit that, under the existing paradigm, will be obtained after all of the project planning has been completed and all local approvals obtained. By the time a project reaches the point that an NOI is filed with the SWRCB for coverage under the CGP, the planning phase has long been completed and re-design to respond to eleventh hour objections to a project's hydromodification control design will cause at a minimum substantial cost and delay, and may result in project abandonment. Thus, we encourage the SWRCB and the RWQCBs to design consistent hydromodification pollutant control policies that are implemented through and during the land use and project planning approval processes, the CEQA process, and the 401 certification process so as to effectuate, with maximum effect and minimal disruption for the industry, any changes to project design necessary to address unacceptable post-construction hydromodification impacts.

Post-construction impacts associated with hydromodification also can also addressed through the various MS4 Permits issued throughout the State.[92] MS4 permits are designed to deal with discharges from the built environment, rather than in the statewide industrial general permit, which is designed specifically to deal with construction-related industrial activities. As the EPA has stated, "[t]he Phase II MS4 regulations contain explicit requirements for a local program to control storm water discharges from construction activities and to manage "post-construction" (long-term) runoff….EPA has provided guidance to permit authorities and MS4s that recommends appropriate components and activities for a well-operated local storm water management program, including appropriate erosion and sediment controls for active construction sites and post-construction storm water management measures." 69 Fed. Reg. 22474 (proposed April 26, 2004). Post-construction hydromodification impacts are, thus, appropriately regulated in MS4 permits. Indeed, many MS4 permits contain such provisions or are considering such provisions as part of their programs.[93]

Local approaches to hydromodification control, including regulation through the local planning and CEQA processes, 401 certification process and/or through the individual MS4 permits, as discussed above, are a technically superior approach because they are able to account for local conditions, which are paramount to understanding and establishing appropriate hydromodification control standards and approaches. A statewide hydromodification standard such as that presented in the PCGP, by contrast, in contravention of the available scientific literature, sets a single standard that is "blind" to varying local and baseline conditions. The

---

[92] Several of the Building Industry Associations have complained about the uncritical, dictatorial, inflexible and "one size fits all" nature of some MS4 provisions concerning hydromodification, and that under such hydromodification controls, existing land use approvals are not appropriately protected in all cases. Notwithstanding these legitimate complaints, we have no disagreement with the proposition that the RWQCBs, through their MS4s and consistent with statutorily-sanctioned processes such as CEQA, may reasonably address hydromodification concerns with appropriately derived hydromodification controls that consider all geomorphically relevant factors causing hydromodification.

[93] *See, e.g.*, Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cites of San Diego County, the San Diego Unified Port District and the San Diego Regional Airport Authority, R9-2007-0001; Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer System (MS4s) Draining the Watersheds of the County of Orange, The Incorporated Cities of Orange County, and the Orange County Flood Control District Within the San Diego Region, Tentative Order R9-2007-0002; Storm Water Discharges From the Municipal Separate Storm Water Sewer System Within the Ventura County Watershed Protection District, County of Ventura and the Incorporated Cities Therein, Tentative Order 07-xxxx (December 27, 2006).

scientific literature is clear that appropriate hydromodification controls must take into account numerous local (sub-watershed/watershed) factors, including in-stream susceptibility of receiving waters to destabilization, local soils conditions, and local runoff characteristics. *See, e.g.,* SCCWRP 2005a (recommending development of a stream channel classification system based on expected vulnerability of different streams to hydromodification-induced change and establish appropriate regional reference conditions based on this system). However, it is impossible to consider such local conditions if a statewide standard is applied across the board as proposed in the PCGP.

3. Development of a statewide hydromodification policy is a necessary precursor to a statewide hydromodification standard.

If the SWRCB determines that regulating hydromodification impacts through the local land use and environmental planning and approval processes, including CEQA, and through the MS4 permits is not adequately protective of water quality from hydromodification impacts, then it should first develop a comprehensive statewide hydromodification policy. Such a policy should mandate consideration of local conditions, such as baseline conditions and receiving water quality, and should be implemented consistently, as part of the Phase 1 and 2 MS4 programs, as well as by regional boards in by participation in the land use planning and environmental processes in areas that are not subject to Phase 1 or Phase 2 MS4 programs. In the Preliminary Draft Fact Sheet for Water Quality Order 2007-XX-DWQ ("Fact Sheet") the SWRCB states with respect to hydromodification controls:

> We intend to phase in such measures over time, with a yet to be determined triage process to determine which projects require them. Measures that control hydromodification at existing urban facilities can be more expensive to address; we do not have a uniform statewide approach to this issue yet. The stormwater program roundtable is working on this issue in order to develop a coherent and defensible statewide approach, even if that approach is to implement via separate Phase I MS4 permits at the regional level.

Fact Sheet, p. 20. But by regulating post-construction hydromodification before developing a statewide policy the SWRCB is putting the cart before the horse as it undertakes to mandate hydromodification controls without having completed the necessary studies to develop a "coherent and defensible approach." Id. It also precludes development of a coherent, defensible, and consistent statewide approach because the hydromodification standards proposed in the PCGP are substantially different than, and undermine rather than support, implementation of appropriately derived hydromodification standards that might be adopted by RWQCBs.

A comprehensive and effective statewide policy with respect to post-construction hydromodification controls would be helpful to hydromodification control, provided that it is characterized both by (i) the flexibility to address hydromodification impacts as appropriate based on geomorphically relevant local conditions, and (ii) provides clear, scientifically valid standards and guidance as to the manner in which the RWQCBs should address hydromodification during appropriate land use planning processes. Such a well-designed policy could be implemented in any number of ways to effectively interface with the land use planning and environmental processes, including CEQA and CWA § 401 water quality certification processes, MS4 permitting requirements, providing water quality benefit for appropriate receiving waters. By moving consideration of hydromodification "upstream" in the planning process, appropriate hydromodification controls could be adequately considered and designed at the most appropriate and effective time in the project development process.

In addition, from a policy perspective, creating an additional layer of hydromodification control to projects already subject to such controls through the MS4 permits under which they are regulated, creates unnecessary complexity and administrative burden on both the regulated community and the agencies, including the RWQCBs and local jurisdictions whose responsibility it is to ensure compliance. Thus, we request that if revised and technically appropriate hydromodification standards are to be proposed as part of the CGP, project proponents whose projects are already subject to hydromodification regulations in a controlling MS4 permit-based or other regulatory programs may elect to comply with the applicable hydromodification control provisions in the local program or with the hydromodification control provisions contained in the Final CGP. Requiring compliance with multiple standards that have conflicting and/or overlapping requirements creates unnecessary confusion and inconsistency and should not be required by the Final CGP.

4. Compliance with hydromodification control standards undermines wetland creation and restoration projects and the use of regional BMPs.

The combination of hydromodification control provisions, including maintenance of natural drainage divides and preservation of recharge rates, discourages, undermines, and precludes wetlands creation and restoration projects. In addition, the characterization of all in-stream work as "high risk" further discourages such environmentally beneficial projects. The PCGP should be revised to remove the significant disincentives with respect to wetlands creation and restoration efforts.

The PCGP also discourages the use of regional and sub-regional hydrologic control and combination hydrologic control and treatment control BMPs, but available scientific evidence indicates that such BMPs can be highly effective and provide significant water quality benefits. Many such regional controls are, or can be, part of integrated water resource management programs which have been promoted by RWQCBs.[94] The provisions of the PCGP that discourage the use of regional BMPs should be deleted and/or revised.

B. The PCGP's Mandate of ATS Raises Significant Policy Concerns Because ATS is an Uncertain Technology Warranting Further Study Before Widespread Implementation can be Required

As an initial matter, the PCGP mandates a specific technology BMP by requiring ATS whenever the Grading Limits are not observed. As discussed in § III.B above, the Grading

[94] As an example, both the Los Angeles and Santa Ana RWQCBs promote the use of integrated programs that often rely on regional controls.

Limits are unduly restrictive, impractical to implement, and likely to result in significant adverse environmental impacts, and thus effectively force projects into the ATS alternative. The terms of Cal. Water Code § 13360 explicitly provide that the SWRCB "shall not specify the design, location, type of construction, or particular manner in which compliance may be had with" a requirement or order issued by the SWRCB. The ATS requirement in the PCGP violates this provision because it mandates the method, mechanism, and specifications for compliance, and as such violates Cal. Water Code § 13360.

Further, sound public policy requires that the SWRCB refrain from mandating ATS in light of the significant technical issues associated with ATS. S*ee* § III. B. above. The technical data required to justify widespread use of ATS simply is not available; otherwise the significant toxicity testing and implementation provisions in the PCGP would not be required. Placing toxicity testing requirements on the vast majority of construction sites to enable implementation of ATS, which may not have water quality benefit, makes little sense from a practical or policy perspective. Therefore, we advise the SWRCB that until it is able to marshal the necessary resources to undertake adequate testing and analysis of ATS, including the chemicals associated with such systems and the certification of ATS operators as conducted in Washington State, the SWRCB should refrain from mandating implementation of ATS. The State of Washington, which has a formal program in place to test and monitor the chemicals used in ATS systems, has certified only three chemicals for use in such systems and requires training for ATS operators. However, the SWRCB's ATS mandate reveals a complete disregard for these as-yet unaddressed concerns by pushing an uncertain technology on the regulated community—and requiring that regulated community to conduct the monitoring and studies that should *inform*, not follow, implementation of this technology—all before any clear water quality benefit has been demonstrated.

If ATS is identified in the CGP even as one among a number of available feasible and practical erosion control BMPs, then an adequate phase-in period should be included to allow sufficient time for the regulated community and support industry to develop the capability to provide the new technology to the industry on a broad basis. The PCGP basically seems to assume that ATS can be implemented immediately. As noted by the Blue Ribbon Panel Report, it simply is not feasible, nor advisable from a water quality perspective, for the numerous permit applicants that covered under the CGP to implement ATS technology immediately. Blue Ribbon Panel Report, p. 17. Research conducted in southern California indicates that there are only a limited number of providers for these types of treatment systems.

C. The PCGP's Approach to Implementation of NELs and ALs is not Appropriate

If, as the SWRCB has stated in its workshops, the intended goal of the PCGP's NEL and AL requirements is the collection of monitoring data, we submit that the SWRCB can achieve this goal without forcing on the regulated community numeric limits that potentially trigger compliance and enforcement provisions, but are not appropriately derived and will not result in water quality benefit. *See* § III above. Similarly, enforcement of ALs is not the most effective or efficient way to generate monitoring data due to the punitive context in which additional studies are imposed for exceedences of ALs. If the SWRCB determines that it requires data beyond that which is collected as part of existing water boards water quality programs, the industry is willing to work with the SWRCB to collect and share such data. As described above in sections III C. and D., implementation of NEL and AL requirements present significant technical and enforcement issues which are arguably unnecessary and inappropriate if what is truly needed is data.

As described in more detail in sections III.C. and D. above, the implementation of NELs and ALs as they are proposed in the PCGP is not appropriate at this time once all of the relevant factors governing promulgation of industry-wide pollutant control standards are considered. However, if the SWRCB does move forward with inclusion of ALs in the Formal Draft PCGP we recommend that such limits be derived correctly based on the available scientific evidence, and as such we request that there be a phase-in period for the AL requirements. With respect to NELs and ALs, the Blue Ribbon Panel recommended the phased implementation of these requirements, commensurate with the capacity of the dischargers and support industry to respond to these requirements. Blue Ribbon Panel Report, p. 17. We encourage the SWRCB to follow the Blue Ribbon Panel's recommendation and work with the building industry to identify any technical and/or practical limitations on implementation of these requirements and to tailor appropriate phase-in to account for such limitations. *See also*, Technical Memo §__.

D. The Monitoring Program as Set Forth in the PCGP is Deficient

As discussed above, rather than take a BMP approach, the PCGP is driven by numeric limits and monitoring, which in many cases will create huge compliance costs without a proportional, if any, water quality benefit. Monitoring in a manner that could effectively improve control of construction site stormwater quality, in many cases, is not technically feasible. For example, the PCGP requires sampling and monitoring for every rain event. This requirement is cost-prohibitive, particularly when it includes Whole Effluent Toxicity Testing.

Additionally, as discussed in greater detail in the Technical Memo, the PCGP's monitoring requirements are deficient as follows:

- there are serious limits to TPH testing which make it a much less useful monitoring device than visual inspection;

- safety exemptions for sampling need to be broader to protect public health and safety;

- provisions regarding triggers for receiving waters are internally inconsistent, and are not reasonably related to the need to monitor receiving waters to assure water quality benefit ;

- hydromodification restrictions prohibiting changes to drainage divides and patterns, combined with ATS monitoring requirements result in the need to monitor every drainage area on a medium or high risk construction site (*i.e.,* all construction sites in California) and preclude the ability to establish a reference site for purposes of comparing monitoring results as required by other sections of the PCGP; and

- the PCGP fails to take into account the time required for completion and results from toxicity testing, which is typically 96 hours.

The SWRCB must consider, evaluate, and resolve these concerns before proceeding with a monitoring program anything like that proposed in the PCGP.

The Final CGP should contain a monitoring program with specific objectives for each monitoring requirement—a basic tenet of any scientifically credible data gathering exercise—as opposed to monitoring for the sake of monitoring, which appears to be the case with respect to many of the monitoring requirements in the PCGP. See Technical Memo §§ VII, VIII. The monitoring program as proposed in the PCGP does not have clear goals and objectives, and will likely result in significant expenditures without providing usable data, much less any measurable water quality benefit.

E. A 90-day Public Review Period is Neither Legally Mandated Nor a Reasonable Public Participation Strategy

The PCGP includes a provision calling for additional public review of documents provided to obtain coverage under the CGP. Specifically the PCGP states:

> Regional Water Boards shall review comments provided from the public on new permit applications within the 90-day public review period. Based upon the public comments and Regional Water Board review of the permit application submittal, Regional Water Boards may take actions that include, but are not limited to: rescinding permit coverage, requiring public hearings or formal Regional Water Board permit approvals, requesting dischargers to revise their SWPPP and Monitoring Programs within a specified time period, or take no action.

PCGP § XII.2. Although it is not entirely clear how this provision is to be applied, we have serious concerns with the prospect of subjecting projects, that have already been through extensive public review and comment as part of land use approval, CEQA, and environmental permitting processes, to yet another round of public review and delays for additional RWQCB review at grading permit, which is the final stage of the development process. This provision's effects could be disastrous. Prior project approvals obtained and avoidance, minimization and mitigation measure established during the CEQA, environmental permitting and local land use approval and permitting processes will be re-opened, and potentially forced to revise project and mitigation plans to address public comments received during the 90-day comment period, *e.g.*, comments regarding hydromodification controls.[95]

[95] At the April 20, 2007 workshop SWRCB staff explained that a 90-day public review period would only apply during the first 100-days of effectiveness of the Final CGP and that perhaps a shorter public review period would apply thereafter, perhaps one as short as 15-days or as long as 60-days. However,

This new public review provision is especially troubling given that PCGP requirements are aimed for the first time at issues involving post-development project design established during land use, CEQA, and environmental approval processes, *e.g.*, hydromodification, and LID requirements. Thus it appears that not only has the SWRCB has overlooked the existing and ample opportunities for the public to participate in land use and environmental planning and design decisions, but under the 90-day review provisions a new opportunity for an eleventh hour challenge to those decisions and approvals is now provided, after the statutes of limitation for the other processes have already expired.

The combination of post-construction hydromodification control requirements coupled with public review and comment creates a new opportunity for members of the public and RWQCBs to challenge existing land use and environmental approvals through enforcement of the CGP. What this means to developers is that after clearing CEQA and obtaining project approvals and permits from local jurisdictions and environmental approvals from other resource agencies (wherein both the public and the respective RWQCB participated or forwent the opportunity to do so), and possibly even after construction has commenced, new challenges to project approvals and insistence upon fundamental changes in project design would extend for months, if not longer, after Permit Registration Documents ("PRDs") have been filed. Notwithstanding the questionable legal authority for this requirement, as discussed in §IV.E.1. below, the practical, real-world implications and business uncertainty for developers are draconian. Such a system would create a new and belated form of project development challenge; the potential for redesign of projects and restart of entitlement processes; the potential for reduction in project size; the potential for increased infrastructure costs after financial commitments and budgets are set; risks and uncertainty associated with potential challenges and additional "public review" process, with the potential to make needed financing understandably unachievable or withdrawn; and increased carrying costs during project delays. Further, the possible enforcement penalties for this new challenge are not well-defined, and it is not clear what, if any, procedural protections are provided to dischargers whose projects may be attacked under the public review provisions.

Accordingly, if the SWRCB determines that a public review process must be provided in the CGP, though such a review is legally not mandated, the public review process should be substantially revised. Any public review process incorporated into the CGP should necessarily establish a defined process whereby project proponents can satisfy public participation requirements without re-opening to a new legal challenge those aspects of the CGP that implicate previously issued land use, CEQA and other environmental approvals (*e.g.*, hydromodification control and LID requirements), which should have been resolved and approved at the time that project approvals such as tentative tract map and CEQA approvals are obtained –long before issuance of grading permit and commencement of construction. Accordingly, the CGP must exempt from any public participation process review of approvals previously issued in the land use planning, CEQA, and environmental permitting processes where public participation was available.

---

that interpretation is not clear from the PCGP. Moreover, whether the public review period provided is 15 days or 90, it still represents a new opportunity for challenge to approved and permitted projects, potentially upending settled approvals.

1. The CWA does not require public review and hearing provisions for NOIs or SWPPP.

We understand that the 90-day public review provision in the PCGP is intended to satisfy the SWRCB's perception that public review of approvals issued under the CGP is legally mandated based on to two recent federal Courts of Appeals decisions discussed in the Fact Sheet: (1) *Environmental Defense Center, Inc. v. United States EPA*, 344 F.3d 832 (9th Cir. 2003) (holding that NOIs submitted under EPA's Phase II general permitting regulations for small MS4s are subject to public review and public hearing provisions of the CWA); and (2) *WaterKeeper Alliance, Inc. v. United States EPA*, 399 F.3d 486 (2d Cir. 2005) (holding that nutrient management plans submitted under EPA's regulation of confined animal feeding operations are subject to public review and public hearing provisions of the CWA). However, as the Fact Sheet observes, "neither of these court cases is directly applicable to states who implement the USEPA regulation. Rather, they are directed at USEPA who must revise its Phase II general permitting regulations." Fact Sheet, p. 6. Moreover, the Fact Sheet distinguishes the PCGP from these two cases, noting that those two cases addressed instances in which the regulated entities "essentially 'wrote their own permits,'" whereas the PCGP contains numerous specific directives and mandatory requirements, and, under the PCGP, SWPPPs "are meant to demonstrate compliance with the detailed permit requirement." *Id.*; *see also* Fact Sheet, p. 32.

A 2005 Seventh Circuit decision addressed this point with respect to public participation and comment on NOIs and SWPPPs submitted under EPA's construction general permit, and upheld EPA's interpretation that NOIs and SWPPPs are not in the nature of "permits" or "permit applications" and, therefore, not subject to the public participation requirements of CWA § 1342(a)(1), (j). *Texas Indep. Producers & Royalty Owners Ass'n. v. United States EPA*, 410 F.3d 964 (7th Cir. 2005). The Seventh Circuit noted the Ninth Circuit's holding in *Environmental Defense Center*, and stated that, "the statutory language at issue addresses only 'permit applications' and fails to include any mention of NOIs, SWPPPs, or other so-called 'functional equivalents.'" *Id.* at pp. 978-79, n.13.

2. The CGP process already includes a sufficient public review component.

Pursuant to CWA §1342 and Cal. Water Code §13260, the SWRCB's issuance of the Final CGP is itself subject to public review. The proper venue for public participation is at the general permit issuance stage, not after submittal of individual PRDs, including NOIs and SWPPPs. *See Texas Indep. Producers*, *supra.* A change to public review of individual PRDs would be a fundamental change in the way in which the CWA general permit process has been conducted. Indeed, the SWRCB's promise here of a robust, collaborative approach to promulgating the Final CGP comports perfectly with the Seventh Circuit's reasoning.

Further, under the current permit, the RWQCBs already have the authority to review SWPPPs, require revisions to SWPPPs, conduct compliance inspections, and take enforcement actions that are well defined in applicable statutes, and which provide sufficient procedural and due process protections for dischargers. Additionally, the RWQCBs have received guidance from the SWRCB to respond promptly to any request by a member of the public to review a SWPPP. Public Availability of Storm Water Management Plans, SWRCB, June 7, 2005.

In addition if it is the SWRCB's goal to enhance public participation in the implementation of the CGP, the provision in the PCGP requiring the electronic filing of PRDs is sufficient. The PCGP requires any person seeking coverage under it to file electronically all permit registration documents, including the NOI, site map, SWPPP and a SWPPP compliance checklist. *See* PCGP, section II.A; Attachment C; Fact Sheet, section III.B.3. The new requirement to submit site maps and SWPPP places a substantial burden on developers, as SWPPPs often contain multiple complex graphics. Developers, particularly small developers, will incur costs associated with converting these graphics into a format that can be uploaded to the California Integrated Water Quality System ("CIWQS") website. Nevertheless, the building industry acknowledges the trend toward electronic filings is inevitable, and therefore recognizes the PCGP's PRD electronic submittal requirement – once thoughtfully developed – is a means to further facilitate public access to SWPPPs.

It is also important to note that from a practical perspective under the requirements of the current permit, SWPPPs undergo many revisions, and are generally viewed as "evolving documents." Thus, we would in any event urge the SWRCB to limit the electronic submittal requirement to the *initial* SWPPP as a part of the PRD package, and not to require submittal of further updates to the SWPPP. Moreover, such a limitation might allow the initial SWPPP to be considered as part of a CEQA approval involving public participation. If so, it would obviate any need for a separate period of potential delay and/or mischief.[96]

3. The Public review process as contained in the PCGP is undefined.

The single mention of a 90-day public review period occurs in § XIII.2 (RWQCB Authorities) of the PCGP; there is no mention of this change in the Fact Sheet beyond the general discussion of public participation cases. Notably, the PCGP does not define the process that is to be followed, the potential enforcement penalties that may be imposed, or the procedural and due process protections that are to be afforded to permittees in the event comments on PRD documents are received, particularly if comments are received after construction commences under, and in reliance upon, administratively approved PRDs in accordance with the permit.

Thus, the PCGP creates a new, but undefined process for redress of public comments on SWPPPs, and the degree to which enforcement action and civil and criminal penalties may apply is uncertain. The PCGP mentions a suite of actions a RWQCB may take based on comments received and/or based on its own independent review, but these provisions raise more questions than they answer. For example, the PCGP notes that if comments are received the RWQCB can rescind permit coverage; however, it is unclear when such an action would take place and what the impact will be on the activities previously conducted in reliance

---

96 The SWRCB's consideration of the use of REAPs reflects a recognition of the fact that construction is a dynamic process involving constant adjustments and readjustments. This practical reality obviates any possibility of continuous public participation of a type that would halt or delay construction whenever a SWPPP or REAP is altered. Permittees must have the flexibility to apply BMPs on the ground immediately when circumstances dictate.

upon permit coverage. Other potential actions by the RWQCBs in response to comments on PRDs include requiring public hearings or formal RWQCB permit approvals and requesting revisions to the SWPPP. Such redress will, in certain cases, inevitably lead to legal recourse, notwithstanding the relative merits, or lack thereof, of the challenge. However, none of these responses are at all defined in the PCGP. Without a well-defined process for public review and RWQCB action, the public review period creates a substantial administrative burden on both the regulated community and the RWQCBs and potentially will lead to violations of the due process rights of future permittees.

4. Alternative approach to increase public participation.

If the SWRCB determines that it is necessary to include a public review period for PRDs, it must carefully define the requirements and procedures for such a process. Although we do not agree that a public review process of any period is legally or otherwise necessary to achieve public participation in the CGP program, if the Final CGP is to include such a process we submit that the better approach is to provide for electronic filings. If any additional review rights are created, the review process must include, at a minimum, the following limitations to avoid creating a process that will have serious legal and economic consequences for the development industry as a whole:

- Comments on which the RWQCBs may act must raise a credible substantial issue regarding, and are limited to addressing, compliance of PRDs with construction phase water quality control requirements; RWQCBs should not act on comments addressing or challenging post-construction controls already reviewed under CEQA or a similar process providing the opportunity for public review due to the potential to countermand final land use and environmental approvals, permits and entitlements.

- There should be a maximum time period of a very short duration in which a RWQCB must respond after receiving a comment, and there should be a provision that if the RWQCB fails to respond to comments within the prescribed timeframe the comments are deemed to have been determined invalid.

- RWQCB action in response to qualified comments should be limited to a prompt determination that comments are not valid or specific direction to the developer to revise the SWPPP as necessary to comply with construction phase (and not post-construction) water quality requirements.

- There should be an express provision that PRDs and the public review and RWQCB determination periods can run concurrently with the applicable CEQA public comment period so as to avoid a “late hit” for projects after CEQA review has been completed.

- The public review period should be limited to a maximum of 15 days.

- There should be an explicit statement that any public review process does not create a citizens' suit provision.

F. The Risk-Based Implementation Approach Should be Altered So As To Accurately Reflect the Risk that Construction Sites Pose to Water Quality

In the abstract, categorization and regulation of construction sites based on the risk they pose to water quality is appropriate and protective of water quality. However, the manner in which this approach is implemented in the PCGP does not accurately reflect the risk that certain construction sites pose to water quality, and will result in the vast majority of construction sites being categorized as high and medium risk without consideration of factors that lessen the actual risk to water quality posed by these sites.

The risk thresholds defined in the PCGP have not been properly determined, nor are they based on sufficient evidence. *See* Technical Memo §§ IV and VI. For example, the emphasis placed in the PCGP on soil characteristics is not technically justified in light of technical information that defines risk thresholds based on a variety of factors, including receiving water characteristics and pre-development runoff characteristics and the degree to which traditional BMPs can effectively control pollutants in construction site discharges. In addition, based on the current risk approach characterizing all construction sites (i) greater than 5 acres, (ii) needing a CWA § 404 permit, (iii) near any receiving water, and/or (iv) primarily composed of certain soil types, many of which are ubiquitous in California, as a medium or high priority threat, the PCGP creates a disincentive to incorporate enhanced effective erosion controls because, regardless of their implementation, there simply will be no way to escape the medium/high risk category, and the concomitant permit requirements. Thus, we suggest that credit be provided in the risk calculation for projects that implement enhanced erosion control features.

Another concern with the PCGP's risk characterization approach is that it encourages project proponents to overstate a construction site's risk category because coverage under the CGP may be denied or rescinded if the SWPPP does not accurately characterize a construction site's the risk category.

The Final CGP's risk thresholds must be reasonably tailored so that sites that truly pose relatively greater risks to water quality can be identified and permit requirements and controls are applied accordingly to achieve water quality benefit. *See* Cal. Water Code § 13263(a). Thus, we request that, as the SWRCB works toward a Formal Draft CGP, Staff undertake to evaluate alternative risk thresholds, including that for soils/fines, to more accurately determine the relative risk that a construction site poses to water quality. Appropriate risk thresholds should take into account factors such as receiving water characteristics, pre-development runoff characteristics, site characteristics, and the types of erosion control features that will be employed at a site. Only upon such evaluation will the SWRCB be able to provide the necessary scientific basis for the CGP's risk thresholds to achieve their intended purpose.

G. The REAP Concept Should be Retained, With Some Revisions

The concept of a Rain Event Action Plan ("REAP") is good one, we agree it can work to further protect water quality. However, some revisions to the program as proposed in the PCGP are needed to make it technically appropriate for implementation at construction sites and to comport with current scientific evidence. We provide the following suggested revisions to the REAP provisions as provided in the PCGP:

(1) REAPs should not have to be updated every rain event. Rather, they should be updated when construction phase and/or site conditions change substantially enough to warrant update to control discharge water quality. The human and financial resources necessary to update the REAP for every rain event is not justified when there is no change of phase or site conditions that warrant a new plan. To require a new REAP for every rain event would result in wasted resources, with no water quality benefit. Technical Memo § XI.

(2) the PCGP defines the trigger to prepare a REAP as a 30% chance of rain, which is termed a "likely" event. This conflicts with the National Weather Service definition of a "likely" rain event. We direct the SWRCB to the Technical Memo, which recommends using definitions for rain events that will more accurately identify potential for measurable rainfall that could result in construction site discharges. Id.

V. CONCLUSION

Once again, we appreciate the opportunity to provide the SWRCB with comments on the PCGP and we thank you for the opportunity to participate in the overall process of developing a legally and technically defensible CGP. We welcome every opportunity to help the SWRCB shape the Final CGP into a sensibly progressive permit that raises the bar for construction site pollutant control. Please feel free to contact us to discuss these comments further.

California Building Industry Association

1215 K Street
Suite 1200
Sacramento, CA 95814
916/443-7933
fax 916/443-1960
www.cbia.org

Technical Issues Memorandum

Comments on: National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated Construction and Land Disturbance Activities

Prepared by

California Building Industry Association

Building Industry Legal Defense Foundation

Construction Industry Coalition on Water Quality

Construction Employers' Association

Submitted to the

California State Water Resources Control Board

Division of Water Quality

May 4, 2007

CBIA Technical Comments: List of Contributors

Ian Adam
Environmental Resources Manager
Fuscoe Engineering
16795 Von Karman Ave., Suite 100
Irvine, CA 92606-4974

Lisa Austin, P.E.
Senior Water Resources Engineer
Geosyntec Consultants
2566 Overland Avenue, Suite 670
Los Angeles, California 90064

Dianne Franks, M.S.
Environmental Specialist
Flow Science Incorporated
723 East Green Street
Pasadena, CA 91101

Mark Grey, Ph.D.
Director of Environmental Affairs
BIA of Southern California/CICWQ
1330 S. Valley Vista Drive
Diamond Bar, CA 91765

Mike Harding
Senior Scientist
Geosyntec Consultants
3990 Old Town Avenue, Suite B-101
San Diego, CA 92110

Marilyn O'Neill, Founder & CEO
Nautilus Environmental
5550 Morehouse Drive, Suite 150
San Diego, California 92121

Susan Paulsen, Ph.D., P.E.
Vice President
Flow Science Incorporated
723 East Green Street
Pasadena, CA 91101

Eric Strecker, P.E.
Principal
Geosyntec Consultants
55 SW Yamhill Street, Suite 200
Portland, OR 97204

Kim Williams, P.E.
Senior Water Resources Engineer
Geosyntec Consultants
3990 Old Town Avenue, Suite B-101
San Diego, CA 92110

CBIA Technical Comments: Executive Summary

The California Building Industry Association (CBIA) is one of the principal stakeholders in the process to issue a revised General Construction Permit and as such has serious concerns about many aspects of the Preliminary General Permit. Foremost is the imposition of requirements to chemically treat storm water and the state's advancement of this technology without considering the cautions and need for significant additional study as recommended by the State's own Blue Ribbon Panel. Should a project proponent choose not to use a stormwater treatment system, then the State has mandated that the construction industry use an equally unfounded and technically and operationally infeasible option of limiting grading and construction activities to five acres or less at any one time. This is an unprecedented act with huge economic consequences to the State as a whole and one that is completely unacceptable to the construction industry in California.

Moreover, the Preliminary General Permit advances stormwater control concepts that require additional and comprehensive specific studies and scientific data gathering to craft a regulatory approach that will actually lead to cleaner receiving waters. Examples include the use of a risk-based approach to guide implementation of Best Management Practices (BMPs), and the imposition of numeric effluent limits, action levels, and receiving water monitoring. Another troublesome development is the placement of hydromodification control standards into the General Construction Permit, when academics and professionals working in this area generally agree hydromodification control is a planning function.

From a technical perspective, overall, the Preliminary General Construction permit should focus on protecting receiving water quality via a pro-active approach for controlling pollutants from construction site discharges. A pro-active approach would emphasize enhanced planning, implementation, inspection, and maintenance of a hierarchy of complementary BMPs with the goal of minimizing sediment and pollutant transport into storm water, rather than requiring chemical treatment to remove sediment from storm water. Proposed requirements mandating statewide compliance with technically infeasible grading limits or implementation of Active Treatment Systems (ATS), extensive monitoring, and compliance with Numeric Effluent Limits (NELs) should be eliminated in favor of this pro-active approach.

The general construction permit that is eventually adopted should set forth pollutant control standards that will clearly enhance stormwater pollution prevention plans (SWPPPs) to assure that construction projects will implement a comprehensive system of BMPs that include measures from all BMP four categories: runoff controls, erosion controls, sediment controls, and non-storm water management controls. Field research, laboratory research, and evaluation of drainage, sediment and erosion control technologies have generally shown that each are highly effective in controlling construction site pollutants, including soil loss and sediment delivery. *See Appendix C,* *Technical Comments "Comparison of Erosion and Sediment Control Best Management Practices (BMPs) Utilizing the Results of Rainfall Simulation Testing at the San Diego State University Soil Erosion Research Laboratory (SERL)"*. When BMPs proven to be effective singularly are combined, the use of the "complementary practices" has been shown in the research, and more importantly observed in the field, to be highly effective.

Based on the collective experience of the construction industry at construction sites throughout California and the U.S. and based on available scientific information, the majority of sites can be well protected with good SWPPP design, more diligent and proper design, application, and maintenance of BMPs, as well as use of a "hierarchy of complementary BMPs" from the four categories identified above. This pro-active approach is one that contractors can successfully implement if given appropriate permit-driven guidelines and is one that is supported by the Clean Water Act.

In order to achieve this goal with respect to the discharge of sediment from construction sites, the General Permit should be revised to assure that the following five major objectives are accomplished at every construction site:

- Minimize exposed areas to the area that can be effectively controlled and provide erosion control practices on all disturbed areas during the rainy season;
- Provide properly designed drainage facilities to control concentrated flows;
- Provide sediment control practices to complement erosion controls around the perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season;
- Reduce the tracking and migration of sediment off-site all year; and
- Properly control non-sediment and non-stormwater discharges.

We support the State's effort to protect and improve water quality through high standards for construction site compliance. Furthermore, as we have presented to you in workshops and discussed with you during several meetings, our industry is willing to work with the State to address the clear deficiencies in the technical foundation of this Preliminary General Permit as written. We also stand ready to assist in crafting appropriate curricula and training programs for construction storm water control practitioners working within our industry and working for the governmental entities responsible for permit enforcement.

A summary of our principal concerns follows, and is organized according to the 14 significant changes and additions identified in the Preliminary Draft Fact Sheet:

I. Technology-based Numeric Action Levels:

The CBIA does not oppose action levels (ALs) in theory because properly derived ALs can support a General Permit that emphasizes enhanced implementation of BMPs proven to be effective in construction site water quality control. However, CBIA has serious concerns with how ALs have been established and with how they fit into the overall structure of the Preliminary General Permit. We recommend that the State Water Resources Control Board (SWRCB) perform additional study to evaluate and refine ALs. Specifically, the ALs for pH and turbidity should consider natural conditions and receiving water quality, and should be developed using appropriate methods to preclude adverse effects on beneficial uses. Because of problems with sample collection and preservation and the proposed analytical methods for TPH, ALs for TPH are not technically well-designed to allow the control discharges of fuel, oil, or grease in the field, and should be replaced with requirements for visual observations for sheen.

II. Technology-based Numeric Effluent Limits:

The CBIA opposes the use of numeric effluent limits (NELs) in the current Preliminary General Permit. As detailed by the state-commissioned Blue Ribbon Panel, NELs are "not likely feasible for construction sites unless chemical addition is permitted." As detailed in Section IX of these comments, the SWRCB has not addressed the reservations of the SWRCB Blue Ribbon Panel, and has not completed the analyses that should be performed before mandating use of chemical addition and the subsequent requirement to meet NELs. In addition, the requirements of the preliminary draft permit will, in many instances, require effluent from construction sites to be treated to a level that is "cleaner" than the receiving water, and that may cause harm to beneficial uses. While chemical treatment may be appropriate in exceptional circumstances, requiring chemical treatment—and subsequent compliance with NELs—uniformly state-wide is neither environmentally prudent, cost-effective, nor indicated by receiving water concerns. Indeed, the proposed NELs were developed without consideration of receiving water quality.

III. Action Level Exceedance Evaluation Report (ALEER):

As written, the Preliminary General Permit is not clear on the number of AL exceedances that trigger the submittal of an ALEER. The Preliminary General Permit also requires that an ALEER be submitted to the SWRCB as a public record when an AL is exceeded. Per the preliminary draft, exceedances of ALs are not violations and thus should not be subjected to submittal in an ALEER.

IV. Risk-based Permitting Approach:

While CBIA understands the intent and potential benefit of the risk-based permitting approach, we have several significant concerns with the approach as proposed in the Preliminary General Permit. First and most importantly, the approach does not consider conditions within the receiving water. By considering only *proximity* to a receiving water and not receiving water characteristics, the preliminary draft fails to consider receiving water quality and habitat, and thus regulates all sites equivalently, whether they discharge to a pristine salmon-spawning stream, or to a concrete-lined flood control channel, or to a natural channel with naturally high turbidity levels. Secondly, the risk-based approach presented in the preliminary draft considers only detention basins as treatment, and does not recognize the significant risk reduction that can and does occur through the proper design and use of erosion control and other “source reduction” control measures. We believe that it makes far more sense to control the sources of sediment (i.e., to minimize sediment entering storm water) than to chemically treat storm water (i.e., to remove sediment once suspended in storm water). Finally, the current risk-based permitting approach does not appear to be properly calibrated or tested, and includes several measures to evaluate risk that are not appropriate. While we are not categorically opposed to a risk-based permitting approach, the current risk evaluation proposed in the preliminary draft is not adequate and should not be used.

V. Minimum Requirements Specified:

The Preliminary General Permit specifies minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance. However, beyond specifying additional minimum BMPs, the Preliminary General Permit does not clearly emphasize a pro-active and comprehensive approach to planning, implementation, inspection, and management of complementary BMPs, including construction site erosion and sediment control. Overall the general permit should emphasize project planning and design, implementation, inspection, and maintenance of a pro-active approach for protecting sites with a hierarchy of complementary BMPs to reduce pollutant discharges from construction sites, instead of highlighting and giving priority to extensive monitoring requirements, NELs, ALs, and Active Treatment Systems.

VI. Project Site Soil Characteristics And Monitoring And Reporting:

The Preliminary General Permit requires all projects to analyze and report the soil characteristics at the project location. The purpose of this requirement is to provide better risk determination and eventually better program evaluation. The primary characterization to be performed pursuant to the preliminary draft permit is an analysis of the fines content both of site soils and of materials to be imported as fill. The permit requires a permittee to determine whether or not site soils consist of >10% fines, where fines are defined as particles smaller than 0.02 mm. This soils test is conducted independently of, and does not provide information to, the risk evaluation, but serves as a trigger for mandatory compliance with the 5-acre grading limit or use of Active Treatment Systems.

If site soils or imported fill are found to contain >10% fines, the permittee must either (a) employ an Active Treatment System (ATS), or (b) limit open grading and/or clearing to less than 5 acres at any time and employ source control measures. These requirements are imposed regardless of the condition of downstream water bodies, and regardless of natural water quality. The requirements are also imposed uniformly throughout the site, and regardless of whether the project activities will occur during the wet or dry season. We find these requirements to be technically onerous, not cost-effective, and inappropriate for several reasons. First, we believe that it is inappropriate to regulate a construction site based upon a single test alone (% fines), and that many more site and receiving water characteristics should be incorporated into a site evaluation. Second, the test, as written, would trigger compliance with the mandatory grading limit or Active Treatment for practically all sites in California. It is inappropriate to require Active Treatment uniformly across the state without consideration of background receiving water quality, particularly natural turbidity. Third, while we support source control requirements, a 5-acre limitation on active construction areas is infeasible at all but the smallest of construction sites.

VII. Effluent Monitoring and Reporting:

Although the Preliminary General Permit states that effluent monitoring and reporting data are to be used in the overall program evaluation, it is unclear how these data will be used for this purpose. We are concerned that, unless the program goals are clearly articulated and incorporated into the permit, data collection will not provide useful information to the overall program. Further, the effluent monitoring and reporting program appears to be designed such that additional data collection is discouraged (e.g., BMP effectiveness monitoring, sampling and analysis within a site to allow better targeting of water quality concerns); we encourage the SWRCB to allow for data collection for the purposes of additional study and information gathering, without threat of penalties for non-compliance and without onerous reporting requirements. We also have some specific concerns about various aspects of the effluent monitoring and reporting proposal, as discussed in our detailed technical comments. We recommend that the SWRCB revisit the effluent monitoring and reporting program design after addressing the other outstanding technical and scientific issues discussed in these technical comments, and that the SWRCB design the monitoring program to more clearly support the long-term goals and objectives of the program.

VIII. Receiving Water Monitoring And Reporting:

Similar to the effluent monitoring and reporting requirements, the preliminary draft states that receiving water monitoring and reporting data are to be used in the overall program evaluation. However, it is unclear how these data will be used for this purpose. We are concerned that, unless the program goals are clearly articulated and incorporated into the permit, data collection will not provide useful information to the overall program. For example, as discussed in Section I above, receiving water pH and turbidity can vary widely based on different natural soils and precipitation characteristics, within a single storm event, and even between storm events, making the meaningful interpretation of analytical results from individual grab samples exceedingly difficult. We are also very concerned about the improper use of receiving water data as an indicator of whether a construction discharge has caused or contributed to a receiving water quality exceedance, given the many forensic challenges inherent in connecting discharge and receiving water quality monitoring. We address these and other specific concerns about aspects of the receiving water monitoring and reporting proposal in our technical comments. We recommend that the SWRCB revisit the receiving water monitoring and reporting program design after addressing the other outstanding technical issues discussed in this technical memorandum, and that the SWRCB design a monitoring program that more clearly supports the long-term goals and objectives of the program.

IX. Active Treatment System or Specific Source Control Requirements:

The active treatment system and specific source control requirements are unworkable for the construction and building industry because of the severe limitation and significant costs it places on construction activities with no demonstrable water quality benefit. Rather, a BMP system requiring site readiness and inspection before, during, and after rainfall events is needed. Advanced treatment is needed only in situations requiring extraordinary water quality protection, such as direct discharge into a water body that is not naturally turbid, and that is (a) 303(d)-listed for sediment or turbidity but where controls implemented pursuant to a TMDL are ineffective, or (b) contains sensitive habitat, such as known salmonid spawning areas. Five-acre grading restrictions are unprecedented in home building and the construction industry in general, and such restrictions would effectively halt construction activities in California.

X. New and Redevelopment Performance Standards for Hydromodification Impacts:

The impact to California's rivers and streams from hydromodification caused by uncontrolled new development and redevelopment projects is an important issue. However, there are three major concerns with the proposed hydromodification performance standards: (1) the General Construction Permit is not the appropriate mechanism for regulating post-construction hydromodification impacts; (2) the standards as proposed are insufficiently protective and/or, in some cases, unnecessary or overly protective; and (3) the standards as proposed are insufficiently specified to be implemented and do not address the range of elements that scientific literature indicates is required to manage hydromodification impacts comprehensively. For these reasons, they are not appropriate as "minimum" standards.

XI. Rain Event Action Plan:

The concept of a Rain Event Action Plan (REAP) is fundamentally sound; in the context of the Preliminary General Permit the trigger for enacting the plan needs significant modification as do the parameters describing when the plan is needed. For example, the REAP should be revised periodically to reflect discrete project phases, rather than for individual rainfall events.

XII. Site Photographic Self Monitoring and Reporting:

The CBIA does not support the use of self-recorded photographic records for construction site reporting under any circumstances. The utility of such an approach is questionable given the subjective nature of photographic evidence (when, where, context) and the speculative interpretations that can be drawn from observational evidence. When inspections occur during a project, local or State or Federal authorities have within their power the ability to photo-document construction activity.

XIII. Annual Reporting:

The preliminary draft permit requires that Annual Reports be submitted no later than January 1, even though January is in the middle of the rainy season, when implementation and inspection and management of discharge pollutant controls will require maximum time and significant effort. It is more appropriate to require submittal of annual reports in July concurrent with the annual compliance certification and to record activities occurring during the current and prior year's wet weather months.

XIV. Certification/Training Requirements for Key Project Personnel:

The CBIA supports the SWRCB's efforts to create baseline program curricula for SWPPP preparers, SWPPP implementers, and SWPPP inspectors, including industry personnel responsible for SWPPP preparation and implementation/inspection, and regulatory staff responsible for document review and in-field inspections.

We trust the SWRCB will address CBIA's technical comments and instead of simply re-drafting the language of the Preliminary General Permit, the SWRCB will revise the approach of the general construction permit to focus on receiving water quality and to emphasize enhanced and pro-active planning, implementation inspection and management of BMPs, including erosion source control measures. During the period that such a permit is in place (5 years), the SWRCB, working with the CBIA and other principal stakeholders, should conduct the necessary scientific studies and data gathering that are necessary to create a revised General Permit that accomplishes the goals of the Clean Water Act.

TABLE OF CONTENTS

The following are CBIA's comments and analysis of technical and scientific issues raised by the Preliminary Draft Construction General Permit (PCGP or Permit). These comments are organized into fourteen major sections that correspond to the categories used by the SWRCB in the Fact Sheet (pp. 9-11) to summarize the key features of the Permit.

I. TECHNOLOGY-BASED NUMERIC ACTION LEVELS (ALS)

The PCGP provides ALs for pH, turbidity, and total petroleum hydrocarbons (TPH) (Section V., p. 11). ALs are to be applied to construction sites that are considered to be "high" or "medium" risk, and to those sites where >10% of the site soils are classified as fines and the source control option is used. These action levels are to be used to evaluate effluent monitoring data, and, if exceeded, as described below, would trigger additional storm water controls and receiving water monitoring. The PCGP specifies that an exceedance of ALs is not considered a violation, but rather serves as a trigger for additional storm water controls and for receiving water monitoring.

The CBIA does not oppose ALs in theory because properly derived ALs can support a General Permit that emphasizes enhanced implementation of BMPs proven to be effective in construction site water quality control. However, CBIA has serious concerns with how ALs have been established and with how they fit into the overall structure of the Preliminary General Permit. We recommend that the State Water Resources Control Board (SWRCB) perform additional studies to evaluate and refine ALs. Specifically, the ALs for pH and turbidity should consider natural conditions and receiving water quality, and should be developed using appropriate methods to preclude adverse effects on beneficial uses. Because of problems with sample collection and preservation and the proposed analytical methods for TPH, ALs for TPH are not technically well-designed to allow the control discharges of fuel, oil, or grease in the field, and should be replaced with requirements for visual observations for sheen.

1. The PCGP establishes ALs for pH as less than 6.5 or greater than 8.5. These limits were derived by calculating one standard deviation above and below the mean pH of runoff from CALTRANS sites (Fact Sheet, p. 35).

   Comment: Setting an AL at plus or minus one standard deviation from the mean is not an appropriate metric. This method for establishing the AL assumes that the available pH data are normally distributed, which is an assumption that should be tested prior to using this method. If data *are* normally distributed, a range of plus or minus one standard deviation would include 68.2% of the data in the dataset that was used to calculate the AL. This would mean that, of all data used to establish the AL, about 31.8% would trigger an AL exceedance and require subsequent action. The 2006 Blue Ribbon Panel Report (BRPR or Report) at p. 8 stated that an AL should be established to indicate an "upset value, which is clearly above the normal observed variability." ALs established using one standard deviation above and below an assumed mean clearly are not upset values.

   Comment: The Caltrans data used to establish the ALs for pH were taken from six of the Caltrans Districts and may not be representative of conditions throughout the State.

Comment: In establishing an AL for pH, the SWRCB should consider a site's climate region, soil condition, and slopes, and natural background conditions (e.g., vegetative cover) as appropriate and as data are available, and as suggested by the SWRCB's own Blue Ribbon Panel of experts. Because soil alkalinity varies by region, regional factors may be an important influence on local pH levels of storm water runoff. The SWRCB should evaluate whether or not receiving water pH varies regionally, and take this information into account to set regionally appropriate ALs, rather than establishing blanket ALs that apply uniformly across the state regardless of local conditions.

Comment: Data collected by the U.S. Geological Survey (USGS) indicate that rain in California has a long-term average pH that varies between 5.3 and 6.0, depending upon location (see http://water.usgs.gov/nwc/NWC/pH/html/ph.html). For individual storms, pH values as low as 4.5 have been observed (see, e.g., http://nadp.sws.uiuc.edu/ads/2003/CA45.pdf and related reports). If storm water runoff includes water that has not had significant contact time with soil or earth, it is possible for runoff pH values to be similarly low. In addition, some areas of the State include alkaline soils, and pH in runoff from these soil types may be higher than average values. In some streams, natural receiving water pH ranges as high as 8.9 (e.g., Trinity River data from California Data Exchange Center (CDEC)).These factors should be examined in detail and taken into account in establishing any ALs for pH.

Comment: Most construction activities will do little to alter the pH of storm flows relative to natural background conditions. Certain construction site activities have a greater potential to alter the pH of storm water runoff.

> *Recommendation:* We recommend that the SWRCB require pH monitoring only when visual observations during site inspections indicate contamination during the respective construction activities that may result in pH alterations (such as the use of hydrated lime, recent concrete pours, and certain materials related to concrete manufacture) at the site.
>
> *Recommendation*: The SWRCB should test the assumption of normality for pH values. Data from different regions or soil types should be grouped and evaluated individually to determine how local conditions influence the pH of construction site runoff. If data are observed to be normally distributed, the ALs should be established using at least two standard deviations, but such that pH values that are outside the ALs but that are caused by natural conditions are not considered an exceedance of the ALs for pH.

2. Section I.15.of Permit (p. 5) states that when an AL is exceeded, the discharger "shall immediately implement additional Best Management Practices (BMPs) and revise their Storm Water Pollution Prevention Plan (SWPPP) as necessary to prevent pollutants in storm water or non-storm water discharges, or to substantially reduce pollutants consistently below ALs."

Comment: Rather than requiring immediate implementation of additional BMPs, the discharger should be required to ***immediately inspect the site and determine the source(s) of potential pollutants***. *If* the source is BMP-related, then the discharger shall correct or implement additional BMPs, revise their SWPPP, and report on the conditions found and the modifications made.

3. For turbidity, the AL established in the PCGP is 500 NTU. The Permit and Fact Sheet state that this level was determined from calculated average sediment loads for each of the five California ecoregions described in U.S. Environmental Protection Agency's Development Document for Final Action for Effluent Guidelines and Standards for the Construction and Development Category and using the Revised Universal Soil Loss Equation (RUSLE). (Section 4.b.ii., p. 35 (Fact Sheet)). Section I. 13, p. 4 of the PCGP states that the turbidity AL of 500 NTU was based on an analysis of data representing background condition and actual construction site characteristics; Caltrans data for actual turbidity values show that typical construction site runoff in California range from 15 NTU to 16,000 NTU.

   Comment: Although provided with the explanation above, it is still unclear how the SWRCB arrived at 500 NTU.

   > <u>*Recommendation:*</u> We recommend that the SWRCB provide additional detail on how this value was calculated.

   Comment: RUSLE estimates ***average*** annual soil loss, expressed as mass per unit area per year. SWRCB Staff (Staff) utilized the Modified Universal Soil Loss Equation (MUSLE) to estimate sediment yield for a specific storm event and assumed a 1:1 relationship between turbidity (NTU) and sediment concentration (mg/L). It appears that Staff may have intended for the AL for turbidity (500 NTU) to fall somewhere between ambient conditions and construction conditions.

   Several authors have attempted to correlate turbidity measurements with gravimetric measurements of total suspended solids (TSS) (e.g., Schroeder et al., 1981; Schubel et al., 1979; Schubel et al., 1978). Correlations are generally site-specific and may change over the course of a year, although not in a consistent fashion (Manka, 2005). The suspended sediment-turbidity relationship shifts between the rising and falling limbs of the hydrograph (Knighton, 1998). Variability in the TSS-NTU relationship can be attributed to differences in size, composition, and refractive index of particles (Earhart, 1984). For dilute solutions, there appears to be a linear relationship between the amount of light scattered and the amount of suspended material, but when TSS levels are high, light cannot penetrate the sample and will distort the turbidity reading (Schubel et al., 1978). Thus, the assumption that a 1:1 relationship exists between turbidity and TSS is suspect and represents a serious oversimplification.

   The three slopes used by Staff in the calculations (3%/200'; 7%/140'; 12%/100') appear to be derived from ambient conditions but may not be representative of typical construction sites. Finally, the use of "dominant soil textures in each ecoregion" appears to be a rational way to determine particle size distribution, but many construction sites are typically comprised of disturbed soils with varying textures from all horizons within the soil profile.

   Comment: The AL does not appear to be calculated to consider natural background conditions. As currently written, receiving water quality is only considered if receiving water monitoring is required pursuant to an AL exceedance. Natural background turbidity and/or TSS levels in storm water runoff vary considerably, both within different areas of the site and in response to different storm conditions (e.g., rainfall intensity, rainfall amount, antecedent conditions). Thus, it makes little sense to adopt a single AL for turbidity that is applied uniformly throughout the state. Rather, ALs for turbidity should be established after consideration of receiving water conditions. As indicated in the BRPR at p.16 "… *it is important to consider natural background levels of turbidity or TSS in setting Numerical Limits or Action Levels for construction activities. The difficulty in determining natural background concentrations/levels for all areas of the state could make the setting of Numeric Limits or Action Levels impractical from an agency resource perspective.*"

> *Recommendation:* We recommend that the SWRCB evaluate available data to determine natural, background turbidity levels throughout the state, and to evaluate the storm conditions under which high background turbidity levels occur naturally. We recommend that the SWRCB not require discharges to be "cleaner" (i.e., to have a lower turbidity or suspended sediment concentration) than natural water quality. See also discussion below.

Comment: In some regions of the state, turbidity levels in receiving waters are fairly high, and ambient turbidity/TSS levels can vary significantly in response to storm events. For example, the natural background TSS concentration in storm runoff from undeveloped watersheds in southern California has been observed to range up to 103,000 mg/l (maximum, Sespe Creek at Sespe Gorge, Ventura County, winter 2005) (Stein and Yoon, 2007). In these conditions, an AL of 500 NTU does not represent an "upset value." TSS concentrations in runoff from undeveloped watersheds were also observed to vary significantly during individual storm events, with peak concentrations of TSS hundreds of times higher than non-peak concentrations (See Figure 1 below) (Stein and Yoon, 2007). Stein and Yoon (2007) also showed that TSS levels in natural, undeveloped watersheds were significantly higher than at typical developed watersheds in southern California (See Figure 2 below). Even in developed watersheds, turbidity levels have been observed to range up to tens of thousands of NTU, with peak turbidity levels occurring around or at peak channel flow rates. Turbidity data for a number of streams are available on the California Data Exchange Center (CDEC) web site (cdec.water.ca.gov); a summary of turbidity data available from the CDEC site is provided in Table 1 at Appendix A.

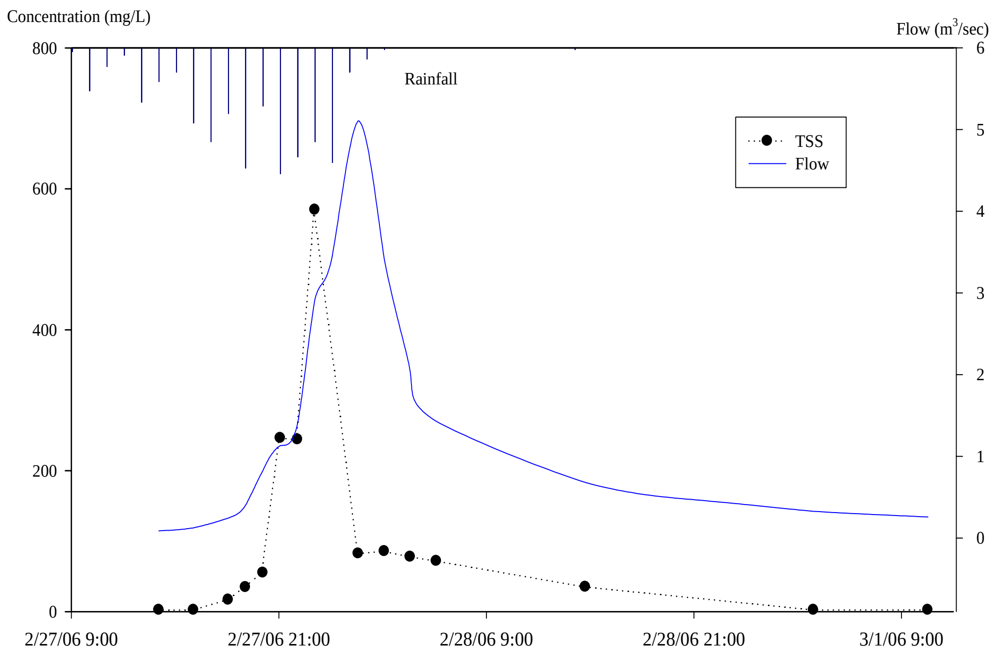


Figure 1. Change in TSS concentration over the course of a storm event at Bear Creek, a tributary to North Fork Matilija, CA; From Stein and Yoon (2007)

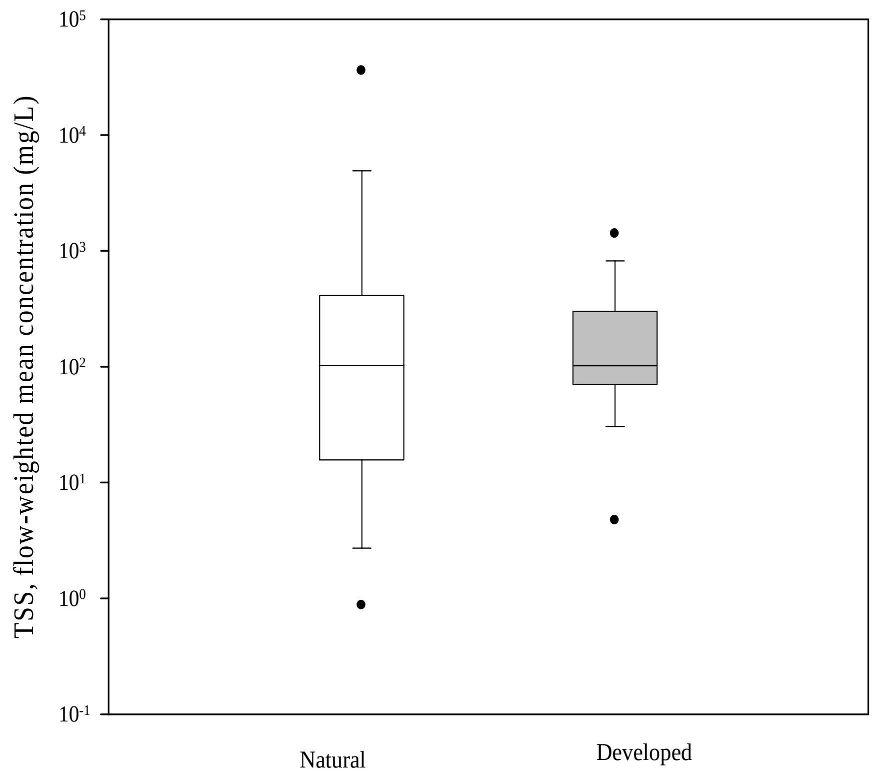


Figure 2. Comparison of wet weather flow-weighted concentrations of total suspended solids (TSS) between natural and developed catchments. The white boxes represent natural catchments, and the gray box represents data from developed catchments. The Y axis is in log scale; From Stein and Yoon (2007).

In unhardened channels, water that is "cleaner" (contains less sediment) than natural background water is referred to as "hungry water," which can often cause downstream erosion. Erosion of bed sediments is a function of channel slope, stream velocity and shear stress, and characteristics of the bed material (see, e.g., Garcia and Parker, 1990; Parker and Anderson, 1977; Brownlie, 1983). Two competing forces, aggradation and degradation, describe the deposition of materials to a stream bed and the erosion of materials from a stream bed; when overlying water is "too clean," erosion dominates over deposition, and net erosion occurs. Importantly, it is often the coarse fraction of a sediment load (fine sand and coarser) that participates in these reactions, as fine sediments will remain in suspension longer and tend not to settle, particularly during high flow events. Retention basins and Active Treatment Systems (ATS) will remove the coarse fraction and some of the fine fraction, and thus may increase the rate of downstream erosion if discharge sediment concentrations are lower than natural sediment concentrations in the receiving water. (See also Section IX.)

In water bodies where turbidity levels are naturally variable and may be high, aquatic organisms appear to be adapted to ambient, naturally high turbidity levels. Moderate turbidity levels appear to be beneficial to fish in estuaries by affording protection from predators in those shallow, food-rich estuaries. Turbidity gradients may also provide a navigational aid to fish entering estuaries (Bruton, 1985; Gregory, 1998; Row and Dean, 1998). The ratio of fish prey per predator was found to be higher at a river with turbidity levels below 1 NTU than in a river with turbidity levels of 27-108 NTU (Gregory, 1998). A reduction in feeding rate by predators at elevated turbidity levels were observed to be the result of a reduced ability to feed, rather than to stress, as exposure to the highest turbidity level of 640 NTU, did not reduce feeding motivation or appetite (Row and Dean, 1998).

Several studies have shown the negative impact of decreased turbidity in relation to the decline of pelagic fish in the Delta. In the Sacramento River and San Joaquin River Delta, pelagic organism abundance has declined dramatically. Studies on pelagic organism decline (POD) are on-going, but early data indicate that decreased turbidity (increased water clarity) is one of the measures that has been correlated to the decline of Delta smelt. Numerous studies have shown a correlation between a change in the turbidity of Delta water and a change in native fish populations; these studies also show the adaptability of Delta smelt to highly turbid water (Nobriga et al., 2005). Feyrer and Healer (2003) sampled 11 sites in the southern Delta from 1992-1999 and noted that native species (tule perch, Sacramento sucker, *Hysterocarpus traski*, and *Catostomus occidentalis*) were associated with conditions of high river flow and turbidity, while the majority of non-native species were associated with either warm water temperature or low river flow conditions. The study also showed that a decrease in turbidity can have an adverse impact on native fish populations that are adapted to naturally high turbidity levels. Several dischargers in the area have included action plans to increase flow and turbidity during the summer in order to increase the amount of habitat for Delta smelt by maximizing the physical habitat area and supporting the food web (see Pelagic Fish Action Plan, March 2007, by the California Department of Water Resources and the California Department of Fish and Game).

As discussed above, it appears that sediment concentrations are often naturally high in certain environments, and that turbidity may fill an important ecological role. In fact, reducing turbidity below natural levels can cause harm, both to channel morphology and to the ecosystem. For these reasons, the SWRCB must consider natural and background receiving water conditions before establishing ALs (or NELs) for turbidity.

4. The PCGP provides an AL for total petroleum hydrocarbons (TPH) of 15 mg/l as diesel. This AL is based on a City of Tacoma 2003 Surface Water Manual, which states that typical oil water separators (one BMP available to treat diesel-contaminated runoff) should be designed and maintained to reduce effluent concentrations to 15 mg/l (at p. 37 of the Fact sheet). The PCGP specified that DHS Method 8015M is to be used to analyze for TPH.

   Comment: While pH and turbidity can be measured in the field without much special training, the sample collection and analysis procedure for TPH is significantly more complicated. Samples must be collected by trained personnel using clean sampling techniques, and samples must be shipped to a laboratory for analysis. Analysis results will not be immediately available, but typically have a turnaround time of 5 days. TPH sampled collected from stored/contained storm water will not be representative of discharge conditions as TPH will volatilize from water. Finally, the test method specified by the PCGP (DHS 8015M) has been replaced by EPA Test Method 418.1. Because of these considerations, visual observations of sheen are generally a better indicator of the presence of hydrocarbons in storm water. We recommend that the permit be modified to require specific observations for sheen instead of laboratory testing.

Comment: Requiring TPH measurements at all medium and high risk construction sites is too stringent. At many sites, there will be no activities that would pose a high risk to cause hydrocarbon contamination (e.g., fuel storage, on-site fueling of construction equipment). If an AL for TPH is retained within the Permit, it should be used only when visual observations during site inspection indicate contamination during the respective activities has occurred, and not as a blanket requirement for all construction sites. Again, the REAP and enhanced site inspection requirements will help to assure site contamination is addressed routinely and prior to storm events.

5. Section IX. B.2. (p. 17) of the Permit reads "However, unless required to comply with receiving water objectives, no additional on-site activities or revision of the SWPPP with respect to sediment control will be required if the turbidity in the release was equal to or less than 1.2 times the turbidity estimated to occur under the actual rainfall conditions at the time of the exceedance, if the site were naturally vegetated, using the method presented in Attachment E, or if the turbidity in the release was equal to or less than 1.2 times the actual turbidity measured in the receiving water upstream of the storm water discharge from the site."

   Comment: The Permit should allow the use of erosion controls if one were to monitor upstream to show that effluent turbidity was lower than receiving water or within 1.2 times calculated background turbidity.

II. TECHNOLOGY-BASED NUMERIC EFFLUENT LIMITATIONS (NELs)

The CBIA opposes the use of numeric effluent limits (NELs) in the current PCGP. As detailed by the state-commissioned Blue Ribbon Panel, NELs are "not likely feasible" for construction sites "if chemical addition is not permitted" (see BRPR at p. 15). As detailed in Section IX. of these comments, the SWRCB has not addressed the reservations of the SWRCB Blue Ribbon Panel, and has not completed the analyses that should be performed before mandating use of chemical addition and the subsequent requirement to meet NELs. In addition, the requirements of the preliminary draft permit will, in many instances, require effluent from construction sites to be treated to a level that is "cleaner" than the receiving water, and that may cause harm to beneficial uses. While chemical treatment may be appropriate in exceptional circumstances, requiring chemical treatment—and subsequent compliance with NELs—uniformly state-wide is neither environmentally prudent, cost-effective, nor indicated by receiving water concerns. Indeed, the proposed NELs were developed without consideration of receiving water quality.

This Permit includes NELs for pH in all discharges from "high" and "medium" risk sites, and for discharges from Active Treatment Systems (ATS) (Section IV., of the Permit (p. 11)).

1. The PCGP includes NELs that specify that the pH of storm water discharges must remain between 5.8 and 9.0. These NELs will apply to "high" and "medium" risk sites, and to those

sites with soils having >10% fines and employing source control, beginning 18 months after permit adoption. (Section IV.3.a. of the Permit (p.11.)) In addition, receiving water limitations specify that storm water and non-storm water discharges from medium and high risk construction projects shall not be more than 0.2 standard units higher or lower than the pH of the receiving water (Section VI. 7. of the Permit (p.12)).

Comment: The pH NEL values were derived by "calculating two standard deviations above and below the mean pH of runoff from highway construction sites in California" (Caltrans study). The Fact Sheet also states that "proper implementation of BMPs should result in discharges that are within the range of 5.8 to 9.0 pH units" and references SWRCB staff's reliance on best professional judgment (BPJ) equivalent to BAT and BCT (Fact Sheet, (p.37)). As detailed in the discussion regarding ALs for pH, the calculation procedure used by the SWRCB assumes that the data in the dataset used to derive the NELs for pH are normally distributed. This assumption should be tested. If normally distributed, 95.4% of the data points in the dataset would fall within the pH limits specified by the permit, and 4.6% would fall outside those limits. Also as discussed above, the pH of rainfall is below the lower limit of the pH NEL. Finally, the pH in runoff from construction sites is likely to differ from natural pH conditions only when the use of pH altering practices occurs at the site. Because these construction practices occur relatively infrequently, or only for short phases of a project, the requirements to monitor for pH and to compare against ALs or NELs should be triggered only when visual inspection during site monitoring indicates site contamination and where those practices occur. For these reasons, the SWRCB should reconsider the NEL for pH.

The SWRCB also proposes to include a numeric effluent limit based upon receiving water conditions. This limitation would require that effluent from construction sites shall not be more than 0.2 standard pH units higher or lower than the pH of the receiving water. However, most Basin Plan water quality objectives require only that a waste discharge not alter the pH of the receiving water beyond certain limits, and in many cases, the limit on pH changes is higher than that required by the SWRCB in the PCGP. (See for example, the Los Angeles Region Basin Plan, which requires that "the pH of inland surface waters shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed by more than <u>*0.5 units*</u> from natural conditions as a result of waste discharge." [emphasis added]) Finally, because of considerations related to mixing and receiving water buffering capacity, a discharge would have to have a pH difference from the receiving water far greater than 0.2 pH units to induce a change of 0.2 pH units within the receiving water itself. Thus, it appears that the requirement in the PCGP is both (a) more stringent than applicable water quality objectives; and (b) improperly applied to effluent, rather than evaluated within the receiving water itself. Finally, meeting this requirement would require receiving water monitoring for pH for all storms, regardless of whether or not an AL or NEL had been exceeded. In addition, it may be difficult to identify the receiving water, and access to the receiving water near the point of discharge may not be possible, either legally or physically, particularly during storm events.

> <u>*Recommendation:*</u> NELs for pH are premature unless and until they are developed to consider local or regional variations in receiving water quality. NELs for pH that are derived from receiving water requirements should be eliminated from the permit unless

they can be made to be consistent with (and not more stringent than) applicable Basin Plan objectives, and until they can be applied in the receiving water, not to the discharge itself.

2. Section IV.3.a. (p.11) of the Permit indicates that NELs apply at all times, in both wet and dry seasons.

   <u>*Recommendation*</u>**:** As suggested by the BRPR (p.17) *"[C]onsideration should be given to the seasonality of applying Numerical Limits." There may be sites where summer only construction that complies with ALs may be preferred to year-round sites that include winter construction that complies with NELs. In such cases, applying NELs to summer construction may be a disincentive to scheduling active grading during dry periods. Allowing summer only construction sites to comply with ALs would discourage winter construction activities."* The BRPR (p.17) also states that the SWRCB should consider whether numeric limits would apply at all sites or only at those with significant disturbed soil areas (e.g., active grading, un-vegetated and/or un-stabilized soils).

   <u>*Recommendation:*</u> If properly calculated NELS are to be included in the Permit, we recommend applying NELs during the wet season only in the relatively few minor situations where application is necessary (e.g., where site activities including the use of chemicals that may alter pH). Further, a site that meets certain conditions should be considered "stabilized" for the wet season and NELs should not apply to appropriately stabilized sites.

   Comment: The BRPR (p. 17) also states that the SWRCB should consider whether numeric limits would apply at all sites or only those with significant disturbed soil areas (e.g., active grading, un-vegetated and/or un-stabilized soils). A site could meet certain conditions to be considered "stabilized" for the runoff season and thus would not have to monitor for NELs.

   <u>*Recommendation:*</u> If a site meets certain conditions and is considered to be "stabilized" for the wet season, the permittee should not have to monitor for NELs.

3. The PCGP establishes the NELs for discharges from an ATS at Section IV.4. a-d. of the Permit (p.11). NELs are established for acute toxicity, chronic toxicity, pH, and turbidity.

   Comment: Pursuant to the BRPR at p. 17, the SWRCB should set NELs that consider the site's climate region, soil condition, and slopes, and natural background conditions (e.g., vegetative cover) as appropriate and as available data allow. With ATS, discharge quality is relatively independent of these conditions. In fact, ATS could result in turbidity and TSS levels well below natural levels, which can also cause problems in receiving waters (e.g., downstream erosion). See discussion in Section I. for details.

4. The PCGP specifies that discharges from ATS must have a pH between 6.5 and 8.5. (Section IV.4.c. of the Permit (p.11)). Additionally, the pH must not be more than 0.2 pH units higher or lower than the receiving water pH. (Section VI.6. of the Permit (p.12)).

Comment: The SWRCB must clarify as to how these limits were derived. Our review of the Basin Plan standards indicates that this limit appears to be a bit more stringent than applicable water quality objectives. See, e.g., the Los Angeles Basin Plan (1994), which requires that "[t]he pH of inland surface water shall not be below 6.5 or raised above 8.5 as a result of water discharges. Ambient pH levels shall not be changed more than *0.5 units* from natural conditions as a result of waste discharge." (Emphasis added.) The ambient pH levels of bays or estuaries shall not be changed more than 0.2 units from natural conditions (same source) (pp.3-15). It is clear that these Basin Plan objectives apply to the receiving water itself and are not effluent limitations. As discussed above, because of considerations related to mixing and receiving water buffering capacity, a discharge would have to have a pH difference far greater than 0.2 pH units to induce a change of 0.2 pH units within the receiving water itself. Thus, it appears that the receiving water requirement in the PCGP is both (a) more stringent than applicable water quality objectives; and (b) improperly applied to effluent, rather than evaluated within the receiving water itself. Finally, meeting this requirement would require receiving water monitoring for pH for all storms, regardless of whether or not an AL or NEL had been exceeded, and making rapid adjustments to pH in response to real-time receiving water monitoring is infeasible. In addition, it may be difficult to identify the receiving water, and access to the receiving water near the point of discharge may not be possible, either legally or physically, particularly during storm events.

Comment: Although, the PCGP (at pp. 3-4) asserts that "numeric effluent limitations (NELs) are feasible for discharges from construction sites that utilize an Active Treatment System (ATS)" the PCGP includes numeric limits for pH for construction sites that do not employ an ATS. As noted in the BRPR at p. 15, it is the use of ATS that may make numeric limits feasible. The SWRCB has not provided any evidence that the NELs for pH in runoff from construction sites can be achieved without retention and chemical treatment.

Comment: If the SWRCB intends to establish technologically based effluent limits, they must provide an analysis of the technology that would be required to achieve those limits

5. The PCGP states that ATS discharges must have a turbidity below 10 NTU. The Fact Sheet (p. 38) cites the BRPR as saying that ATS can "consistently produce a discharge less than 10 NTU…"

Comment: The BRPR finding was for ATSs that used polymer coagulation. We are unaware that electrocoagulation systems can consistently provide a similar quality of effluent.

> *Recommendation:* The SWRCB must provide support for the assertion that electrocoagulation ATS can consistently provide effluent meeting the permit requirements. If available data indicate that these systems cannot meet permit requirements, reference to them should be deleted, or the NELs should not be applied to these types of systems.

Comment: As noted above, effluent turbidity that is "too low" (i.e., far lower than natural turbidity levels) can cause downstream erosion in natural channels. This effect would be especially pronounced where the construction site discharge is a large fraction of the water in the stream. When turbidity or TSS is too low in a discharge, downstream scouring of stream channels will occur, increasing stream hydromodification. Turbidity levels that are too low can also cause ecological concerns, as discussed in section I. A turbidity value of 10 NTU is very low, and is lower than observed storm event turbidity levels in all streams for which data have been reviewed (see Table 1 at Appendix A).

> <u>Recommendation</u>*:* The SWRCB should exercise great care in establishing NELs for turbidity, and should not require effluent to be treated to levels that are "cleaner" than natural background levels during storm events.

6. Section IV.4.a. and b. of the PCGP (p. 11) states that acute and chronic toxicity tests must be performed on all discharges from an ATS.

   Comment: Acute toxicity tests must be performed on all discharges from ATS. Acute toxicity of ATS discharges shall have no significant difference, at the 95% confidence level, between a control discharge and 100% effluent. The test methodology for acute toxicity is a 96-hour test. Results would not be available before discharge. We are also concerned about the laboratory capacity to run a large quantity of tests at the same time (i.e., several contractors will be submitting samples from the same storm event.)

   Comment: For toxicity tests, the control sample is to be collected from an alternate storm water discharge location on site where an ATS is not being used. If site soils meet the PCGP's fines requirements, it is our understanding that the entire site would be required to use ATS. Thus, it is not clear that an alternate storm water discharge location would exist.

   Comment: Requiring a chronic toxicity test for discharges from treated storm water from an ATS is inappropriate. Chronic testing determines the effects of long-term (chronic) exposures to toxic substances. By definition, ATS discharges are short-term, storm driven events, making a chronic toxicity test irrelevant.

   Comment: The test methodology for chronic toxicity is a 7-day test (Test Method 1002.0). Results would not be available before discharge.

   Comment: Currently, only 18 commercial DHS-ELAP certified laboratories in the State can perform acute and chronic toxicity testing. Of these 18 labs, 10 are located in Northern California counties (Amador (1), Shasta (1) Sonoma (1), Contra Costa (4), Mendocino (1), Yolo (1), Santa Cruz (1), and eight laboratories are located in Southern California (Ventura County (2), Orange County (3), Imperial (1), San Diego (2)). As indicated in Section VI. it appears that most construction sites within the State would be required to implement ATS. Thus, we are also concerned that the laboratory capacity to run a large quantity of tests at the same time (since several contractors will be submitting samples from the same storm event) does not exist.

   Comment: According to the BRPR (p. 15), the SWRCB should to take into account the long-term effects of chemical use, operational and equipment failures or accidental releases.

Comment: The BRPR (p.18) recommended that the SWRCB consider the costs of monitoring discharges to meet ALs or NELs. Costs may be prohibitive. Cost effectiveness improved at larger sites where development occurs over one or more wet seasons. Panel recommends that the SWRCB give particular attention to improving the application of cost-effective source controls to small construction sites.

III. ACTION LEVEL EXCEEDANCE EVALUATION REPORT (ALEER)

As written, the PCGP is not clear on the number of AL exceedances that trigger the submittal of an ALEER. The preliminary draft also requires that an ALEER be submitted to the SWRCB as a public record when an AL is exceeded. Per the preliminary draft, exceedances of ALs are not violations and thus should not be subjected to submittal in an ALEER.

This Permit requires any discharger who exceeds two consecutive ALs for a single parameter at a single effluent sampling location to submit to the State Water SWRCB electronically (and make publicly available) a report of the exceedance and their response.

Comment: The SWRCB needs to clarify the terminology that it wishes to use when discussing sampling locations that could trigger the submission of an ALEER. The term “single effluent sampling location” is used in the Fact Sheet (Section I. D., p 9) yet the term “drainage area” is used to denote when a submission of an ALEER is necessary in Section IX.B.2. of the Permit (p.17).

1. Section I, 18. (p. 5) of the Permit states that “This General Permit requires the submittal of an ALEER…when discharges of storm water or non-storm water result in two consecutive AL exceedances for any one parameter (pH, turbidity or TPH) at a single effluent sampling location.”

Comment: This statement appears to define when medium risk dischargers must sample receiving waters (and file an ALEER) yet it conflicts with the text footnote 4 to Table 1 of the Permit (p. 7) which states that “receiving water monitoring is only required at medium risk sites when the discharge from any drainage area exceeds the AL for pH or turbidity or the NEL for pH for two consecutive storm events, medium risk dischargers shall sampling receiving waters for the parameter(s) that consecutively exceeded the AL or NEL.” Footnote 5 in that same table states that “[R]eceiving water monitoring is only required at high risk sites when the discharge from any drainage area exceeds the AL for pH or turbidity or the NEL for pH during any storm event, that dischargers shall immediately sample receiving waters for the parameter(s) that exceeded the AL or NEL. The SWRCB must provide clarification, and check language throughout the Fact Sheet and Permit, to ensure that the obligations of medium and high risk dischargers are clear, and to clarify the number of exceedances that trigger an ALEER reporting event.

Comment: Also, as discussed above, there may be a great distance between an effluent discharge location and the receiving water, resulting in both spatial and temporal “disconnects” between the discharge from a site and the receiving water, so that determining the role of a singe discharge to an exceedance in receiving water will be difficult, if not impossible.

2. In Section IX.B.2.c. of the Permit, (p.17), dischargers are to address any written comments to revise the ALEER, SWPPP, and/or Monitoring Program from the Regional Water SWRCB within 14 days of receipt.

   Comment: As a practical matter, we believe that it is unlikely that SWRCB staff will be able to review these reports promptly after submission, and we suggest that untimely comments are not useful, and will affect a permittee's ability to respond appropriately.

   > *Recommendation:* The SWRCB should specify a review window of 15 business days, within which the Regional SWRCB should provide written comments on an ALEER, SWPPP, and/or Monitoring Program.

3. Section I. 18. (p. 5) of the Permit states: "This General Permit requires the submittal of an ALEER when discharges of storm water or non-storm water result in two consecutive AL exceedances for any one parameter (pH, turbidity, or TPH) at a single effluent sampling location. "

   > *Recommendation:* According to the Permit, an AL exceedance is not a violation. We recommend that these types of ALEER not be entered into SWARM, which allows for public access, and thus, could be misleading.

4. Section M.4.e. of Attachment E. of the Permit (p. 69) indicates that, for turbidity exceedances, the Turbidity MUSLE worksheet or an equivalent, alternative form/worksheet, can be used to calculate the ratio of measured turbidity.

   Comment: As detailed above in Section I, we have several concerns with the assumptions used in these calculations and the MUSLE approach itself for this purpose. This calculation procedure should be tested against real data from construction sites and from undeveloped sites, and the methodology should also consider receiving water characteristics.

   > *Recommendation:* The SWRCB should provide calibration and validation information for the calculation procedure in Attachment E. Real-world datasets should be used to test this calculation procedure.

IV. RISK-BASED PERMITTING APPROACH

This Permit includes a three-tiered system for dischargers that is based on the relative risk their project poses to causing water quality impacts. The site and project – specific factors used in this determination include the "R" factor, proximity to receiving waters, acreage of site to be graded, dominant soil type, design of sediment basins, and slope-length of disturbed area.

While CBIA understands the intent and potential benefit of the risk-based permitting approach, we have several significant concerns with the approach as proposed in the Preliminary General Permit. First and most importantly, the approach does not consider conditions within the receiving water. By considering only *proximity* to a receiving water and not receiving water characteristics, the preliminary draft fails to consider receiving water quality and habitat, and thus regulates all sites equivalently, whether they discharge to a pristine salmon-spawning stream, or to a concrete-lined flood control channel, or to a natural channel with naturally high turbidity levels. Secondly, the risk-based approach presented in the preliminary draft considers only detention basins as treatment, and does not recognize the significant risk reduction that can and does occur through the proper design and use of erosion control and other "source reduction" control measures. We believe that it makes far more sense to control the sources of sediment (i.e., to minimize sediment entering storm water) than to chemically treat storm water (i.e., to remove sediment once suspended in storm water). Finally, the current risk-based permitting approach does not appear to be properly calibrated or tested, and includes several measures to evaluate risk that are not appropriate. While we are not categorically opposed to a risk-based permitting approach, the current risk evaluation proposed in the preliminary draft is not adequate and should not be used.

1. The Permit requires that the discharger complete Attachment F: Sediment Transport Risk Worksheet in order to determine whether their site is a "Low," "Medium," or "High" risk site.

    Comment: We agree with the basic principal of linking site-specific risk factors to appropriate levels of project controls related to those specific factors. However, it is unclear how the risk factors were identified, how point values were assigned, and whether or not sensitivity analyses that were performed.

        Recommendation: We request an assessment of the expected confidence in the results of the risk evaluation, including the evidence and rationale behind how each factor was developed and weighted. We request information on other risk-based systems that were considered and why additional factors such as receiving water characteristics and pre-development runoff quality and characteristics, were not included in the risk-based approach. We also request information on how point values were assigned, and sensitivity analyses of the risk evaluation framework using real data from representative construction sites throughout the State. We also suggest that risk reduction be allowed to recognize the effect of BMPs and erosion control measures used within a site

        Recommendation: We proposed that the risk based system be redesigned in order to relate scores within individual risk categories to control requirements relevant *to that specific category only*.

    Comment: In developing Attachment F, we believe that the SWRCB failed to take into consideration the sensitivity of the receiving water and natural receiving water conditions (this is of major importance for salmonid streams, for example). As detailed in Section I. of these technical comments, low sediment concentrations may be required to support certain beneficial uses (e.g., salmon spawning), while other systems have naturally high turbidity levels. Introducing heavily sediment-laden water into a very sensitive habitat may have detrimental effects, but the converse is also true: introducing sediment-poor water into a stream or river that normally has high sediment concentrations may also cause detrimental effects. In the PCGP, the emphasis should not be on reducing all sediment loads, but on mimicking natural water quality to the extent possible.

Recommendation: If the risk-based approach is used, a metric should be incorporated to assign a higher risk level (more risk points) to highly sensitive receiving waters. In no case should discharges from construction sites be required to reduce sediment loads to below the levels that occur naturally in the receiving water.

Comment: The risk evaluation framework fails to recognize effective risk reduction measures, such as erosion controls and technologies that could effectively reduce the risk posed by a specific construction site. As detailed throughout these comments, source control should be preferred, whenever possible, to chemical or electrical treatment, and source and erosion control efforts should be recognized in the risk reduction framework through the allowance of credits.

Recommendation: We recommend that credits be given for factors such as: a) construction activities completed outside of the rainy season; b) sites that do not use soil amendments; c) participation in regional solutions, or for offsets; d) specific erosion control measures; e) special types of projects (e.g., infill or below ground sites where water must be pumped out); f) adjustments for project phasing; g) special types of soils.

2. Based on discussions with SWRCB staff, we are under the impression that the staff believes that by completing Attachment F, most sites will fall under the "low" or "medium" risk categories.

Comment: We disagree. Based on our analysis of data from the Natural Resources Conservation Services data, we believe that a majority of sites within California would be "medium" or "high" risk sites" (see Figure 1, Appendix B).

Recommendation: We request that the SWRCB provide additional detail to describe how the point values were selected for each of the measures in the risk evaluation worksheet, plus calculations for sites that are representative of the range of construction sites in the State. We also request that the SWRCB conduct a sensitivity analysis to determine the effect of assigning different point values to the existing parameters, and to determine the effect on risk of the addition of additional parameters and allowance of "credits." Please see detailed comments below and also comments contained in Section IV.

3. As the Permit is currently written, low risk sites are not required to submit a SWPPP.

Comment: A majority of our members are opposed to this idea. Our member companies have spent years and resources training personnel in complying with the current regulations and believe that the SWPPP is a worthwhile document.

4. Six specific factors are used in Attachment F, the Sediment Transport Risk Worksheet, to calculate the risk posed by an individual construction site. Each of these factors is discussed in detail below.

a) Proximity to receiving water. The worksheet requires a permittee to determine the distance to the nearest receiving water, and assigns the greatest number of points (highest risk) to a site located in a stream channel, wetland, vernal pool, or marine near-shore habitat. An intermediate number of points are assigned for construction activities located within 100 feet of such a water body; those located within a streamway or 100-year floodplain; or those from which runoff is routed directly to a surface water of the state via a pipe, channel, or ditch.

Comment: While in many cases the nearest receiving water will be easy to identify, for many projects it will not. The term "surface water of the state" is undefined in the PCGP, and it is unclear whether components of the MS4 system, such as covered storm drain pipes, curbs, and gutters, are included in the definition. No distinction is made between unimproved receiving water channels and engineered channels that are used primarily for flood control purposes. Further, as discussed above, this risk evaluation factor does not include any evaluation of the sensitivity of the receiving water or associated habitat.

Recommendation: The SWRCB should clearly define the terms used in the risk evaluation worksheet. Proximity to a receiving water provides very little indication of the potential impact of a discharge on the receiving water, and should be discarded in favor of an evaluation of natural receiving water quality and susceptibility.

Comment: We are concerned that this risk evaluation factor will be used to discourage stream restoration and other in-stream construction activities that occur and result in a net environmental benefit.

Recommendation: The risk evaluation worksheet should provide a means to encourage stream restoration and other construction projects conducted for the benefit of the environment, or that result in a net environmental benefit.

b) Area of site to be cleared and/or graded. The risk evaluation worksheet assigns 25 points to sites between one and five acres in size, and 50 points to sites five acres or larger.

Comment: The PCGP clearly wishes to encourage permittees to limit grading to five acres in size. However, as discussed in greater detail in Section IX, below, a five acre grading limitation is infeasible for most projects. If adhered to for larger projects, a five acre grading limitation could dramatically lengthen the project duration and increase the risks posed by the project. Further, the risk posed by a project to a receiving water is more likely to be a function of both the size of the project and the size of the overall watershed; a five acre project poses a far greater risk in a small watershed than in a very large one.

Recommendation: The SWRCB should recognize that projects of a variety of sizes are likely to occur, and that these projects will occur within watersheds of varying sizes. The risk evaluation worksheet should be reformulated and recalibrated to recognize that reducing project size may lengthen and increase project impacts, and recognize risk reduction measures that can be taken on larger projects.

c) Clearing outside designated rainy season, and evaluation of Erosivity Index. While we agree, in principle, that clearing outside the rainy season may be preferable under certain circumstances; there will be circumstances for which clearing entirely in the dry season poses a greater environmental risk. For example, the presence of endangered species may preclude clearing during a significant portion of the dry season. Raptor and threatened or endangered species nesting or mating seasons sometimes extend well into the summer and fall dry seasons. Further, it is possible to have an erosivity index greater than five even for a project that is conducted entirely within the dry season.

> *Recommendation:* This measure of site risk should be re-evaluated, and other factors should be considered (e.g., presence of endangered species). A lower number of risk points should be awarded for dry-season projects that have an erosivity index greater than five.

d) Erodibility Index (RKLS/T) of site. This factor is calculated using the RKLS/T index, the sheet flow length, and the slope

> **Comment:** The RKLS/T measure is inappropriate for construction sites. In particular, the "T" factor is the soil tolerance, which is a measure of the maximum amount of soil loss an agricultural site can sustain and still be productive; it has no meaning for construction sites. For example, in the State of Oregon's "Erosion and Sediment Control Manual," (2005) (Manual), the State makes clear when discussing erosion factors used in RUSLE, that "[T]he T factor is not used for construction site erosion." The Manual describes the Erosion factor T as "…an estimate of the maximum average annual rate of soil erosion by wind or water than can occur without affecting crop productivity over a range of time…" Additionally, values for cover (C) and practice (P) were left out of the RKLS/T equation, despite the fact that these are the very parameters that can be managed through proper use of BMPs to prevent erosion and sedimentation.

> *Recommendation:* We recommend that the RKLS/T factor in the risk evaluation framework be abandoned. If this factor is reworked and included in the risk evaluation worksheet, it should not include "T," and should include other important factors, as discussed above. Further, we request that the SWRCB provide detail on the derivation of a scientifically appropriate factor, how point values were assigned, sensitivity analysis of the factors in the formulation, and an evaluation of this factor using data from representative constructions sites throughout the State.

e) Runoff potential of dominant soils. The risk evaluation worksheet assigns different point values for Hydrologic Soil Types A, B, C, and D. Finer soils (i.e., those with a higher percentage of fine particles) are assigned higher point values.

> **Comment:** It is unclear that the Hydrologic Soil Types have any relationship to the relative risk posed by a construction site. As detailed in these comments, the ability to control erosion and to prevent soils from entering storm water is almost entirely independent of particle size. Further, it is unclear how the State Board developed the point values assigned to each of the Hydrologic Soil Type categories. Additional detail

is necessary to support the Staff's use of this factor, including justification for its use as an indicator of risk, sensitivity analyses performed on this indicator, and an evaluation of this factor using data from a range of construction sites representative of conditions throughout the State.

<u>*Recommendation:*</u> We recommend that this factor be eliminated from the risk evaluation worksheet.

f) Sediment basin sizing. The risk evaluation worksheet assigns 25 points if basins are used and if they are not sized according to the standard in Attachment K and 0 points if either basins are not used or if they are not sized according to Attachment K.

Comment: Sediment basins are just one of many control measures that are available for use at construction sites. Rather than add points if certain sizing requirements are not met, it would be more appropriate to allow credits (to subtract points) for sediment basins and other source or erosion control measures that serve to reduce the risk posed by discharges from a construction site. See Section V of these comments for specific comments on Attachment H, which provides detention basin sizing requirements.

<u>*Recommendation:*</u> The SWRCB should subtract points for well-designed BMPs and erosion control measures. This factor should be moved to a "credit" portion of the risk evaluation worksheet, and points should be determined for various control measures. These points would be subtracted from the overall risk score to determine the overall risk posed by a project with well-designed and implemented BMPs. It might be possible to include ATS within this framework, as a risk reduction measure that could be given more points, but only to the extent that ATS would be required for receiving water protection in extraordinary circumstances. In any case, the risk evaluation worksheet should be well-calibrated and sensitivity analyses should be performed to ensure that it appropriately assigns risk to a project.

V. MINIMUM REQUIREMENTS SPECIFIED

The PCGP specifies minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance. However, beyond specifying additional minimum BMPs, the Permit does not clearly emphasize a pro-active and comprehensive approach to planning, implementation, inspection, and management of complementary BMPs, including construction site erosion and sediment control. Overall the Permit should emphasize project planning and design, implementation, inspection, and maintenance of a pro-active approach for protecting sites with a hierarchy of complementary BMPs to reduce pollutant discharges from construction sites, instead of highlighting and giving priority to extensive monitoring requirements, NELs, ALs, and Active Treatment Systems.

1. Section VII. 3. of the Permit (p.13) states that existing dischargers shall make and implement necessary revisions to their SWPPP and Monitoring Program no later than 90 days aft the adoption date of the permit.

Comment: The SWRCB must clarify whether this means 90 days after EPA 100-day review period. If not, then 90 days after the adoption of the permit but before EPA completes its review of the permit is not adequate for permittees to implement these extensive new permit requirements. Further, given the practical requirements of the permit to train and certify qualified practitioners, a phase-in approach may be appropriate.

> *Recommendation:* The SWRCB should clarify that necessary revisions to SWPPP and Monitoring Program documents should be made within 90 days after the close of the 100-day EPA review period. Further, the permit requirements should be phased in to allow for training and certification of personnel. It may make sense to phase in permit requirements according to the risk level posed by a site, so that high risk sites must comply with the provisions of the permit sooner than medium or low risk sites.

2. The Fact Sheet indicates that the PCGP specifies more minimum BMPs and requirements that were previously only required elements of the SWPPP or were suggested as guidance (Fact Sheet, pg. 9 of 40).

Comment: Overall the permit should do a better job at emphasizing project planning, implementation, inspection, and maintenance of a pro-active approach for protecting sites with a hierarchy of complementary BMPs to reduce pollutant discharges from construction sites, instead of highlighting and giving priority to extensive monitoring requirements, NELs, ALs, and ATS. The permit should clearly emphasize that the SWPPP should contain, and a project must implement, a system of BMPs that include measures from all four BMP categories: runoff controls, erosion controls, sediment controls, and non-storm water management controls. Both field and laboratory research and evaluation of drainage, sediment and erosion control technologies shows that they are individually highly effective in controlling soil loss and sediment delivery. These data are illustrated in Appendix D. "Comparison of Erosion and Sediment Control Best Management Practices (BMPs) Utilizing the Results of Rainfall Simulation Testing at the San Diego State University Soil Erosion Research Laboratory (SERL)," which includes data from the Caltrans Soil Stabilization of Temporary Slopes study (1999) and the Caltrans Erosion Control Pilot Study (2000).

The majority of sites can be well protected with effective SWPPP design and site planning and diligent, proper application and maintenance as well as use of a "hierarchy of complementary BMPs" from the four categories identified above. This pro-active approach is one that contractors can successfully implement if given appropriate permit-driven guidelines and is one that is supported by the Clean Water Act.

Comment: The stormwater provisions of the Clean Water Act require the implementation of BMPs to control and abate the discharge of pollutants in stormwater discharges from construction sites utilizing the best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT). In order to achieve this goal with respect to the discharge of sediment from construction sites, the following five major objectives should be accomplished at every construction site:

- To minimize exposed areas and provide erosion control practices on disturbed areas during the rainy season;
- To provide properly designed drainage facilities to control concentrated flows;
- To provide sediment control practices around the perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season;
- To reduce the tracking of sediment off site all year; and
- To reduce wind erosion all year.

However, stating these objectives alone in a permit does not provide the desired degree of specificity and guidance for the designer and contractor to decide when and what types of erosion and sediment control practices are needed, and how much erosion and sediment control is enough.

Recommendation: Additional language with more specific design criteria applicable to all sites is suggested below. In addition, suggestions for "Enhanced Measures" for high risk sites (e.g., those that drain directly to water bodies that are 303(d) listed for sediment constituents and where TMDL-implemented controls are ineffective, or those that drain to other water quality sensitive areas as determined by the local jurisdiction) are provided below with comments for Section IX. "Active Treatment System (ATS) or Specific Source Control Requirements."

a. Require that **erosion control practices** be provided on disturbed areas during the rainy season. In order to address the timing of implementation of these measures, the permit should specify that all disturbed areas that will not be re-disturbed for a certain length of time (e.g., 20 days) shall be provided with erosion control measures within a certain length of time (e.g., 14 days) from last disturbance. The erosion control practices should achieve and maintain a specified minimum soil coverage (e.g., 70 to 90 percent of the soil being treated shall be covered) until the permanent vegetation or other permanent stabilization provides the intended long-term erosion control function at the site. In addition, more guidance could be provided through CASQA's California BMP Handbook for Construction when it is updated, or another appropriate mechanism, for minimum erosion and sediment controls based on slope, season, and anticipated duration of inactivity. Dry season requirements should be based predominately on wind erosion control requirements (see e. below).

b. Require that on-site **drainage facilities** for carrying concentrated flows be designed to control erosion and to prevent damage to downstream properties.

c. Require that **sediment control practices** be provided around the down gradient perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season. These sediment control measures may include filtration devices (such as silt fences and inlet filters) and/or settling devices (such as sediment traps or basins). Filtration devices that are designed for sheet flow shall be installed and maintained properly in order to perform effectively. Sediment traps or basins shall be designed and maintained to optimize effectiveness.

d. Require that practices be implemented and maintained to **reduce the tracking of sediment off site** at all times. This may be accomplished by stabilized construction entrances or other appropriate and effective measures designed in accordance with the most current CA BMP Handbook.

e. Require that practices be implemented and maintained to **reduce wind erosion** at all times. This may be accomplished by limiting the area of disturbance, applying dust control measures, and stabilizing disturbed areas in a timely manner, and should be designed in accordance with the most current CA BMP Handbook.

The standard principles of pro-active and effective construction site erosion and sediment control identified above are consistent with the current erosion and sediment control manuals. However, these principles are not necessarily implemented appropriately at all construction sites due to a lack of permit specificity and design guidance. Additionally, these requirements would be relatively easy for a designer to specify, a contractor to implement, and a resident engineer, site superintendent, or site inspector to evaluate and enforce in the field.

3. Finding 25 indicates that the Permit "recognizes five distinct phases of construction (Section I. of the Permit (p. 6)).

   Comment: The Permit needs to recognize that not all projects include all phases, particularly infill redevelopment projects. For example, a project that is completely contained (say a basement construction within a city block) where no water can be discharged without pumping should not face the same set of requirements as an open site that drains to a surface water. In addition, for many redevelopment projects, much of the area may have been previously paved. Runoff from sites where surfaces can be predominantly impervious throughout construction require a different set of BMPs. For example, perimeter controls and inlet protection are generally paramount, whereas erosion and sediment control, with the exception of fugitive dust practices may be of lesser concern.

4. Section VIII of the Permit (p.15), Project Planning Requirements, requires quantitative analysis of sediment transport risk and soil particle size analysis.

   Comment: Section VIII limits project planning to quantitative analysis of sediment transport risk and soil particle size analysis. This section illustrates the Permit's apparent emphasis on ATS and numeric limits. (See also comments on Sections IV. and VI.)

   Recommendation: Section VIII should emphasize good erosion and sediment control planning instead of just requiring risk and soil analyses. Key elements in good erosion and sediment control planning include:

- Minimize disturbance in accordance with the BCT standard and retain natural vegetation in undisturbed areas;
- Time and phase construction to minimize soil exposure in accordance with the BCT standard , particularly near sensitive areas;
- Minimize concentrated flows and divert runoff away from slopes or critical areas;
- Minimize slope steepness and slope length (e.g., by using benches, terraces, or diversion ditches);
- Utilize channel linings or temporary structures in drainage channels to reduce runoff velocities;
- Keep sediment on site in accordance with the BCT standard by using sediment basins, traps or sediment barriers; and
- Inspect sites frequently and correct problems promptly.

Although many of these elements are project implementation requirements, they must be considered during the project planning and design phase to be successfully implemented.

5. Much of the language in Section IX, Project Implementation Requirements, (pp. 15-26) related to site controls is potentially confusing, and does not clearly convey requirements that are protective of the environment and that can be implemented on construction sites.

    Recommendation: Specific examples and suggested alternatives are given in Appendix C, Table 2.

6. Section IX.E. 2. of the Permit (p. 18) requires: "The discharger shall, at a minimum, design sediment basins according to Attachment H." Attachment H provides a sediment basin sizing method using an "apparent effectiveness" approach that should allow for a 90% reduction of suspended soil particles having a diameter of 0.02 mm or larger.

    Comment: Attachment H or the Fact Sheet should provide the basis for the proposed sizing methodology. Attachment H should also provide guidelines that optimize basin effectiveness and improve performance of traditional sediment basins. Enhanced sediment basins would be a much more cost effective method to improve sediment control than the widespread use of ATS.

    Recommendation: The SWRCB must further evaluate and enhance design requirements outlined in Attachment H to better address settling velocity of sediment particles and enhance overall effectiveness of temporary sediment basin design for all sites. For example, the methodology should reference and provide documentation for the basis of development of the empirical method proposed (i.e., "Apparent Effectiveness" equation) and specifically provide corresponding design guidance. In addition, the methodology should provide additional guidance regarding outlet sizing and basin configuration (e.g., length to width ratio and appropriate inlet and outlet placement to eliminate "short circuiting") in order to optimize detention time, promote a maximum flow length within the basin, and control effluent flows.

7. Section IX.L. 2 of the Permit (p.25), Inspection, Maintenance, and Repair, states: "The discharger shall perform inspections and observations weekly, and at least once each 24-hour period during extended storm events, to identify BMPs that need maintenance or failed to operate as intended.

   Comment: As previously stated, one of the basic problems seen at construction sites is the proper application and maintenance of BMPs, and improved inspection requirements will facilitate compliance. However, weekly inspections by a qualified SWPPP practitioner during the dry season are not necessary.

   > <u>*Recommendation:*</u> We recommend that inspections be conducted by a qualified practitioner during the dry season at most on a bi-weekly basis, or less frequently, with the inspection frequency to be determined based upon site risk. In addition, more frequent inspections could be carried out by site personnel who are trained by a qualified practitioner (e.g., the qualified practitioner would design an inspection program and inspection forms, and would train site operators). Weekly inspections during the dry season are especially burdensome for small sites. Inspections should be conducted by the SWPPP developer (a qualified professional) at critical project phases (e.g., after initial BMP installation, prior to clearing and grubbing and general grading, and between subsequent phases identified in the SWPPP) to confirm that the site is protected and to identify potential BMPs issues associated with phase transitions. We recommend that inspection be promoted in lieu of the 90-day SWPPP comment period and as part of comprehensive enhanced protection program that should be prioritized over ATS and NEL requirements.

8. Requirements for the preparation, implementation, and oversight of a SWPPP are included in Section X, pp. 26-28, of the PCGP. Attachment D (pp. 52-58) presents SWPPP requirements.

   Comment: Requirements of Attachment D need to be crossed-checked against requirements in Section IX of the Permit (Project Implementation Requirements), as there appear to be some implementation requirements raised in Attachment D.

   > <u>*Recommendation:*</u> We suggest that all site implementation requirements be presented in Section IX, and that Attachment D focus on the written plan and drawing content requirements but not include new site requirements. Also, SWPPP requirements should be modified to be consistent with CBIA comments to other permit sections. Specific comments to Section X and Attachment D. are provided in Appendix C, Table 2.

9. Termination of Coverage (Section XII, page 28 of 79).

   Comment: Specific comments to this section are provided in Appendix C, Table 2.

VI. PROJECT SITE SOIL CHARACTERISTICS MONITORING AND REPORTING

The PCGP requires all projects to analyze and report the soil characteristics at the project location. The purpose of this requirement is to provide better risk determination and eventually better program evaluation. The primary characterization to be performed pursuant to the preliminary draft permit is an analysis of the fines content both of site soils and of materials to be imported as fill. The permit requires a permittee to determine whether or not site soils consist of >10% fines, where fines are defined as particles smaller than 0.02 mm. This soils test is conducted independently of, and does not provide information to, the risk evaluation, but serves as a trigger for mandatory compliance with the five acre grading limit or use of ATS.

If site soils or imported fill are found to contain >10% fines, the permittee must either (a) employ an ATS, or (b) limit open grading and/or clearing to less than five acres at any time and employ source control measures. These requirements are imposed regardless of the condition of downstream water bodies, and regardless of natural water quality. The requirements are also imposed uniformly throughout the site, and regardless of whether the project activities will occur during the wet or dry season. We find these requirements to be technically onerous, not cost-effective, and inappropriate for several reasons. First, we believe that it is inappropriate to regulate a construction site based upon a single test alone (% fines), and that many more site and receiving water characteristics should be incorporated into a site evaluation. Second, the test, as written, would trigger compliance with the mandatory grading limit or ATS for practically all sites in California. It is inappropriate to require ATS uniformly across the state without consideration of background receiving water quality, particularly natural turbidity. Third, while we support source control requirements, a five acre limitation on active construction areas is infeasible at all but the smallest of construction sites.

1. Section VIII, B. 1. (p. 15) of the Permit states that dischargers must complete a soil particle analysis using test method ASTM D-422.

   Comment: This analysis is an evaluation of site soils, to determine if the fraction of site soils or imported fill material that would be characterized as "fines." If site soils or imported fills include >10% fines, a construction site would be required either to implement ATS or to limit grading to five acres and employ source control. The permit also includes other requirements to characterize site soils (e.g., to characterize the hydrologic soil type). The PCGP specifies that results of the particle size analysis are to be provided as part of the permit application, prior to the beginning of construction activities.

   Comment: This analysis is conducted independently of other measures of risk, including receiving water condition and natural water quality and other site characteristics that influence erosion potential (e.g., site slopes). In fact, it is possible for a low risk site that will be open during the dry season to meet this test, and therefore to have to employ either ATS or stringent grading restrictions.

   > *Recommendation:* This percentage fines test should not be conducted as a stand-alone test that is used to trigger requirements as to the specific control measures to be used on a construction site. Rather, the percentage fines test should be dropped, or—at a minimum—incorporated into a larger risk evaluation framework that considers other

relevant parameters, such as receiving water status, natural/background water quality, erosion potential, erosion and source control measures to be used at the site, etc.

Comment: More often that not, and due the nature of the business, the source of import is not known until a short time before it is actually brought into the project, and after the permit application would be filed. Thus, in most cases it will not be possible to characterize imported fill material during the application process.

> *Recommendation:* We request that the SWRCB either remove the requirement to characterize fill material before the project begins, or qualify this requirement and specify that it is to be conducted "if possible" or "to the extent possible." We also request that the SWRCB clarify that the permit does not require the re-calculation of risk as the project proceeds.

Comment: This analysis is conducted independently of other measures of risk, including receiving water condition and natural water quality and other site characteristics that influence erosion potential (e.g., site slopes). In fact, it is possible for a low risk site that will be open during the dry season to meet this test, and therefore to have to employ either ATS or stringent grading restrictions.

> *Recommendation:* This percentage fines test should not be conducted as a stand-alone test that is used to trigger requirements as to the specific control measures to be used on a construction site. Rather, the percentage fines test should be dropped, or—at a minimum—incorporated into a larger risk evaluation framework that considers other relevant parameters, such as receiving water status, natural/background water quality, erosion potential, erosion and source control measures to be used at the site, etc.

2. Section VIII, B. 3. (p. 15) of the Permit states that at least one sample shall be taken per mapped soil unit on the site and that information on soils can be obtained from the Natural Resources Conservation Services (NRCS) and/or published soil surveys.

> *Recommendation:* We recommend that the SWRCB Include a definition of "mapped soil units" as those that will be ultimately deposited on the upper one foot of finished grade effect.

> *Recommendation:* Our discussions with the NRCS have indicated that not all areas in California have been surveyed. We believe that the Permit should provide an alternative approach when a construction area is located within an area that has not been surveyed.

3. Section I. 19 (p. 5) of the Permit indicates that "[S]oils with more than 10% (by weight) of their particles smaller than 0.02 millimeters (mm) (i.e., finer than medium silt) do not settle easily using conventional measures for sediment control (i.e., sediment basins)."

Comment: Mr. Gearheart, SWRCB staff, cited as the source of the 10% requirement a Fifield sedimentation basin reference and a desire to have a 90% efficiency of sediment removal for traditional (non-ATS) sediment basis. We have reviewed the Fifield reference and have been unable to determine the origin of the 10% requirement. While settling times are longer for smaller particles, other factors, including slope, rainfall intensities, and whether stormwater can "escape" site, all affect the ability for sediments to be entrained and leave the site.

> *Recommendation:* The SWRCB should provide a detailed rationale for the derivation of the 10% fines requirement, and should evaluate additional thresholds. Again, we recommend that the SWRCB incorporate any soil evaluations into the overall risk evaluation framework.

Comment: Our review of available data indicates that the vast majority of sites within the State will have soils with >10% fines. Available soil data have been summarized by URS using NRCS data based on different particle size thresholds. Soil particle size data are available for approximately 60% of the State's land area. Of this mapped area, approximately 96% consists of soils where >10% of particles, by weight, are smaller than 0.05 mm in size. Although data to judge the requirement based on a fines size of 0.02 mm appear to be unavailable, results are not expected to differ significantly. See Figure 1, Appendix B for a map summarizing the results of our analysis. If a site has >10% fines, it is required either to (a) implement ATS; or (b) limit grading to five acres and implement source control. The particle size analysis is conducted separately from the risk evaluation and independently of other measures of risk, including receiving water condition and natural water quality and other site characteristics that influence erosion potential (e.g., site slopes). In fact, it is possible for a low risk site that will be open during the dry season to meet this test, and therefore to have to employ either ATS or stringent grading restrictions. Further, as detailed in Section IX. the percent of fines present at a site has little or no relation to erosion potential or to ability to control erosion from a construction site. Thus, this requirement will trigger a need to implement ATS or limit grading regardless of a site's risk factor, and regardless of whether or not the receiving water is impacted by or sensitive to sediment.

> *Recommendation:* We recommend that the evaluation of the percentage of fines be incorporated into the Risk Evaluation worksheet and not serve as a stand-alone requirement. We also recommend that various thresholds (30%, 50%, etc.) be evaluated, and that the SWRCB evaluate the sensitivity of this test to various thresholds for soils located throughout the State. Further, the soil size test should not be used as a sole trigger for requiring ATS or for requiring limitations to grading; as discussed throughout these comments, properly selected and implemented erosion and source control measures will be effective in protecting water quality, and are selected based upon a variety of site characteristics, including but not limited to site soil size.

VII. EFFLUENT MONITORING AND REPORTING

Although the PCGP states that effluent monitoring and reporting data are to be used in the overall program evaluation, it is unclear how these data will be used for this purpose. We are concerned that, unless the program goals are clearly articulated and incorporated into the permit, data collection will not provide useful information to the overall program. Further, the effluent monitoring and reporting program appears to be designed such that additional data collection is discouraged (e.g., BMP effectiveness monitoring, sampling and analysis within a site to allow better targeting of water quality concerns); we encourage the SWRCB to allow for data collection for the purposes of additional study and information gathering, without threat of penalties for non-compliance and without onerous reporting requirements. We also have some specific concerns about various aspects of the effluent monitoring and reporting proposal, as discussed in our detailed technical comments. We recommend that the SWRCB revisit the effluent monitoring and reporting program design after addressing the other outstanding technical and scientific issues discussed in these technical comments, and that the SWRCB design the monitoring program to more clearly support the long-term goals and objectives of the program.

This Permit requires effluent monitoring and reporting for pH, turbidity and TPH in storm water discharges. The primary purpose of this monitoring is to compare against the NEL of pH and the ALs for the other parameters. The secondary purpose is to provide the needed information to use in overall program evaluation. The permit also requires discharges from ATS to be monitored and compared to NELs for pH, turbidity, chronic toxicity, and acute toxicity.

1. The Permit requires a discharger with a medium or high risk construction project to collect storm water samples from each drainage area within one business day after the initial ½ inch of measured precipitation from a storm event, and every one inch thereafter. The discharger shall collect samples of stored or contained storm water that is discharged subsequent to a storm event producing precipitation of ½ inch or more at the time of discharge (p. 61).

   Comment: If no or limited on-site retention is employed, requiring monitoring within one business day after a 0.5 inch storm will likely yield data that are not representative of runoff conditions. Unless the site is very large, attenuation is likely not significant enough to yield runoff this long after a storm. For sites utilizing retention, effluent samples should be representative of storm water discharged to the receiving water (e.g., collected as effluent leaves the site, or after a representative detention time). Further, requiring effluent sample collection for each storm of 0.5 inches or more could result in requirements to collect a very large number of samples.

   <u>*Recommendation:*</u> The SWRCB should limit the number of required storms to be sampled per month (e.g., sample the first two, three or four storms per month meeting specified criteria), and that the SWRCB limit the total number of samples to be collected during the wet season. The permit should also be modified to specify that effluent samples should be representative of effluent discharged from the site, after treatment by BMPs or other measures, as appropriate.

2. As indicated in the description of effluent monitoring and reporting (Fact Sheet, Section I.D. (p. 9)) a stated goal of the monitoring is "to provide the needed information to use in overall program evaluation."

   Comment: We request additional information from the SWRCB as to how data will be used in the overall program evaluation. Without knowing the ultimate purpose of the data to be collected pursuant to this permit, it is difficult to assess whether or not the proposed monitoring program will provide data sufficient to meet the program's goals. For example, the data that have been collected pursuant to the State's General Industrial Permit (generally grab sample data for four basic constituents) have not been useful in refining that permit or in providing data sufficient to develop scientifically appropriate numeric limits. A data collection program that is designed to support numeric effluent limits (especially water quality based effluent limits, or WQBELs) will look much different than one designed to support the proper development of, or evaluation of, action levels.

   Recommendation: We recommend that the SWRCB provide additional information on how effluent monitoring conducted pursuant to the permit requirements would be used within the program. The effluent monitoring data collection program should be designed with program goals in mind, and as part of a longer-term plan for the regulation of discharges from construction sites.

3. Attachment E., D. 2. (p. 60) requires that "discharger shall record any storm event that produce [sic] less than ½ inch of precipitation."

   Recommendation: We suggest rewording this statement to "1/2 inch of precipitation or more."

4. Section V.C. 3 (p. 43) of the Permit states that "If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under Part 136 or, in the case of sludge use or disposal, approved under Part 136 unless otherwise specified in Part 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Water SWRCB. (40 C.F.R. § 122.41(l)(4)(ii).)

   Comment: We are concerned that the requirement to report data collected more frequently than required by the order will discourage additional data collection and study efforts, particularly if any additional data will be used for compliance evaluation purposes. A discharger may elect to collect data more frequently to evaluate BMPs or erosion control measures in use on the site, or to provide information on the performance of BMPs under different storm conditions (e.g., over the course of a storm, or with variations in rainfall intensity).

   Recommendation: We recommend that the permit language be modified to allow dischargers to conduct special studies or to collect additional data for the purposes of evaluating their site practices or BMP performance generally. Suggested language follows: "Data collected more frequently than required by the permit, if used for general study of effectiveness or temporal and spatial variations in constituent concentrations or loads from the site, or if collected at locations internal to the site and not at designated outfalls, shall not be used for compliance purposes and shall not be required to be reported in the ALEER or SWARM system."

5. Section G. of Attachment E (p. 65), describes exceptions to visual observations and sampling collection.

   Recommendation: While an exception is made for dangerous weather conditions, we also suggest the inclusion of language that provides an exception for required visual observations or sample collection when safe access is not possible (e.g., safety on a steep slope, unsafe traffic crossings, etc.).

   Recommendation: We recommend that an exception for sampling should be allowed when the storm event has exceeded the design capacity of the BMPs. As currently written in the Permit, for an ATS system, this would be a 10-year 24 hour storm. For other types of BMPs, the Permit should indicate that compliance is not expected for very large storms or extreme hydrologic conditions. Note that hydrologic criteria for dischargers from ATS would differ from criteria for discharges from other types of BMPs. We recommend that the SWRCB address the issue of a design hydrologic condition, taking into account CEQA and economic considerations.

6. Section I. 16. (p. 5) of the Permit states "Should monitoring results indicate that a construction-related storm water or non-storm water discharge exceeds the NEL, the discharger shall electronically enter the analytical results into the SWARM and comply with any Regional Water Quality Control Board enforcement action.

   Comment: It will be difficult to determine who should report an exceedance in the case where storm water from multiple builders discharges into a common drainage area/receiving water. Further, many discharges are both temporally and spatially distant from the relevant receiving water, making a determination of whether a discharge has "caused or contributed to" an exceedance of receiving water objectives very difficult. In addition, it is our understanding that the public has access to SWARM, and we request that the SWRCB address the situation where the exceedance becomes public knowledge, but culpability has not been determined.

   Recommendation: ALs must not be entered into SWARM and NELs should be entered into SWARM only upon the Regional SWRCB's determination of culpability.

7. Attachment E, Section E.2.b (p. 61) of the PCGP requires monitoring for all parameters "indicating the presence of pollutants identified in the pollutants source assessment required in Section IX.I.5" of the PCGP. The provision is vague, overly-broad, and could potentially greatly expand the monitoring program beyond the constituents already required to be monitored. Potentially, this provision could require monitoring for every material found on site. The PCGP provides no indications to justify why such an extensive, expensive, and likely unnecessary monitoring program must be required. Furthermore, we cannot determine the water quality benefit that would be gained from imposing such an extensive monitoring program.

<u>Recommendation</u>: Attachment E, Section E.2.b (p. 61) of the PCGP should be stricken and the monitoring program should be limited to only pH and turbidity.

VIII. RECEIVING WATER MONITORING AND REPORTING

This Permit requires medium risk dischargers to monitor receiving waters when there are two exceedances of ALs or two exceedances of the NEL for pH. High risk dischargers are required to monitor receiving waters when there are two exceedances of ALs or one exceedance of the NEL for pH. The primary purpose is to provide needed information to use in overall program evaluation.

Similar to the effluent monitoring and reporting requirements, the preliminary draft states that receiving water monitoring and reporting data are to be used in the overall program evaluation. However, it is unclear how these data will be used for this purpose. We are concerned that, unless the program goals are clearly articulated and incorporated into the permit, data collection will not provide useful information to the overall program. For example, as discussed in Section I above, receiving water pH and turbidity can vary widely based on different natural soils and precipitation characteristics, within a single storm event, and even between storm events, making the meaningful interpretation of analytical results from individual grab samples exceedingly difficult. We are also very concerned about the improper use of receiving water data as an indicator of whether a construction discharge has caused or contributed to a receiving water quality exceedance, given the many forensic challenges inherent in connecting discharge and receiving water quality monitoring. We address these and other specific concerns about aspects of the receiving water monitoring and reporting proposal in our technical comments. We recommend that the SWRCB revisit the receiving water monitoring and reporting program design after addressing the other outstanding technical issues discussed in this technical memorandum, and that the SWRCB design a monitoring program that more clearly supports the long-term goals and objectives of the program.

1. Section I.28. (p. 8) of the Permit states that "This General Permit requires all dischargers to comply with applicable water quality standards for receiving waters. Dischargers are responsible for determining the receiving waters potentially impacted by their discharges, and for complying with all applicable water quality standards. Where a receiving water has a more conservative standard, a NEL stated in this permit may not be the most restrictive applicable requirement."

    Comment: This provision of the permit appears to imply that dischargers should be responsible for calculating NELs for water quality constituents not specifically governed by this PCGP. This is inappropriate, and places an undue burden on dischargers to perform the job responsibilities of the SWRCB.

    <u>Recommendation:</u> As an alternative to monitoring receiving water, the Permit should require a review of receiving water data at the permit application stage to help establish appropriate ALs and/or NELs on a regional, or site-specific basis.

    <u>Recommendation:</u> The SWRCB should consider alternatives such as limiting sampling of receiving waters to waters that are impaired for turbidity/sedimentation or pH.

Comment: It is unclear how "receiving water" is defined and whether it would include the MS4 or storm drain system. The risk evaluation worksheet (Attachment F) likewise requires a discharger to determine how proximate their site is to a receiving water, and it is unclear how a "surface water of the state" is defined.

Recommendation: Please define the terms "receiving water" and "surface water of the State" in the Glossary, and please provide guidance on how an applicant would determine the relevant water body. Also, consider having a link available on the SWRCB website that indicates if you site is located within the boundaries of a receiving water similar to the website that is available for this purpose in the State of Oregon. (See: http://deq12.deq.state.or.us/tmdl/default.aspx)

2. The primary purpose of the receiving water monitoring required by the permit is to collect "needed information for use in overall program evaluation." (Fact Sheet, pp. 9-10.)

Comment: We request additional information from the SWRCB as to how receiving water monitoring data will be used in the overall program evaluation. Without knowing the ultimate purpose of the data to be collected pursuant to this permit, it is difficult to assess whether or not the proposed monitoring program will provide data sufficient to meet the program's goals. For example, if the data collected by the program are to be used to support or develop numeric effluent limits (especially water quality based effluent limits, or WQBELs), the data collection program may be more intensive and should be designed differently than if the data will be used to support the proper development of, or evaluation of, action levels.

Recommendation: We recommend that the SWRCB provide additional information on how effluent monitoring conducted pursuant to the permit requirements would be used within the program. The effluent monitoring data collection program should be designed with program goals in mind, and as part of a longer-term plan for the regulation of discharges from construction sites

3. Receiving water measurements of turbidity would be compared to effluent; alternatively, receiving water turbidity could be estimated from the permit calculator.

Comment: See comments in Section I. and Section III, which describe our concerns with the turbidity calculator. As detailed in Section I, ALs for turbidity should be developed in consideration of local conditions and receiving water characteristics. Since receiving water monitoring is triggered by an exceedance of ALs, use of ALs that are calculated in consideration of natural or background conditions should reduce the frequency with which receiving water monitoring is required.

Recommendation: ALs for turbidity should be calculated in consideration of receiving water and natural background water quality, thereby reducing the number of "false" AL exceedances (i.e., an exceedance of an AL that is consistent with natural background conditions). The turbidity calculator should be revisited in accordance with the recommendations in Section I, and should be tested against real data from representative natural areas and construction sites.

4. Section VI.3. (p. 12) of the Permit states that “Storm water discharges and authorized non-storm water discharges shall not cause foam at discharge locations.”

   Comment: The SWRCB staff has failed to take into consideration the fact that there are natural sources of foam that should be allowed.

   Recommendation: Insert language that allows for “naturally” occurring foam.

5. Section VI. 6. (p. 12) Receiving water limitations specify that storm water and non-storm water discharges from medium and high risk construction projects shall not be more than 0.2 standard units higher or lower than the pH of the receiving water. Similarly, storm water discharges from an ATS shall not be more than 0.2 pH units higher or lower than the pH of the receiving water.

   Comment: This provision cannot be “enforced” without having real time receiving water monitoring data to compare to real-time effluent monitoring data. Even if real-time receiving water monitoring is data are available, it will be difficult to ascertain whether or not a specific discharge “causes or contributes to” and exceedance of receiving water objectives, especially when an effluent discharge is distant from the receiving water, when travel times from the discharge point to the receiving water are long, or when multiple discharges enter a storm drain system prior to reaching a receiving water. In these cases, real-time receiving water monitoring is useful only to observe what turbidity and pH values in the receiving water were as a function of time, but not in establishing the relationship between a particular discharge and receiving water conditions. See also comments on ALs and NELs for pH, in sections I and II above.

   Recommendation: We recommend removing this provision as it is impractical to implement.

IX. ACTIVE TREATMENT SYSTEM (ATS) OR SPECIFIC SOURCE CONTROL REQUIREMENTS

The ATS and specific source control requirements are unworkable for the construction and building industry because of the severe limitation and significant costs it places on construction activities with no demonstrable water quality benefit. Rather, a BMP system requiring site readiness and inspection before, during, and after rainfall events is needed. Active treatment is needed only in situations requiring extraordinary water quality protection, such as direct discharge into a water body that is not naturally turbid, and that is (a) 303(d)-listed for sediment or turbidity but where controls implemented pursuant to a TMDL are ineffective, or (b) contains sensitive habitat, such as known salmonid spawning areas. Five-acre grading restrictions are unprecedented in home building and the construction industry in general, and such restrictions could have a significant impact on construction activities in California.

1. Sections IX.G (p.19) and IX.H (p. 21) of the PCGP, requires that sites that contain soils with greater than 10 percent fines (by weight of particles smaller than 0.02 mm) implement ATS or implement a source control option that most notably limits areas of active construction to five acres at any one time. An ATS is defined in Attachment A of the Proposed Permit (Glossary, page 32 of 79) as “a treatment system that employs chemical coagulation, chemical flocculation, or electrocoagulation to aid in the reduction of turbidity caused by fine suspended sediment”) and is required by the proposed permit to be sized to treat runoff up to 1.5 times the 10-year, 24-hour design storm within 48-hours.

   Comment: Following are our principal concerns with the ATS and Specific Source Control requirements:

   - It appears that the PCGP requires either ATS or a five acre grading limitation (based on fines content) for most construction sites state-wide, including low-risk sites. Because limiting grading to five acres is infeasible for most sites (see comments below), the PCGP effectively requires ATS for almost all construction sites in the state (see Figure 1, Appendix B.).

   - The derivation of the 10% fines requirement is unclear and needs elaboration by the SWRCB. Without any additional, scientifically defensible justification of the 10% fines requirement, it would appear that requirements based upon this term are not appropriate for inclusion in the PCGP.

   - It is unclear what activity would trigger the transition from ATS to conventional erosion and sediment control BMPs. For example, it is unclear if ATS would no longer be required when streets and slabs are fully installed and when storm drains becomes active and functional.

   - There are currently not enough trained personnel or equipment suppliers to implement the ATS requirements.

- ATS effectiveness will vary based on system design, selected coagulant, and other site specific conditions. Coagulant/flocculent dosing will vary with ambient soil characteristics. Additional research is required on the varying types of soils and components that will affect ATS effectiveness prior to implementation of this requirement.

- Testing, sampling, and submittals requirements will add substantially to paperwork and operational activities in ways that are difficult to implement.

- ATS will not be cost-effective for implementation at all construction sites statewide, particularly as compared to the cost-effectiveness of comprehensive erosion control and sediment control measures. Average costs for ATS are difficult to predict with specificity because the costs vary substantially depending on site specific factors, including the size of a construction site, the number of catchment areas to be treated, the total amount of precipitation and runoff generated and similar factors. Available information supplied by ATS vendors and consulting engineers indicates ATS facilities can cost from $26,000 to $115,000 per acre to install, operate, and maintain, depending on site specific factors.

  Recommendation: As detailed throughout these comments, we recommend that the permit be modified to allow a comprehensive, well-designed BMP treatment train to be implemented in lieu of requiring ATS for all situations, particularly where downstream receiving waters are not impaired for sediment and do not contain sediment-sensitive habitat.

Comment: The ATS and five acre grading limitation requirements essentially ignore the proven effectiveness of implementing well designed and properly installed and maintained source controls (including appropriate project planning and phasing and erosion controls) on a project specific basis in conjunction with sediment controls and drainage controls to minimize erosion and effectively reduce off-site sediment transport. Source controls and sediment controls do not carry the risk of toxic discharges associated with ATS. Further, source controls and sediment controls, unlike ATS, can be tailored to meet changing site conditions, construction phase, and to take into account local weather and rainfall patterns and local receiving water conditions.

Recommendation: The Permit should present requirements for sites with a justifiably higher sediment risk (due to both erosion potential and receiving water impacts) to implement routine and enhanced source control and sediment control BMPs. Suggestions for routine and enhanced control practices are as follows:

- Require that **erosion control practices** be provided on disturbed areas during the rainy season. In order to address the timing of implementation of these measures, the permit should specify that all disturbed areas that will not be re-disturbed for a certain length of time (e.g., 20 days) shall be provided with erosion control measures within a certain length of time (e.g., 14 days) from last disturbance. The erosion control practices should achieve and maintain a specified minimum soil coverage (e.g., 70 to 90 percent of the soil being treated shall be covered) until the permanent vegetation or other permanent stabilization provides the intended long-term erosion control function at the site. In addition, more guidance should be provided through the California BMP Handbooks or other appropriate mechanism to for minimum erosion and sediment controls based on slope, season, and anticipated duration of inactivity. Dry season requirements should be based predominately on wind erosion control requirements, below.

Enhanced practices for high risk sites include increased BMP inspection and maintenance requirements (e.g., requiring inspection by the SWPPP preparer/engineer or qualified inspector at the time of BMP installation and at specified frequencies during the wet and dry seasons); voluntary limitations (not prohibitions) on wet weather grading and limiting the area of disturbance to the area that can be effectively controlled during wet weather. Requirements should be flexible enough to allow the SWPPP preparer to specify appropriate limitations including wet weather grading restrictions or limiting disturbed area.

- Require that on-site **drainage facilities** for carrying concentrated flows be designed to control erosion and to prevent damage to downstream properties.

- Require that **sediment control practices** be provided around the down gradient perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season. These sediment control measures may include filtration devices (such as silt fences, sediment check devices, and inlet filters) and/or settling devices (such as sediment traps or basins). Filtration devices that are designed for sheet flow shall be installed and maintained properly in order to perform effectively. Sediment traps or basins shall be designed and maintained in accordance with requirements of the California General Construction Permit.

  Enhanced practices to consider for high risk sites include enhanced sediment basin controls such as the addition of baffles or other controls required to meet water quality objectives on a site-specific basis. Enhanced sediment basin controls should target portions of the site that cannot be effectively controlled by standard proactive erosion and sediment controls described above and not necessarily required throughout a site.

- Require that practices be implemented and maintained to **reduce the tracking of sediment off site** at all times. This may be accomplished by stabilized construction entrances, wheel wash facilities, or other appropriate and effective measures designed in accordance with the most current CA BMP Handbooks; and

- Require that practices be implemented and maintained to **reduce wind erosion** at all times. This may be accomplished by limiting the area of disturbance, applying dust control measures, and/or stabilizing disturbed areas in a timely manner, and should be designed in accordance with the most current CA BMP Handbooks.

  The standard principles of proactive and effective construction site erosion and sediment control identified above are consistent with the current erosion and sediment control manuals. However, these principles are not necessarily implemented appropriately at all construction sites due to a lack of permit specificity and design guidance. Additionally, these requirements would be relatively easy for a designer to specify, a contractor to implement, and a resident engineer, site superintendent, or site inspector to evaluate and enforce in the field.

Comment: The BRPR at pp.16-18 included the following "reservations and concerns" on ATS:

- "ATSs have generally been employed on sites five acres or larger. While the systems are technically feasible for sites of any size, including sites or drainages as small as an acre or less, the cost may be prohibitive. The cost-effectiveness of active treatment systems is greatly enhanced for large drainage areas, at which construction occurs for an extended period of time, over one or more wet season. There is also a more "passive" active system that is employed in New Zealand that uses captured rainfall to release the chemical into flows entering a detention system that requires less instrumentation and flow measurement infrastructure. Even more passive systems such as the use of polymer logs and filter bags are currently under development for small sites. Regardless, the Panel recommends that the Board give particular attention to improving the application of cost-effective source controls to small construction sites."
- "In considering widespread use of active treatment systems, full consideration must be given to whether issues related to toxicity or other environmental effects of the use of chemicals has been fully answered. Consideration should be given to longer-term effects of chemical use, including operational and equipment failures or other accidental excess releases."
- "….active treatment systems could result in turbidity and TSS levels well below natural levels, which can also be a problem for receiving waters." One of the causes of stream degradation impacts is the elimination of sediment producing areas in a watershed. Releasing runoff with virtually no sediment load can increase channel downcutting or bank erosion.

<u>Recommendation:</u> These concerns and recommendations should be meaningfully addressed and answered by the SWRCB prior to requiring the use of ATS. It appears that the SWRCB has not addressed the concerns nor followed the advice of its own expert panel; therefore, the scientific justification for the requirement to use ATS is unclear.

Comment: The requirement to size an ATS to treat the runoff volume from 1.5 times the 10-year event within 48 hours is exceptionally conservative. A storm with a 10% chance of occurring in any given year is relatively rare, to couple this with a 50% factor of safety and require an inter-event drain time of 48 hours results in an extremely low probability of occurrence.

<u>Recommendation</u>: As detailed in these comments, ATS should be an option only for high risk sites located upstream of sensitive receiving waters. Only for these conditions should such an infrequent event be considered as a design criterion.

Comment: There does not appear to be any practical value to require the discharger to direct effluent from an ATS system through a subsequent physical filter such as a grassed swale. Water quality will not be improved below the 10 NTU requirement, and the discharge options for the operator are greatly constrained with this requirement.

> *Recommendation:* At an absolute minimum, remove the requirement to direct ATS discharges through a physical filter.

> *Recommendation:* Reconsider and/or scientifically justify the establishment of turbidity limits at 10 NTU, which will almost certainly constitute "pollution" as defined by the federal Clean Water Act. See 33 U.S.C. § 1362(19), which defines "pollution" as the "man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water." As noted in Section I, discharging water that is "too clean" can cause downstream ecological and habitat impacts. In any case, the permit requirements should be tied to natural conditions within the receiving water, and should not require sediment to be reduced from a discharge to below natural levels.

2. Section IX.H (p. 21) of the PCGP, requires that sites that contain soils with greater than 10 percent fines (by weight of particles smaller than 0.02 mm) implement a source control option that limits areas of active construction to five acres at any one time as an option to implementing an ATS.

Comment: Following are our concerns with the **five acre grading limitation** in the Specific Source Control option:

- The soil balance and soil handling requirements on any construction project requiring mass grading on more than five acres make this requirement infeasible. The need for an equipment staging area, equipment ingress and egress areas, and soil stockpiling areas could effectively mean that less than two acres could actually be utilized for actual project construction at any one time, if the activities are limited to five acres. Similarly, rock blasting requirements or use of explosives on some sites make a five-acre restriction infeasible to accommodate multiple project requirements (safety buffers, staging, ingress-egress, stockpiling). Moreover, many projects require rock crushing operations and associated aggregate preparation to be performed within the active construction area. These activities themselves consume significant space within the construction area footprint. To choke down the size of disturbed areas to five acres will have an astounding impact on construction in California.

- Stockpiling soil during cut and fill operations is a standard operating practice to limit the amount of soil imported to a particular site. Restricting grading to five acres will limit soil stockpiling, thus encouraging import of soil to make up the site balance difference and creating more localized construction impacts such as increased truck traffic (import soil ingress and egress) and a greater likelihood of dust production and other nuisance conditions such as noise.

- Some types of construction projects would be entirely infeasible to complete if grading were limited to five acres. For example, reservoir construction requires large-scale cut and fill grading work, and would be infeasible if limited to five acres at a time.

- Limiting grading to five acres will significantly increase the time to complete construction projects. On projects more than five to 10 acres in size, this could then have the unintended consequence of extending the project and increasing exposure during the wet season.

- As an example, consider a typical mall construction site. Such a site would be ¼ mile by ¼ mile, and would thus consist of forty (40) five acre parcels. Each five acre parcel is equivalent to a square 467 feet by 467 feet in size. If this project were required to limit grading and underground utility construction to five acres at a time, it would have to be constructed as 40 separate projects, potentially lengthening overall construction time by a factor of 40 or more compared to traditional construction methods, which would grade the entire site at the same time.

- A five-acre limitation does not have any bearing to the real-world need to install the “underground” utilities (e.g., water, sewer, natural gas, and often electricity and storm drainage systems) at projects sites. Installing these systems in small, five-acre increments is infeasible. In addition, there are often water supply “loop systems” required for fire protection. These water supply systems employ above ground pipes/hoses that require large buffers of bare ground around the perimeter of a construction site.

- Many construction sites need “surcharging” (also known as pre-loading) to properly prepare the site for building footing and foundation requirements. Surcharging is often done over large areas greater than one acre, often for months at a time, and will reduce the effective area that would remain for site grading and follow on construction.

- All grading projects proceed in a logical fashion that involves initiating and completing remedial grading prior to completion of design grading. Remedial grading often involves specific corrective grading to stabilize or remove landslides or other geologically unstable areas. It is not possible to remediate a large landslide or stabilize proposed cut slopes with an acreage limitation of five acres of active construction area. Deep removals and large keyway/buttress excavations will often significantly exceed five acres at a time. Simultaneous with corrective grading, the soils removed by corrective grading need to be hauled to separate fill areas which would also likely be larger than five acres. The corrective grading needs to be accomplished as one integrated operation in order to maximize the safety of the equipment operators and properly remediate the landslides and unstable areas, and as such cannot be divided into five acre pieces. Corrective grading limits should be determined by the geotechnical considerations of the construction site.

- No other US states have such a small area grading restriction. The following list is a partial summary:

Caltrans - 17-acre is the allowable total limit of disturbed soil area,

Tennessee - 50 acre limit before project phasing is required,
Washington - no total disturbed soil area limit,
Texas - no total disturbed soil area limit,
Minnesota - no total disturbed soil area limit; special requirements >50 acres; and
US EPA - no total disturbed soil area limit.

- The PCGP is not clear concerning the stage of construction the first five acres that would need to be in before the next five acres is allowed to start. This issue would apply to any restriction on the area allowed to be graded.

  The five acre limit will increase the cost of construction drastically or render projects essentially infeasible. Since projects will take longer to build out, the owners will have to wait longer for their product to sell and realize their return on investment. This delay will increase the debt service on the land and the funds tied up in construction loans. Costs will be passed on to the buyer, who may not be able to afford to purchase the product. The additional risk of more project delays created by grading restrictions could make it infeasible to even build some projects and could expand the shortage of affordable housing needed to support the future population growth of the state. Land developers typically measure costs of delay by considering affects of delay on an internal rate of return, which is a measure of profitability considering the amount of pre-construction project expenses, including the direct cost of the land plus all costs related to pre-acquisition, acquisition, entitlement, environmental review and permitting, financing and pre-construction site and project preparation and time until recovery. For typical development projects, internal rate of return varies between 20 and 30 percent. The formula is: (Land Value per Acre) x (Internal Rate of Return/Year) x (# Years of delay).

  The costs of carry alone associated with delaying project completion by even 6 months can total between 62,500 and 125,000 per acre depending on land value for the project affects. The following shows the calculation of this range:

Land Value	Rate of Carry	Length of Carry	$/acre/6 months
$500,000	25%	0.5 Years	$62,500
$1,000,000	25%	0.5 Years	$125,000

  Based on this calculation, the costs of delay alone associated with grading restrictions (without considering other adverse affects of grading restrictions on construction costs related to project phasing, economies of scale, etc.) for even a small 10-acre parcel delayed by only six months may cost the project proponent between $625,000 and more than $1 million dollars.

- There is an economy of scale in the construction industry. The more work that is able to be conducted at one time directly correlates to lower unit costs. Conversely, if a smaller area can be worked on at one time, unit costs will be greater. Further, a grading limitation such as that proposed here would require construction equipment to remain on a site far longer, and to remain idle for far longer, than if no grading limitation were imposed. These restrictions are likely to limit the amount of construction that could occur at any given time, and could have serious economic consequences for the state.

<u>Recommendation</u>: Eliminate the Specific Source Control Option as written. As discussed above, it is infeasible and impractical to impose area grading restrictions. Uniform, statewide restrictions on grading should not be included in the PCGP. Grading restrictions should be considered only on a case-by-case basis, only for high risk sites upstream of sensitive receiving waters, and only where other control measures would be insufficient to protect beneficial uses. Consider encouraging summer grading and using a phased grading approach during winter months that allows some flexibility in the size of the disturbed area through the use of enhanced site inspection procedures for anticipated rain events and requirement to use complimentary BMPs.

Comment: Erosion controls are very effective if properly installed and maintained. (See further Appendix D.). Existing research has predominately used total volume of soil loss when an erosion control product is applied compared to bare soil under similar conditions (soil type, slope length and steepness, and rainfall simulation) as an effectiveness indicator and has shown many types of erosion controls (e.g., compost blankets, straw mulch, hydraulic matrices, bonded fiber matrices, and many types of erosion control blankets) to be up to 95-99% effective. Because soil erodes heterogeneously with respect to particle size, in rills and gullies down a slope, a product that is 90% effective at reducing soil loss is expected to retain fine particles as well as larger particles.

<u>Recommendation</u>: More research is recommended, in both laboratory and field environments, of erosion control and sediment control effectiveness, to quantify exact relationships between relative effectiveness and different soil types and particle sizes. Research should be conducted to evaluate the effectiveness of sediment control BMPs <u>in series</u> with erosion control BMPs. This research would advance the industry's understanding of erosion and sediment control effectiveness. Conducting this research concurrently with implementing revised General Permit requirements that promote a pro-active approach for site protection are the next steps in improving water quality from construction sites statewide.

X. NEW AND RE-DEVELOPMENT PERFORMANCE STANDARDS FOR HYDROMODIFICATION IMPACTS

The impact to California's rivers and streams from hydromodification caused by new development and redevelopment projects is an important issue. However, there are three major concerns with the proposed hydromodification performance standards:

a. The Construction General Permit (CGP) is not the appropriate mechanism for regulating post-construction hydromodification impacts.

b. The standards as proposed are insufficiently protective and, in some cases, unnecessary.

c. The standards as proposed are insufficiently specified to be implemented and do not address the range of elements required to manage hydromodification impacts comprehensively.

1. Section IX.K. of the PCGP (p. 24) contains performance standards designed to encourage all construction sites disturbing over one acre in California to avoid, minimize, and/or mitigate hydromodification impacts (Fact Sheet, p. 10). The following comments address each concern in further detail, request additional information, and make recommendations for alternative approaches.

   Comment: The CGP is not the appropriate mechanism for controlling post-construction hydromodification impacts. We understand that the Board's intent is to provide hydromodification coverage for those areas not currently covered by Phase I or Phase II MS4 Permits. However, it is inappropriate to implement planning-level design requirements through a construction permitting mechanism. Furthermore, the requirement as drafted creates overlapping and conflicting requirements for hydromodification management where projects are covered by existing MS4 Permits with hydromodification provisions or other locally-imposed hydromodification programs.

   Recommendation: Section IX.K should be removed from the PCGP. At a minimum, this permit should clarify that standards established in MS4 Permits or through local watershed or other planning processes or project CEQA documents should prevail over the CGP hydromodification performance standard. The SWRCB should provide information on what other mechanisms have been considered for addressing hydromodification impacts, the advantages and disadvantages associated with these other mechanisms, and whether a state-wide hydromodification control program or policy has been considered.

   Comment: The proposed hydromodification standards are insufficiently protective and, in some cases, unnecessary. We agree with the overall objectives identified in the PCGP and Fact Sheet regarding protecting receiving waters from accelerated channel bed and bank erosion. However, the four specific controls identified in the permit are too simplistic and therefore insufficient to achieve these goals. In some cases, the controls are also unnecessary.

   Preservation of all drainage divides and drainage patterns is unnecessary to prevent hydromodification impacts to receiving waters. Drainage patterns and divides may be modified without causing channel erosion or other adverse impacts to streams as long as BMPs are implemented to achieve an appropriate hydromodification control standard, as recommended below, to prevent these impacts. In many cases, a project that adjusts drainage divides will be environmentally preferable to a project that does not.

   Maintaining groundwater recharge is also not dependent on preserving the exact pre-project drainage patterns or divides on a lot-level scale. Infiltration in regional facilities located within the same groundwater basin can also achieve groundwater recharge goals.

   An additional concern regarding standards for drainage patterns and divides is the ambiguity in the term "first order stream" which is not clarified by the definition provided ("A first order stream is defined as a stream with no tributaries"). This is of special concern in arid and semi-arid regions of the state where intermittent and ephemeral streams are common.

> *Recommendation*: The SWRCB should remove requirements to preserve drainage divides and drainage patterns from the PCGP. The SWRCB should specify the references that they propose would serve as the basis for identifying first order streams, and evaluate alternatives to the selected approach.

Comment: The requirement to "ensure that the post-development runoff volume approximates the pre-project runoff volume for areas covered with impervious surfaces" and to "ensure that post-project time of concentration is equal to or greater than post[sic]-project time of concentration" are not protective for several reasons. While volume and time of concentration (Tc) are two aspects of the runoff hydrograph that are changed by (uncontrolled) urbanization, changes in flow rates and durations can also significantly impact stream channels. To focus solely on controlling runoff volume and Tc is too simplistic an approach, and could result in hydromodification impacts in the receiving water due to under-control of surface discharge rates and durations, or costly and unnecessary over-control of project runoff, depending on project specific conditions. For example:

- <u>Under-control</u> - An infiltration basin could be designed to meet the stated criteria, but produce a more erosive flow regime than the pre-project condition due to the rate at which volumes were released. Furthermore, by limiting the volume requirements to only runoff from impervious surfaces, the permit ignores the increased volumes caused by compaction and vegetation removal that can potentially occur in pervious areas associated with development.

- <u>Over-control</u> - A project may result in some increase in runoff volumes without causing erosion impacts, if these volumes are released at a rate lower than the critical flow for sediment transport (a value specific to the slope, geometry and sediment characteristics of the receiving channel).

Furthermore, while matching time of concentration may be theoretically possible, it would be impractical for most projects and would not provide a hydromodification control benefit, therefore is unnecessary.

> *Recommendation*: The SWRCB should remove requirements to approximate pre-development runoff volumes and time of concentration from the PCGP. The SWRCB should provide additional background on the alternative approaches that were considered to establish a numeric standard for hydromodification control.

Comment: The proposed standards are insufficiently specified to be implemented and are not comprehensive. The proposed standards are inconsistent with the approaches used in current hydromodification management plans (HMPs) and proposed MS4 Permits in the State in terms of level of comprehensiveness. Although there are significant differences among current approaches, they are all generally structured to include the following major elements:

- Development Trigger

- Stream Susceptibility Trigger
- Numeric Control Standard
- Analysis Methodology

A comprehensive standard includes these elements (see Figure 2).

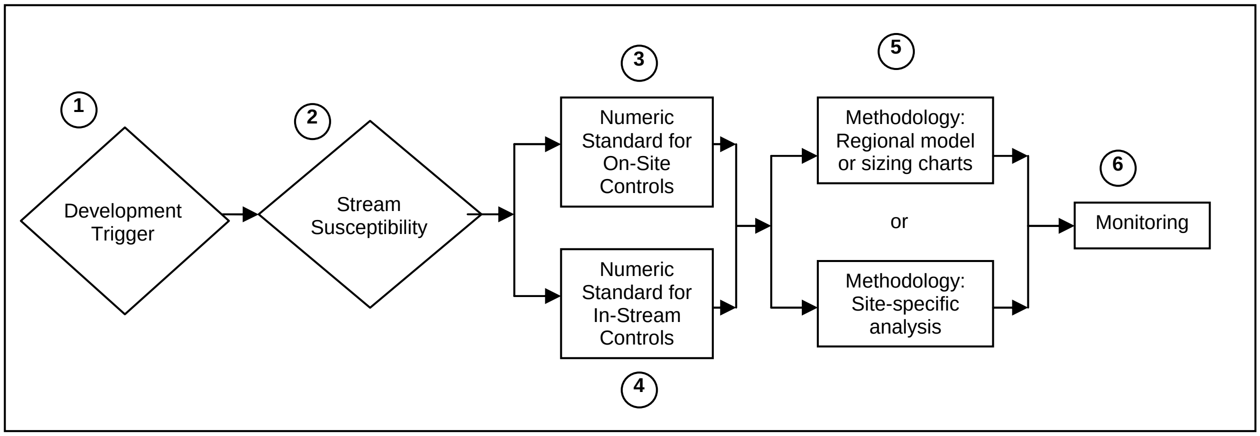


Figure 2. Recommended Major Elements of a Comprehensive Hydromodification Management Standard

The Permit does not currently account for variations in the size or nature of development projects or the susceptibility of the receiving water (for example, natural vs. hardened channels) when identifying required controls. The PCGP standards do not allow for in-stream or regional controls. Controls are proposed for four aspects of site hydrology, but there is insufficient detail provided to establish a compliance standard. Volume requirements are not specified in the PCGP language. Additionally, no guidance is provided for determining important variables, such as percent impervious values as a function of land use. It is unclear how the worksheet provided in Attachment G in the Permit relates to the Tc control standard.

The Permit allows other calculation methodologies to be used, but provides no details regarding acceptable modeling approaches, data sources, baseline assumptions, or tolerances.

> *Recommendation*: The SWRCB should provide information on other approaches considered (relative to current research and other proposed permits). This information may include, but should not be limited to, how the following technical considerations were addressed when formulating the hydromodification requirements: baseline conditions, local stream characteristics (e.g. natural vs. hardened channel), critical thresholds for sediment transport, changes in sediment supply, alternatives to on-site controls including regional BMPs and in-stream controls/restoration, feasibility of implementation on redevelopment projects in highly urbanized settings, and results of recent completed studies (including the Santa Clara Valley Urban Runoff Pollution Prevention Program's Hydromodification Management Plan literature review) and current research such as the Southern California Coastal Water Research Project (SCCWRP) Regional Hydromodification Assessment and Management Project (see Appendix E).
>
> Hydromodification control standards should be based on the current scientific literature as follows:

- Use a long-term, continuous approach to setting a numeric standard, as this captures the full range of precipitation variation and antecedent moisture conditions which will influence BMP sizing. This sizing analysis should be performed using a rainfall record of 25-30 years or more, in conjunction with a model capable of continuous simulation.

- An erosion potential (Ep) index—if used is an approximation only—is the most effective means of incorporating a range of factors which influence channel erosion. The Ep index is the ratio between post- and pre-development sediment transport capacity, calculated based on critical shear stress and sediment transport equations. An Ep of one represents a theoretically "equal" transport capacities before and after development, whereas an Ep value greater than one indicates an increase in sediment transport capacity and potential for channel erosion in the post-developed condition. The Ep index has several advantages, including allowing sediment supply reductions to be accounted for, allowing the use of a risk-based approach to setting tolerances within economical reason, and being applicable to both on-site and instream control options.

- The range of flows used to calculate Ep should include flows above the critical flow, which is dependent on the receiving water channel geometry, slope and sediment characteristics.

- The target Ep should be site-specific to account for reductions in sediment supply and should be based on the best available data relating change in Ep to risk of channel instability.

- The performance standard should address each of the additional elements shown in Figure 2 in order to be sufficiently comprehensive.

Comment: The relationship between project site hydrologic changes and hydromodification impacts to project receiving waters is far more complex than is suggested by the proposed new and redevelopment performance standards for hydromodification impacts.

Urbanization has the potential to modify natural watershed and stream hydrologic and geomorphic processes by introducing increased volumes and durations of flow via increased runoff from impervious surfaces and drainage infrastructure unless appropriate controls are implemented. Several studies have evaluated affects of increased runoff associated with the introduction of impervious surfaces and drainage facilities on geomorphic processes (SCCWRP 2005a; GeoSyntec 2002; Bledsoe & Watson 2001; Booth, 1990; Hollis 1975; Hammer 1972). Potential changes to the hydrologic regime that may cause adverse hydrologic effects in natural drainages include increased runoff volumes, frequency of runoff events, long-term cumulative duration of runoff, as well as increased peak flows.

Changes in the hydrologic regime of a natural system affects sediment transport and often leads to stream channel enlargement and loss of habitat and associated riparian species (SCCWRP 2005a; GeoSyntec 2002; Bledsoe & Watson, 2001; MacRae 1992; Booth 1990). Under certain circumstances, development can also cause a reduction in the amount of sediment supplied to the stream system, which can lead to stream channel incision and widening. These changes also have the potential to impact downstream channels and habitat integrity, though because all streams are constantly undergoing change and adjustment, effect of impervious cover should be investigated in terms of changes in the rate of channel response in addition to the absolute magnitude of response. (SCCWRP 2005b). A project that increases runoff due to impervious surfaces and traps sediment from upland watershed sources can create compounding effects.

These types of changes to the runoff hydrograph related to the introduction of impervious surfaces are referred to as “hydromodification.” A change to a development project site’s runoff hydrologic regime would be considered to create hydrologic conditions of concern if the change could have a significant impact on downstream natural channels and habitat integrity.

The limited hydromodification impact research to date has focused on empirical evidence of channel failures in relationship to changes in hydrologic regime associated with introduction of directly connected impervious area (DCIA)[1] or total impervious area. However, more recent research has established the importance of several watershed specific characteristics in determining potential for hydromodification and hydrologic conditions of concern. These characteristics include size of watershed, natural receiving water sediment loads, channel slope and materials, and climatic and precipitation patterns (Lane 1995, SCCWRP 2005a, Balance Hydrologics 2005).

Booth et al. (1997) reported finding a correlation between loss of channel stability and increases in DCIA. In Washington State, streams were found to display the onset of degradation when the DCIA increases to ten percent or more, and a lower imperviousness of five percent was found to cause significant degradation in sensitive watersheds (Booth 1997). The Center for Watershed Protection (Schuler and Holland, 2000) described the impacts of urbanization on stream channels and established thresholds based on total imperviousness within the tributary drainage area. It states “a threshold for urban stream stability exists at about 10 percent imperviousness.” It further states that a “sharp threshold in habitat quality exists at approximately 10 percent to 15 percent imperviousness.” These studies, however, addressed changes in a very different climatic region than Southern California.

Geosyntec’s work in the San Francisco Bay area’s Santa Clara Valley (Geosyntec 2004) also evaluated the relationship between imperviousness and stream channel degradation in an area that had predominately directly connected impervious areas. Geosyntec found similar results to those published by Booth and Schuler, where channel erosion was observed at approximately six to nine percent imperviousness for two separate watershed systems. More recent studies conducted by Geosyntec in this same watershed area showed that levels as low as two to three percent total imperviousness could lead to stream channel degradation, depending on channel characteristics.

Because regional climactic conditions and precipitation patterns directly affect the potential for hydromodification impacts, each of these studies must be considered applicable to, and in the context of the region in which it was conducted and the region’s attendant climatic characteristics.

[1] Impervious area that drains directly to a storm drain system and then to the receiving water is considered “directly connected,” whereas impervious area that drains through vegetation or to infiltration facilities is considered “disconnected.”

Although physical degradation of stream channels in semi-arid climates of California may be detectable when watershed imperviousness is between three and five percent, not all streams will respond in the same manner (SCCWRP, 2005b).

Assessment of potential for a project to create hydrologic conditions of concern must take into account all of the characteristics that are directly associated with the potential for hydromodification impacts to develop, including changes in flow regime related to development of DCIA, size of watershed, existing and future planned levels of DCIA within a watershed, natural receiving water sediment loads, channel slope and materials, and climatic and precipitation patterns. In addition, the rate of channel response, as well as the absolute magnitude of response, should be considered.

Similarly, management strategies need to account for these characteristics, as well as existing channel condition, current and expected amount of basin imperviousness, and existing or planned hydromodification control strategies. Managing the effects of hydromodification requires attention to more than just runoff. The work (or energy) that affects the physical and biological channel structure results from movement of water and sediment controlled by runoff volume, flow magnitude and duration, frequency of erosive events, timing of high flows and magnitude and duration of base flows (Konrad and Booth 2005; Montgomery and MacDonald 2002; Paul and Meyer 2001; Roesner and Bledsoe 2003; SCCWRP 2005b). Because streams are coupled hydrologic, geomorphic, biologic systems, it is important to understand the various effects of all changes in surface runoff patterns and sediment patterns and to develop appropriate management strategies taking into account each type of potential effect. The choice of management strategy may vary based on the channel type, degree of current and anticipated hydromodification, magnitude and duration of runoff, degree of bank stabilization and similar factors. (SCCRWP 2005b). As a result, hydromodification is best addressed by using a suite of strategies, including project site design, restoration of degraded stream systems, as well as in-stream and on-site controls and regional controls. (SCCRWP 2005b)

Managers need to identify the most appropriate set of strategies for hydromodification control based on channel type and setting, existing channel condition, and amount of existing and anticipated impervious cover in the drainage catchment, as well as constraints that may affect implementation of various management strategies, including soils conditions (pervious or impervious), runoff characteristics, and depth to groundwater.

The most successful case studies (see, *e.g.*, SCCRWP 2005b) have all involved hydromodification plans employing a comprehensive set of management options addressing the many different characteristics that determine degree of potential impact, which can be applied flexibly, but in accordance with performance standards, to reduce hydromodification effects in natural channels. Measures and standards include control measures from several different categories, including:

Geomorphology/Terrains:

- Recognize and account for the hydrologic response of different terrains and soils at the sub-basin and watershed scale.

- Recognize and measure pre-project versus post-project erosive potential to assist in demonstrating that increased flows will not accelerate stream erosion.

Hydrology:

- Control of hydrology to mimic, to the extent feasible, existing runoff and infiltration patterns in consideration of specific terrains, soils types and ground cover.
- Use continuous simulation modeling to compare post- to pre-project flows to assist in demonstrating increased flows will not accelerate stream erosion.

Sediment Sources, Storage and Transport:

- Maintain coarse sediment yields, storage and transport processes.
- Design of geomorphically referenced in-stream solutions that protect or enhance habitat.

Project Design:

- Reduce percentage of DCIA using cluster design of development as well as LID techniques where feasible in light of soils, groundwater and geotechnical conditions.
- Use of regional and combination treatment and hydromodification control BMPs.

Advantages of maintaining a suite of hydromodification control tools, including site design, on-site controls, regional facilities, and in-stream controls, include the ability to prepare a hydromodification management plan that combines available techniques that are tailored to project-specific site and environmental conditions. Effective and cost-efficient hydromodification control can be achieved through the selection of available and feasible hydromodification control tools that are appropriate for the site constraints. For example, so long as an appropriate menu of tools is available that includes the use of flow duration control, off-site regional and/or in-stream solutions, hydromodification control can be effectively achieved for new development even if the project soils, groundwater conditions, and/or geotechnical conditions preclude the feasibility of safely infiltrating the entire increase in runoff volume on the project site. Because the hydromodification control standards of the PCGP will undermine or prevent the use of a broad range of control tools, costs will increase but receiving channel stability will not benefit**.**

Drainage Divide and Pattern Preservation. Standard K. 2. of the PCGP requires for projects impacting 2 or more acres the retention of drainage divides for all drainage areas serving a first order stream or larger. Standard K.3 of the PCGP requires the preservation of pre-construction drainage patterns. We believe that these standards are inconsistent with and undermine appropriate watershed planning and hydromodification control principles, which should be based upon fluvial geomorphology, as acknowledged in the Fact Sheet. According to the Fact Sheet:

> "In order to address hydromodification from urbanization, a basic understanding of fluvial geomorphic concepts is necessary." (Fact Sheet, p. 26)

In describing the geomorphic sequence that characterizes stream channel behavior over time, the Fact Sheet notes that:

> "The magnitude of the geomorphic sequence discussed above varies along a stream network as well as with the age of development, slope, geology, sediment characteristics, type of urbanization, and land use history" (Fact Sheet, p. 29, emphasis added).

Proper hydromodification control planning should be based upon a set of planning principles that consider fluvial geomorphology and specific soils and hydrologic characteristics of sub-watersheds within the planning area. Using these principles, development areas are focused in clay soils where possible, which minimizes potential for lot-by-lot infiltration within developed areas. Very importantly, however, this approach to focusing development in areas with high runoff rates under natural conditions allows for the protection of substantial areas containing sandy soils to be preserved in open space. The clustering of development and preservation of sandy soils, although it minimizes infiltration opportunities within development areas, is extremely important to maintaining overall streamcourse functions and beach sand supply.

However, within the development areas, hydrologic characteristics will necessarily change to facilitate development and preservation of open space. The entirety of any development areas will be graded. The PCGP, and in particular, Section K, does not recognize the benefits of clustering development and planning at a watershed scale, although SCCRWP 2005b expressly encourages this approach. Rather than encouraging comprehensive and integrated treatment and hydromodification planning at a sub-watershed and watershed scale, the PCGP instead favors equalizing pre- and post-development project runoff and preservation of drainage divides and drainage patterns within a development site even where impacts to these areas have been otherwise permitted.

> *Recommendation*: Hydromodification control can best be achieved at a sub-watershed scale through properly sited and operated hydromodification control measures, including site design, on-site controls, regional facilities, and/or in-stream controls. Section K prescriptions would inhibit the use of such systems. The hydromodification provisions are very prescriptive and are event-based. These detailed prescriptions are contrary to management recommendations and measures used in the hydromodification control plans noted as case studies in SCCRWP 2005b. Section K should eliminate drainage divide and drainage pattern preservation standards, and should revise flow control standards to allow for an equivalent, or better, hydromodification control standard to be used to better benefit water quality. The "one-size fits all" approach must be re-examined and should be modified to allow for the use of alternative measures and programs for achieving hydromodification goals based applicable principles discussed in available literature.

XI. RAIN EVENT ACTION PLAN

The concept of a Rain Event Action Plan (REAP) is fundamentally sound; in the context of the Permit the trigger for enacting the plan needs significant modification as do the parameters describing when the plan is needed. For example, the REAP should be revised periodically to reflect discrete project phases, rather than for individual rainfall events.

This Permit requires dischargers to develop and implement a REAP, which is designed to protect all exposed portions of a site within 48 hours prior to any "likely" precipitation event.

1. Section XI.1. (p. 28) of the Permit states that "The discharger shall develop and implement a Rain Event Action Plan (REAP) designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event. A likely precipitation event is any weather pattern that is forecasted to have a 30% or greater chance of producing precipitation in the project area. The discharger shall obtain likely precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at http://www.srh.noaa.gov/forecast)."

   Section D.4. of Attachment E. (p. 60) contains similar requirements, stating that "[W]ithin 48 hours of each anticipated storm event, the discharger shall visually observe (1) all storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources and implement appropriate corrective actions, (2) all BMPs to identify whether they have been properly implemented in accordance with the SWPPP/REAP and implement corrective actions, and (3) any storm water storage and containment areas to detect leaks and ensure maintenance of adequate freeboard. For the purposes of this General Permit, an anticipated storm event is defined as any storm event with at least 30% chance of precipitation as predicted by the National Weather Service for the local climate zone."

   Comment: The trigger of 30% probability of precipitation ("POP") (i.e., 30% chance of 0.01" of rain) is too low. A storm event with 1/100 of an inch of depth is unlikely to produce runoff.

   > *Recommendation:* We recommend that the SWRCB evaluate the accuracy of POP forecasts, and the probability that a POP of 30% will produce measurable runoff. We also request that the SWRCB evaluate different thresholds (e.g., a POP of 60-70%, which the NWS defines as "likely" precipitation) or a different trigger such as the Quantitative Precipitation Forecast (QPF). The QPF specifies the likelihood that a given depth of rain (say 0.25" or 0.5") would fall and is therefore more likely to be a more reliable indicator of actual runoff. See http://www.nws.noaa.gov/om/tpb/487body.htm for more information. The QPF is also routinely forecasted by the NWS and is readily available online.

   Comment: The Permit requirement to "protect all exposed portions of the site within 48 hours prior to any likely precipitation event (30%)" is overly stringent. Forty-eight hours is too long; a properly operated site can be prepared for a rain event with 24 hours notice, and 24 hours notice will also provide a more accurate forecast. The requirement to prepare a site 48 hours in advance of a rain event could potentially shut down sites two days before a "chance of rain," resulting in lost construction time and making scheduling extremely difficult.

   > *Recommendation:* The word "all" should be removed from the text as it could effectively shut down most projects for 48 hours before an anticipated rain event. Instead, we recommend that when the REAP is triggered that inspections be required to insure that BMPs have been installed properly, and to identify any repairs to existing BMPs that may be required, as well as the potential need for additional BMPs to be installed before a rain event.

Recommendation: The need for a REAP should be triggered 24 hours (not 48 hours) in advance of the appropriate forecast conditions.

2. Section XI.3. (p. 28) of the Permit states that the REAP is required for each rain event.

   Comment: We believe that this is excessively burdensome, and suggest that a REAP should be prepared for specific project phases and activities, rather than for specific storm events. We believe that preparation of a storm-specific REAP would impose significant unnecessary costs.

   Recommendation: We recommend that the REAP should be changed as site conditions change (e.g., significant changes in site phasing) and should include provisions for different types of events and staffing. We also request that the SWRCB evaluate the costs of preparing REAPs as specified in the current permit draft.

3. In our discussions with SWRCB staff, they indicated that they intend for the SWPPP to be a static document, prepared once at the project outset, and that the REAP would be modified periodically throughout the various phases of construction.

   Comment: In our review of the permit language, we do not find language that supports this intention. For example, on p. 27, the PCGP states that "the SWPPP shall be written and amended, as needed, to address the specific circumstances for each construction site covered by this General Permit prior to commencement of construction activity for any stage."

   Recommendation: We recommend that the Permit specify that the SWPPP will be updated for each project phase and that the corresponding REAP address each project phase rather than each individual rain event.

XII. SITE PHOTOGRAPHIC SELF MONITORING AND REPORTING

This Permit requires all medium and high risk projects to self-report photographs of their sites at least once quarterly if there are rain events that cause a discharge. The purpose is to help Regional Water SWRCB staff prioritize their compliance and evaluation measures (inspections, etc.). In addition, this reporting will provide more transparency of compliance related information to the public.

Comment: The CBIA does not support the use of self-recorded photographic records for construction site reporting under any circumstances. The utility of such an approach is questionable given the subjective nature of photographic evidence (when, where, context) and the speculative interpretations that can be drawn from observational evidence. When inspections occur during a project, local or State or Federal authorities have within their power the ability to photo-document construction activity.

Recommendation: The requirement to provide photographic self-monitoring and reporting should be removed from the Permit.

XIII. ANNUAL REPORTING

1. Section L.1. of Attachment E. (p. 68) of the Permit states that "Low, medium and high risk dischargers shall prepare and electronically submit an annual report no later than January 1 of each year using the Storm Water Annual Report Module (SWARM)."

   Comment: The PCGP requires that Annual Reports be submitted no later than January 1, even though January is in the middle of the rainy season, when implementation and inspection and management of discharge pollutant controls will require maximum time and significant effort. It is more appropriate to require submittal of annual reports in July concurrent with the annual compliance certification and to record activities occurring during the current and prior year's wet weather months.

   > *Recommendation*: The Permit should be modified to require submittal of annual reports in July concurrent with the annual compliance certification and to record activities occurring during the current and prior year's wet weather months.

XIV. CERTIFICATION/TRAINING REQUIREMENTS FOR KEY PROJECT PERSONNEL

1. Section X.A., (p.26) of the Permit requires that key personnel (e.g., SWPPP preparers, inspectors, etc.) have specific training or certifications to ensure their level of knowledge and skills are adequate to ensure compliance.

   Comment: The CBIA supports the SWRCB's efforts to create baseline program curricula for SWPPP preparers, SWPPP implementers, and SWPPP inspectors, including industry personnel responsible for SWPPP preparation and implementation/inspection, and regulatory staff responsible for document review and in-field inspections.

XV. OTHER COMMENTS

The following terms are omitted or poorly defined in the Fact Sheet and/or PCGP. The SWRCB should define or clarify the definition of these terms:

Attachment A of the Permit is missing the following terms:

"Wind Erodibility Groups" (WEGs) as used at IX. C.3. p. 18 of the Permit.
"Stabilized" as used at IX. C.3. p. 18 of the Permit.
"Soil Unit" as used in VIII.B.3. p. 15 of the Permit.
"Permit Registration Documents (PRD)" as used throughout the Fact Sheet and Permit.
"Surface Waters of the U.S."
"Receiving Water"

Attachment A of the Permit and the Fact Sheet needs to include a better definition of:

"First Order Stream" as used at footnote 12 at IX.K.2. p.24, is defined as "a stream with no tributaries." We suggest that a definition be based upon blue line streams on USGS topo maps.

REFERENCES CITED

Bledsoe, Brian P. and Chester C. Watson. 2001. Effects of Urbanization on Channel Instability. Journal of the American Water Resources Association, vol. 37 (2). 255-270.

Booth, Derek, B. 1990. Stream-channel incision following drainage-basin urbanization. Water Resources Bulletin, vol 26, pg 407-417.

Bruton, M.N., 1985. The effects of suspensoids on fish. Hydrologia. 125(1):221-241.

Brownlie, W.R., 1983. Flow depth in sand-bed channels. Journal of Hydraulic Engineering 109(7):959-990.

Caltrans, 1999. Soil Stabilization for Temporary Slopes, Final Report, November 1999. CTSW-OT-99-001.

Caltrans, 2000. District 7 Erosion Control Pilot Study, Final Report, June 2000. CTSW-RT-00-012.

Earhart, HG. 1984. Monitoring total suspended solids by using nephelometry Journal Environmental Management 8(1):81-86.

Favrer, F. and Healer, M.P, 2003. Fish Community Structure and Environmental Correlates in the Highly Altered Southern Sacramento-San Joaquin Delta. Environmental Biology of Fishes 66: 123-132, 2003.

Garcia, M. and G. Parker, 1991. Entrainment of bed sediment into suspension. Journal of Hydraulic Engineering, 117(4):414-435.

Geosyntec Consultants, 2002. Hydromodification Management Plan Literature Review, Santa Clara Valley Urban Runoff Pollution Prevention Program.

Geosyntec Consultants, 2004. Hydromodification Management Plan, Santa Clara Valley Urban Runoff Pollution Prevention Program.

Gregory, R.S., 1998. Turbidity Reduces Predation on Migrating Juvenile Pacific Salmon. Transactions of the American Fisheries Society.127:275–285

Hammer, Thomas R. 1972. Stream and channel enlargement due to urbanization. Water Resources Research, vol. 8, pg 1530-1540

Hollis, G.E. 1975. The Effect of Urbanization on Floods of Different Recurrence Intervals. Water Resources Research, vol. 11 (3), pg 431-435.

Knighton, D. 1998. Fluvial forms and processes, a new perspective. Arnold Publishing.London, United Kingdom. 383 pages.

Konrad, C.P. and D.B. Booth 2005. The Effect of Urbanization on Floods of Different Recurrence Interval. *Water Resources Research,* 11(3): 431-435.

MacRae, C.R. 1992. The Role of Moderate Flow Events and Bank Structure in the Determination of Channel Response to Urbanization. Resolving conflicts and uncertainty in water management: Proceedings of the 45th Annual Conference of the Canadian Water Resources Association. Shrubsole, Dan, ed. 1992, pg 12.1-12.21.

Manka, P. 2005. Suspended sediment yield in tributaries of Elk River, Humbolt County, California, Master's thesis. Department of Natural Resources, Humboldt State University, Arcata, California.

Montgomery, D.R. and L.H. MacDonald, 2002. Diagnostic Approach to Stream Channel Assessment and Monitoring. *Journal of the American Water Resources Association, 38(1): 1-16.*

Nobriga, M. L., F. Feyrer, R. D. Baxter, and M. Chotkowski. 2005. Fish community ecology in an altered river Delta: spatial patterns in species composition, life history strategies and biomass. Estuaries. Vol. 28, No. 5, p. 776–785

Parker, G., and A.G. Anderson, 1977. Basic principles of river hydraulics. Journal of the Hydraulics Division, Proceedings of the American Society of Civil Engineers (ASCE), 103(HY9):1077-1087.

Paul, M.J. and J.L. Meyer, 2001. Streams in the Urban Landscape. *Annual Review of Ecology and Systematic,* 32:333-365.

Roesner, L.A. and B.P. Bledsoe, 2003. *Physical Effects of Wet Weather Flows on Aquatic Habitats: Present Knowledge and Research Needs.* Water Environment Research Foundation, Report #00-WSM-4. Alexandria, VA.

Row, D.K. and Dean, T.L., 1998. Effects of turbidity on the feeding ability of the juvenile migrant stage of six New Zealand freshwater fish species. New Zealand Journal of Marine and Freshwater Research. 32:21-29

SCCWRP, 2005a. Effect of Increases in Peak Flows and Imperviousness on the Morphology of Southern California Streams. Technical Report 450. April 2005.

SCCWRP, 2005b. Managing Runoff to Protect Natural Streams: The Latest Development on Investigation and Management of Hydromodification in California. Technical Report 475. December 2005 (Stein, Eric D. and Susan Zaleski)

Schubel, J. R., H. H. Carter, R. E. Wilson, W. M. Wise, M. G.Heaton, and M. G. Gross. 1978. Field investigations of nature, degree, and extent of turbidity generated by open-water pipeline disposal operations. Technical report D-78-30. US Army Engineer Waterways Experiment Station, Vicksburg, MI. 245 pp. + appendices.

Schubel, J. R., H. H. Carter, and W. M. Wise. 1979. Shrimping as a source of suspended sediment in Corpus Christi Bay (Texas).
Estuaries 2(3):201-203.

Schroeder, W. W., G. G. Crozier, and E. C. Blancher. 1981.
Comparison of suspended total solids gravimetry to laboratory in situ nephelometric measurement. Estuaries 4(3):292.

Schueler, Thomas R. and Heather K. Holland, 2000. The Practice of Watershed Protection, Article 4, "Nutrient Movement from the Lawn to the Stream?", pp. 29 – 36

Stein, E.D. and V.K. Yoon. 2007. Assessment of water quality concentrations and loads from natural landscapes. Southern California Coastal Water Research Project. Costa Mesa, CA.

APPENDIX A

LIST OF CDEC STATIONS THAT CONTAIN TURBIDITY DATA

Table 1. List of CDEC stations that contain turbidity data

River Basin	Station	ID	Duration	Start Date	End Date
TRINITY R	TRINITY RIVER BELOW LIMEKILN GULCH	TLK	HOURLY	3/15/2001	present
	RUSH CREEK NEAR LEWISTON	RCL	HOURLY	3/15/2001	present
SF BAY	TERMINAL TANK (KB004207)	TTK	HOURLY	11/1/1992	8/19/2002
	TERMINAL TANK (KB004207)	TTK	DAILY	11/1/1992	8/19/2002
	VALLECITOS TURNOUT	NBV	DAILY	3/6/2002	present
		NBV	HOURLY	3/31/2002	present
SANTA CLARA R	CASTAIC LAKE OUTLET (CAS00000)	CSO	HOURLY	1/1/2000	present
		CSO	DAILY	1/1/2000	present
SANTA ANA R	DEVIL CANYON HEADWORKS (KA041288)	DVC	HOURLY	3/4/2003	present
		DVC	DAILY	3/4/2003	present
SAN JOAQUIN R	SAN JOAQUIN R MCCUNE STATION NR VERNALIS	SJR	EVENT	1/20/2005	present
	ROUGH AND READY ISLAND	RRI	EVENT	11/13/2001	1/1/2007
	PACHECO PUMPING PLANT (SLR00000)	PPP	HOURLY	7/3/1989	present
		PPP	DAILY	7/3/1989	present
	CAL AQUEDUCT CHECK 13 (KA007089)	C13	HOURLY	7/2/1991	present
		C13	DAILY	7/2/1991	present
SACRAMENTO R	WEAVER CREEK NEAR WEAVERVILE	WVC	HOURLY	11/28/2000	1/1/2003
	SACRAMENTO R AT HOOD	SRH	HOURLY	3/20/2007	present
	SPRING CREEK POWERHOUSE	SPP	HOURLY	6/22/1998	present
	SHASTA DAM	SHD	HOURLY	9/1/1990	present
	SACRAMENTO R AT RED BLUFF DIVERSION DAM	RDB	HOURLY	11/13/1989	present
	PRISONERS POINT	PPT	HOURLY	3/2/2006	present
	PIT RIVER NEAR MONTGOMERY CREEK	PMN	HOURLY	5/16/1990	present
	MCCLOUD RIVER ABOVE SHASTA LAKE	MSS	HOURLY	11/13/1989	present
	KESWICK	KWK	HOURLY	11/13/1989	present
	JELLYS FERRY	JLF	HOURLY	10/27/1998	present
	SACRAMENTO RIVER AT DELTA	DLT	HOURLY	11/13/1989	present
	DEER CREEK NR VINA	DCV	HOURLY	10/1/1998	2/14/2007
	CLEAR CK AT SOUTH BONNEVIEW	CCR	HOURLY	11/16/1998	present
	BALLS FERRY BRIDGE	BSF	HOURLY	2/2/1990	present
	BEAR CK AB HOLSTEN CYN NR RUMSEY	BRK	EVENT	1/11/2000	3/1/2006
	SACRAMENTO RIVER AT BEND BRIDGE	BND	HOURLY	10/10/1989	present
	BIG CHICO CREEK NEAR CHICO	BIC	HOURLY	10/18/1999	present
	BUTTE CREEK NR CHICO	BCK	HOURLY	10/18/1999	1/1/2005
MOJAVE R	CAL AQUEDUCT CHECK 66 (KA040341)	C66	DAILY	7/15/2003	present
		C66	HOURLY	7/15/2003	present
	CAL AQUEDUCT CHECK 41 (KA030341)	C41	DAILY	6/1/1993	present
		C41	HOURLY	6/1/1993	present
KINGS R	CAL AQUEDUCT CHECK 21 (KA017226)	C21	DAILY	6/1/1990	present
		C21	HOURLY	6/1/1990	present
	CAL AQUEDUCT CHECK 18 (KA014321)	C18	DAILY	5/7/1990	8/14/2002
		C18	HOURLY	5/7/1990	8/14/2002
KERN R	CAL AQUEDUCT CHECK 29 (KA024454)	C29	DAILY	1/1/1990	present
		C29	HOURLY	1/1/1990	present
FEATHER R	FEATHER RIVER NEAR GRIDLEY	GRL	HOURLY	3/4/2003	present
EAST BAY	DEL VALLE CHECK 7 (KB001638)	DV7	DAILY	6/7/1994	present
	DEL VALLE CHECK 7 (KB001638)	DV7	HOURLY	6/7/1994	present
DELTA	HARVEY O BANKS PUMPING P (KA000331)	HBP	DAILY	6/29/1988	present
		HBP	HOURLY	6/29/1988	present
	CORDELIA PUMPING PLANT (KG002111)	CPP	DAILY	3/1/1993	present
		CPP	HOURLY	3/1/1993	present
	CLIFTON COURT (KA000000)	CLC	HOURLY	3/10/1988	present
		CLC	DAILY	3/10/1988	present
	BARKER SLOUGH PUMPING PLANT (KG000000)	BKS	HOURLY	6/1/1989	present
		BKS	DAILY	6/1/1989	present

APPENDIX B

SILT PERCENTAGE OF SURFACE SOILS IN CALIFORNIA

SOURCES: CDF-FRAP (planning watersheds and state boundary 1999); NRCS (Soils - Publication 2007).

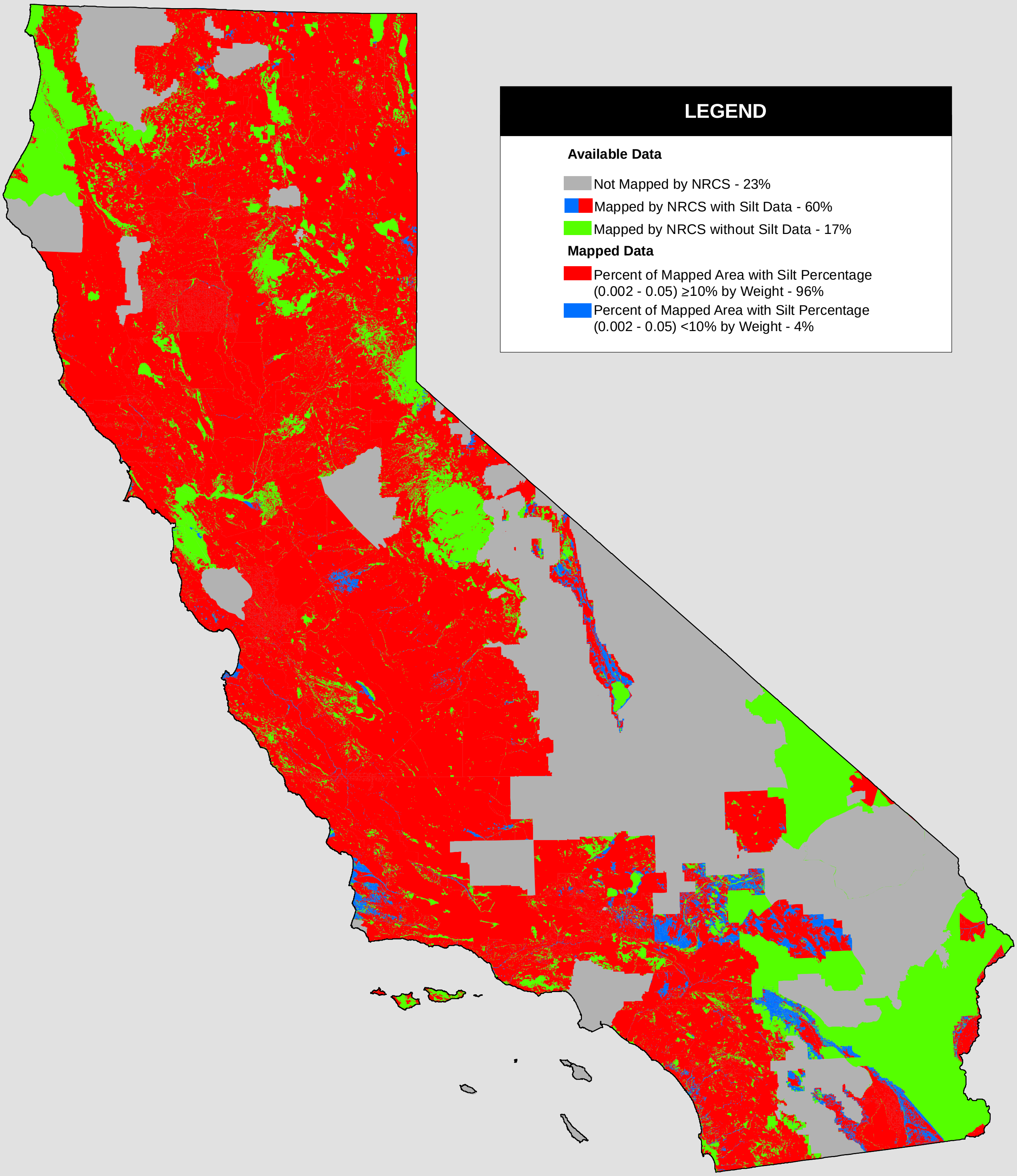
SILT PERCENTAGE (0.002 - 0.05) OF SURFACE SOILS

URS

40 0 40 80 Miles

SCALE: 1" = 80 miles (1:5,068,800)

CREATED BY: CL	DATE: 04-26-07	FIG. NO: 1
PM: EO	PROJ. NO: 20500168.00001	



LEGEND

Available Data

- Not Mapped by NRCS - 23%
- Mapped by NRCS with Silt Data - 60%
- Mapped by NRCS without Silt Data - 17%

Mapped Data

- Percent of Mapped Area with Silt Percentage (0.002 - 0.05) ≥10% by Weight - 96%
- Percent of Mapped Area with Silt Percentage (0.002 - 0.05) <10% by Weight - 4%

G:\gis\projects\1577\20500168\mxds\303d_waters_port.mxd, 04/24/07, megan_sayles

APPENDIX C

TABLES 3 AND 4. SPECIFIC COMMENTS TO SECTIONS IX, X, AND XII (TERMINATION OF COVERAGE) AND PRELIMINARY GENERAL PERMIT ATTACHMENT D (SWPPP)

Table 3. Specific Comments to Section IX, Project Implementation Requirements

Page	*Section*	*Comment*	*Suggested Approach*
18	IX.C.1	"The discharger shall provide appropriate soil cover for inactive areas of soils disturbed by construction activities that are not scheduled to be re-disturbed until the next stage of construction. The permit should reference or provide more prescriptive guidance on "appropriate soil cover" for inactive areas.	The permit should reference guidance to be developed on a statewide basis that provides an approach and suite of techniques for temporary soil stabilization. The document should provide guidance for temporary stabilization based on slope, soil type, season, region of the state, and anticipated duration of inactivity and should go above and beyond information provided in the current CA BMP Manuals. Dry season requirements should be based predominately on wind erosion control requirements. The SWPPP Developer and contractor should be given a broad choice of practices and the guidance should not be limited to a list that might not reflect current science and technological developments. However, more targeted guidance would aid the selection and implementation of effective stabilization techniques. This guidance may be a possible task for CASQA's revision of the CA BMP Handbook or for the building industry. Caltrans has guidelines for *Protection by Temporary Soil Stabilization and Temporary Sediment Controls* (Caltrans Construction Site BMP Manual 2003) that could be used as a starting point, supplemented by erosion and sediment control effectiveness research.
18	IX.C.2	"At a minimum, the discharger shall stabilize all active disturbed areas regardless of time of year from all erosive forces, including rainfall, non-storm water runoff, and wind." It is unclear what this language means or applies to. If site is active, does apply to when a storm is coming? Or is the intent to require "protection" of all active disturbed areas (through drainage controls and sediment controls). Stabilizing active areas of disturbance throughout the year isn't reasonable.	The following language is suggested: "During the rainy season, all disturbed areas that will not be re-disturbed for at least 20 days shall be stabilized with erosion control practices within 14 days of last disturbance. Erosion control practices shall provide and maintain 90 percent soil coverage until the permanent erosion control practices are providing the intended long-term erosion control function."
18	IX.C.4	"The discharger shall stabilize all finished slopes, open space, utility backfill, and lots as soon as they have been completed."	The permit language should state as soon as possible, but within a specific time frame (i.e., within 14 days of final grading) and be consistent with requirements for other disturbance/stabilization time frames (e.g., within 14 days of last disturbance for disturbed areas that will not be re-disturbed for at least 20 days.

Table 3. Specific Comments to Section IX, Project Implementation Requirements

Page	*Section*	*Comment*	*Suggested Approach*
18	IX.D	"The discharger shall effectively manage runon from offsite, all runoff through the site, and all runoff that discharges off the site." The language "effectively manage" is vague.	The following language is suggested: "Drainage for concentrated flows (runon and runoff) shall be designed to control erosion, to return flows to their natural drainage courses, and to prevent damage to downstream properties. Concentrated flows shall be contained and/or conveyed in erosion-resistant structures (e.g., vegetated swales, rip rap-lined channels) to the point of off-site discharge.'
18	IX.E.3	"For areas under active construction, the discharger shall implement erosion control BMPs (runoff control and soil stabilization) in conjunction with sediment control BMPs." This is a very confusing statement. Need to clarify how active areas can be effectively "stabilized" (which refers to erosion control not sediment control).	It would be better to specify planning and stabilization requirements on an on-going basis for inactive areas. Planning considerations include phasing construction to limit the amount of area disturbed at once and timing of construction to limit disturbance during the wet season or in advance of likely predicted rainfall be implemented at all sites. Stabilization requirements should be consistent with comments/approach to IX.C.2 and IX.C.4 above.
19	IX.E.4	"The discharger shall apply linear sediment controls along the toe, top, face, and at the grade breaks of exposed and erodible slopes to comply with sheet flow lengths in accordance with Table 3." In general, more of this type of guidance would be helpful. However, guidance must be well thought out, supported by industry research, be consistent with CA BMP manuals and use clear terminology.	Use the term "slope interruption devices" instead of "linear sediment controls" in this context. For example, silt fence and triangular silt dikes are considered to be "linear sediment controls" but should not be used the face of slopes. Data that supports Table 3 "Critical Slope/Sheet Flow Length Combinations" should be referenced/provided. Provide support for permit criteria, "75 feet (apart) for slopes greater that 10%." We are aware of research that has been conducted on slope interruption devices (SIDs) was done proprietarily at the San Diego State University Soil Erosion Research Laboratory and the lengths (because of the size of the test bed) were limited to around 8-10 meters (30 feet). It should also be emphasized that these practices are generally not used by themselves, but in combination with track-walking, seeding, and surface mulching to establish a "treatment train" or as a system of complementary BMPs to protect a site.

Table 3. Specific Comments to Section IX, Project Implementation Requirements

Page	*Section*	*Comment*	*Suggested Approach*
19	IX.E.5	"The discharger shall, at all times, establish effective perimeter controls and stabilize all construction entrances/exits sufficient to control erosion and sediment discharges from the site."	Move entrance/exit requirements to IX.F. The following language is suggested, "The discharger shall, at all times, stabilize all construction entrances/exits sufficient to control sediment discharges from the site." Add an additional section to VIII. (Project Planning Requirements) and referenced in Section IX (Project Implementation Requirements) referencing/requiring sites to implement and overall approach for good erosion and sediment control that uses a system of complementary BMPs. Also, delete "erosion and" from this sentence. Perimeter controls and stabilized entrances do NOT control erosion. They control sediment discharges and tracking, respectively when used with drainage controls and erosion controls on a site.
19	IX.E.6	"At all times during the year, the discharger shall appropriately protect and maintain all storm drain inlets and perimeter controls, runoff control BMPs, and stabilized entrances/exits."	Consider winter requirements/alternative protection at higher elevations related to inlet protection (which may be a problem with snow clearing) and stabilized entrances which can be ineffective when embedded with snow and ice.
19	IX.E.7	"The discharger shall limit traffic to stabilized driveways." Requirement is vague and could be interpreted to limit any site traffic to stabilized driveways. This requirement should be listed in IX.F.	Suggested language: "The discharger shall limit site entry/exit to stabilized entries/exits, including use of fencing, barricades, or other controls as needed to clearly direct traffic to stabilized entrances/exits."
24	IX.J.2	"The discharger shall wash vehicles and streets in designated areas to prevent non-storm water discharges." How can you wash a street in a designated area?	Washing of vehicles and streets should be discouraged and more specific controls, including containment or dry methods, specified if either is necessary at a site.

Table 4. Comments Related to Sections X/Attachment D (SWPPP) and XII (Termination of Coverage)

Page	*Section*	*Comment*	*Suggested Approach*
7	I.26	Table 1 "Summary of Risk Categories and Required Elements" does not require a SWPPP for "Low Risk" sites (repeated in Section X.A.8).	All sites should be required to have a SWPPP, with modified requirements as appropriate for "Low Risk" sites.
26	X	This section should reference requirements in Attachment D (SWPPP Requirements) and Attachment E (Monitoring Program and Reporting Requirements), particularly written Construction Site Monitoring Program requirements.	Reference requirements in Attachment D (SWPPP Requirements) and Attachment E (Monitoring Program and Reporting Requirements), particularly written Construction Site Monitoring Program requirements.
52	Att. D.2.b	Section requires a narrative description of pre-construction controls. "Pre-construction practices" should be defined. Does this refer to the preliminary stage (rough grading, clearing and grubbing and soil disturbance prior to mass grading)? Misleading to call this phase "pre-construction" which implies that "construction" or at least construction that would require coverage under the general permit has not started yet.	SWPPP should include a narrative description of control practices for each phase of construction, not just pre-construction/preliminary controls.
52	Att. D.2.e	Section requires a construction activity schedule that "describes all major activities or construction stages at the site, the proposed time frame to conduct those activities, and subsequent changes to Good Housekeeping BMPs.	The construction activity schedule in the SWPPP should address all major activities and construction stages including a sequence of construction that clearly identifies the timing for implementation of BMPs (entrance, perimeter controls, drainage control, erosion control, sediment basins, etc.) related to construction stages and major activities. The schedule should not be limited to "changes in Housekeeping BMPs."
52	Att. D.2.f	Only subsection f.ii. specifies that features should be shown for all phases of construction.	The project site map(s) should show the features in subsections f.iii through f.xiii for all phases of construction (as applicable).
52	Att. D.2.f.i	Requirement seems like a carry-over from the existing permit.	Site maps should identify the project sampling locations as identified in the project Construction Site Monitoring Program (if applicable to the site).
53	Att. D.2.f.x	"Show the drainage patterns into each on-site storm water inlet point or receiving water."	Drainage patterns to off-site discharge locations should also be identified.
52	Att. D.3.a	Last sentence, "The discharger shall consider any additional site-specific and seasonal conditions when selecting and implementing appropriate BMPs."	Delete "any additional" – this qualification is confusing. Suggest "The SWPPP developer/discharger shall consider site-specific and seasonal conditions when selecting and implementing BMPs."
53	Att,D.4.a	"The SWPPP shall include calculations for anticipated runon, and describe, including appropriate design details, all BMPs implemented to divert off-site drainage around or through the construction project."	This requirement should not apply to stream restoration projects, as it may cause more damage than good to the stream in this situation.

Table 4. Comments Related to Sections X/Attachment D (SWPPP) and XII (Termination of Coverage)

Page	*Section*	*Comment*	*Suggested Approach*
54	*Att. D.4.d*	*This subsections states: "The SWPPP shall include the volume and velocity of the discharge from the conveyance. The volume and velocity of the discharge shall not exceed the carrying capacity of the receiving water, and velocity dissipation at the outfall may be required." This language is confusing. It's not clear if the requirement applies only to the diversion conveyance system or the total of diversion and anticipated site runoff.*	*Clarify what portions of the requirement apply to diversion and what portions apply to overall project impact to "carrying capacity" of the receiving water/drainage system.*
54	*Att. D.5.b*	*Requires that the SWPPP include a "proposed schedule for deployment and maintenance of sediment control BMPs."*	The SWPPP should include a general schedule for deployment of all BMPs by phase, not just sediment control BMPs, as well as maintenance requirements and a maintenance schedule for all BMPs.
54	*Att D.6.b*	*This subsection states: "The SWPPP shall specify daily or more frequently as necessary, inspection, sweeping, and/or vacuuming procedures for public and private roads; maintain sampling records; include a discussion of maintenance of such stabilized construction entrances." This is a confusing requirement and language. It is unclear if only inspection of entrance areas are required daily to identify tracking problems or is daily sweeping required for all sites. It is unclear what the "sampling records" apply to.*	*Daily sweeping may not be necessary for all sites. This is too prescriptive and potentially very costly, especially for smaller sites. Suggest identifying examples of tracking controls (stabilized construction entrances, traffic controls, barricades, etc.) and then require that sweeping or other controls (tire wash) be implemented as necessary to control tracking to off-site roads.*
57	*Att D.10.l*	*Section limits sites discharges to "storm water."*	*Should also include "allowable non-storm water discharges."*
29	*XII.2.a*	*Criteria for final stabilization include, "Proper maintenance of plant ground cover should result in near 100% coverage after the second growing season." Final stabilization is defined as 70% (or alternative) coverage. How can the permit identify a second growing season "requirement" that is applicable after the NOT is filed?*	*Remove second growing season language from this section. Suggest that this be addressed in a post-construction site maintenance portion of the SWPPP.*
29, 30	*XII.2.b*	*Equivalent stabilization measures should include measures appropriate for arid areas (e.g., final stabilization in Palm Springs, El Centro, etc. can be largely gravel or decorative landscaping rock, etc.).*	*See Comment.*

Table 4. Comments Related to Sections X/Attachment D (SWPPP) and XII (Termination of Coverage)

Page	*Section*	*Comment*	*Suggested Approach*
29	*XII.2.c*	*"Storm water discharges from all stabilized areas contain turbidity less than 40 NTU." All stabilized areas doesn't clearly define where samples should be collected. Does this mean that turbidity from site discharge locations must be < 40 NTU? Is this based on sample(s) from one post-construction storm event or several? What is the basis for the 40 NTU limit (especially compared to the 10 NTU NEL for ATS and 500 NTU NAL referenced elsewhere in the permit.)*	*Not clear what the advantage of this approach would be. Suggest removing option.*

APPENDIX D
COMPARISON OF SEDIMENT CONTROL BMPS

Appendix D

COMPARISON OF EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs) UTILIZING THE RESULTS OF RAINFALL SIMULATION TESTING AT THE SAN DIEGO STATE UNIVERSITY SOIL EROSION RESEARCH LABORATORY (SERL).

Rainfall Simulation Testing in the United States

In the last twenty years, comparative evaluation of erosion control materials and methods has been performed at several testing facilities in the United States. The USDA National Soil Erosion Research Laboratory at Purdue University has conducted basic soil erosion research since the early 1980's. Until the year 2000, two facilities performed testing that was relevant to highway slopes: the Texas Transportation Institute (TTI), Hydraulics and Erosion Control Laboratory at Texas A&M University, which has an outdoor facility; and, the Utah Water Research Laboratory (UWRL) at Utah State University, which has an indoor facility.

Each of these facilities use rainfall simulation to evaluate the performance of a variety of erosion control products and techniques, including standard biodegradable mulches (SBM) and rolled erosion control products (RECP). Some of this testing has been sponsored by agencies and some has been sponsored by manufacturers.

The San Diego State University Soil Erosion Research Laboratory

The San Diego State University Soil Erosion Research Laboratory (SDSU/SERL) integrates beneficial features from some of the aforementioned soil erosion research facilities in the United States. Funding for the facility was provided by Caltrans, (California State Department of Transportation) as part of a 1998-2000 Erosion Control Pilot Study, in which design, construction and operation of the SERL was supervised by URS Corporation and SDSU faculty from the Department of Civil and Environmental Engineering.

The SDSU/SERL is primarily used to provide comparative evaluations of erosion and sediment control practices relative to baseline bare soil conditions under controlled and documented conditions. The laboratory is in general conformance with the outlined methods and scope of ASTM D6459, Standard Test Method for Determination of Erosion Control Blanket (ECB) Performance in Protecting Hillslopes from Rainfall Erosion.

The SDSU/SERL is comprised of five (5) major components:

- Norton Ladder-Type rainfall simulation units (4)
- A 3 meter wide x 10 meter long tilting soil test bed (maximum 2:1 testing gradient)
- Two 5-stage, single-acting, telescopic cylinder hydraulic lift system
- Runoff and sediment collection and analysis system
- A water treatment system, including an activated carbon filter and reverse osmosis unit

Soil is placed and compacted on the test bed while it is in the horizontal position. Candidate erosion control practices are then applied/installed as to manufacturers' specifications, generally on a 2 meter by 8 meter plot. The test bed is then raised to a specified gradient, with a 2H:1V slope being the maximum inclination. Simulated rainfall is then introduced for a specified storm event. All runoff from the test surface is collected by flume at the bottom of the slope and analyzed.

Results of Recent Testing

Three (3) tables are presented which provide information on erosion control effectiveness derived from recent testing at the SDSU/SERL:

- **Table 1** presents the "Results of Rainfall Simulation Testing for Soil Roughness". This testing was conducted from January-June 2000 as part of the District 7 Erosion Control Pilot Study (ECPS). The purpose of this testing was to simulate various conditions of roughness on the soil surface and their relative effectiveness in reducing erosion and sediment transport during rain events. Testing was conducted on a 2:1 (H:V) slope using a clayey sand soil.

- **Table 2** is a comparison of various mulching best management practices (BMPs) and is primarily based on the results from the Caltrans District 7 Erosion Control Pilot Study (ECPS) and Soil Stabilization for Temporary Slopes (SSTS). This table was updated in 2005 to reflect the results from private evaluations at the SERL that were published by the manufacturers who funded their own proprietary testing. Criteria definitions are also provided.

- **Table 3** is an additional comparison of various mulching best management practices (BMPs) but only presents data on erosion control effectiveness and unit prices for installing each practice. This table also includes some sediment control and re-vegetation practices. As with Table 2, this table is primarily based on the results from the District 7 Caltrans Erosion Control Pilot Study (ECPS) and Soil Stabilization for Temporary Slopes (SSTS). This table was updated in 2005 to reflect the results from a survey of erosion control contractors (to derive the price information) and to reflect the results of private evaluations at the SERL that were published by the manufacturers.

- **Table 4** presents a comparison of various types of soil binders or “tackifiers”. These glue-like materials are typically used to hold straw mulch in-place; as a stand-alone dust palliative; or, as a component in a hydraulic mulching application of wood or paper fiber. The source for the data contained in Table 2 is the Caltrans “Soil Stabilization for Temporary Slopes Study (SSTS) 1999. In this study, the products were tested (applied) in solution with water and no mulch was used. In addition to the relative erosion control effectiveness information, Table 4 also provides criteria (and definitions) with which to further evaluate products, such as water quality impact, drying time, etc. Like Table 2, this table was updated in 2005 to reflect the results from private evaluations at the SERL.

TABLE 1:
RESULTS OF RAINFALL SIMULATION TESTING FOR SOIL ROUGHNESS

Treatment	Measurement	Statistic	Storm						Average Increase (+) Decrease (-)
			5-yr (1)	5-yr (2)	10-yr (1)	10-yr (2)	50-yr (1)	50-yr (2)	
Smooth	Normalized Erosion Rate (kg/m²/mm)	Mean	0.06	0.07	0.16	0.09	0.12	0.09	
		St. Dev.	0.03	0.07	0.04	0.01	0.02	0.02	
		% of Smooth	100%	100%	100%	100%	100%	100%	0%
	Runoff (L)	Mean	255.7	364.4	419.2	470.3	422.3	611.0	
		St. Dev.	11.9	35.1	19.6	9.7	10.6	20.3	
		% of Smooth	100%	100%	100%	100%	100%	100%	0%
Imprinted	Normalized Erosion Rate (kg/m²/mm)	Mean	0.03	0.02	0.03	0.02	0.03	0.02	
		St. Dev.	0.03	0.19	0.11	0.12	0.04	0.05	
		% of Smooth	49%	26%	18%	25%	22%	19%	76% (-)
	Runoff (L)	Mean	222.3	415.6	380.8	446.6	464.4	501.8	
		St. Dev.	13.3	96.1	49.4	84.0	21.1	37.8	
		% of Smooth	87%	114%	91%	95%	110%	82%	4% (-)
Ripped	Normalized Erosion Rate (kg/m²/mm)	Mean	0.04	0.07	0.12	0.08	0.15	0.06	
		St. Dev.	0.18	0.03	0.07	0.04	0.01	0.09	
		% of Smooth	66%	99%	75%	88%	121%	71%	12% (-)
	Runoff (L)	Mean	154.2	276.3	387.3	416.3	373.5	443.4	
		St. Dev.	75.6	17.0	29.8	24.7	7.0	79.2	
		% of Smooth	60%	76%	92%	89%	88%	73%	19% (-)
Sheepsfoot	Normalized Erosion Rate (kg/m²/mm)	Mean	0.03	0.03	0.02	0.05	0.06	0.04	
		St. Dev.	0.03	0.14	0.06	0.03	0.04	0.03	
		% of Smooth	58%	46%	14%	56%	51%	46%	55% (-)
	Runoff (L)	Mean	361.3	374.8	525.1	511.8	503.3	584.4	
		St. Dev.	11.9	71.3	26.7	22.5	26.0	24.3	
		% of Smooth	141%	103%	125%	109%	119%	96%	12% (+)
Trackwalked	Normalized Erosion Rate (kg/m²/mm)	Mean	0.04	0.04	0.05	0.04	0.04	0.07	
		St. Dev.	0.11	0.05	0.08	0.06	0.09	0.04	
		% of Smooth	80%	60%	30%	40%	30%	80%	52% (-)
	Runoff (L)	Mean	218.7	448.3	460.7	468.5	410.6	579.9	
		St. Dev.	48.0	26.8	35.5	38.4	49.7	36.0	
		% of Smooth	86%	123%	110%	100%	97%	95%	2% (+)

Source: Erosion Control Pilot Study Report, Caltrans, June 2000, Table 4-1	Note: Testing was conducted at the San Diego State University tilting test bed (fill slope) on a 1:2 (V:H) slope using a clayey sand soil.

TABLE 2:
MULCHING BMPs COMPARISON TABLE

Surface Mulch Category	Unit Cost Installed	Estimated Relative Erosion Control Effectiveness	Standard Application Rate	Ease of Installation	Longevity / Degradability
Hydraulic Mulching Types: Wood, paper, cellulose fiber	$900–1,200/ac	50 – 60%	2,000 lbs per acre	2	6 months
Compost Application	$900–1,200/ac $7,000-10,000/ac $10,000-15,000/ac	40 – 50% 95 - 99% 95 - 99%	(1 inch blanket application) (2 inch blanket application) (3 inch blanket application)	3 3 3	6 months 12 months 12-18 months
Straw Mulching Types: Rice and wheat	$1,800–2,100/ac	90 – 95%	2 tons per acre	3	6 months
Wood Chip Types: Blanket	$900–1,200/ac	Unk		3	24 months
Hydraulic Matrices Types: Wood mulch + Granular or liquid binder Paper mulch + Granular or liquid binder Cellulose mulch + binder	$1,000-2,000/ac	65 - 99%	2,000 lbs/ac mulch + 10% tackifier	 2 2 2	 6-12 months 3-6 months 3-6 months
Bonded Fiber Matrices	$5,000–6,500/ac	90 – 99%	3,500 – 4,000 lbs/ac	3	6-12 months
Rolled Erosion Control Products					
Types: Biodegradable					
Jute	$6,000–7,000/ac	65 – 70%	N/A	4	12-18 months
Curled Wood Fiber	$8,000–10,500/ac	90 – 99%	N/A	4	12 months
Straw	$8,000–10,500/ac	90 – 99%	N/A	4	12 months
Wood Fiber	$8,000–10,500/ac	90 – 99%	N/A	4	6-12 months
Coconut Fiber	$13,000–14,000/ac	90 – 99%	N/A	4	24-36 months
Coconut Fiber Net	$30,000–33,000/ac	90 – 99%	N/A	4	24-36 months
Straw Coconut	$10,000–12,000/ac	90 – 99%	N/A	4	18-24 months
Non-Biodegradable					
Plastic Netting	$2,000–2,200/ac	< 50%	N/A	4	24 months
Plastic Mesh	$3,000–3,500/ac	75 – 80%	N/A	4	24 months
Synthetic Fiber w/Netting	$34,000–40,000/ac	90 – 99%	N/A	4	permanent
Bonded Synthetic Fibers	$45,000–55,000/ac	90 – 99%	N/A	5	permanent
Combination Synthetic and Biodegradable Fibers	$30,000–36,000/ac	85 – 99%	N/A	5	variable

Source: Erosion Control Pilot Study Report, Caltrans, June 2000, and Soil Stabilization for Temporary Slopes, Caltrans 1999. Adapted and Updated January 2005

Criteria Definition

Unit Cost Installed: Cost of materials and labor to effect installation on a per acre basis

Relative Erosion Control: Reduction in soil loss when mulch is compared to bare soil (control) under similar conditions of soil, slope length and steepness and rainfall simulation

Ease of Installation: Ratings range from 1 (relatively easy or few steps required for application/installation) to 5 (labor intensive or numerous steps required for application/installation)

Longevity/Degradability: Functional longevity in terms of erosion control effectiveness.

TABLE 3:
EROSION AND SEDIMENT CONTROL BMPs
INSTALLED COSTS AND EFFECTIVENESS

BMP	Unit Cost Installed	Estimated Relative Erosion/ Sediment Control Effectiveness
Sediment Control		
Silt Fence	$1.50 – 2.00 per lineal foot	UNK
Compost Berm (12-16 inch height)	$1.75 - 2.00 per lineal foot	95 - 99%
Fiber Rolls (9 inch) (12 inch) (9 inch with trackwalking)	$1.50 – 2.00 per lineal foot $2.00 - 2.50 per lineal foot $3.00 - 4.00 per lineal foot	58% 95 - 99% 84 %
Erosion Control		
Fertilizer	$450 – 550 per acre	N/A
Seeding	$870 – 2,170 per acre	50%
Stolonizing	$2,200 per acre + cost of stolons	90%
Hydraulic Mulching	$900 – 1,200 per acre	50 – 60%
Compost Application (2,000 lbs/acre) (2 inch blanket application) (3-4 inch blanket application)	$900 – 1,200 per acre $7,000 - 10,000 per acre $10,000 - 15,000 per acre	40 – 50% 95 - 99% 95 - 99%
Straw Mulching	$1,800 – 2,100 per acre	90 – 95%
Soil Binders		
Plant Material-Based (Short-Term)	$700 – 900 per acre	85 - 99%
Plant Material-Based (Long-Term)	$1,200 – 1,500 per acre	60 – 65%
Polymeric Emulsion Blends (Including PAM)	$700 – 1,500 per acre	30 – 95%
Petroleum Resin-Based	$1,200 – 1,500 per acre	25 – 40%
Cementitious Binder-Based	$800 – 1,200 per acre	80 – 85%
Hydraulic Matrices (Wood mulch + Soil binder)	$1,000 - 2,000 per acre	65 - 99%
Bonded Fiber Matrices	$5,000 – 6,500 per acre	90 – 99%
Rolled Erosion Control Products		
Biodegradable		
Jute	$6,000 – 7,000 per acre	65 – 70%
Curled Wood Fiber	$8,000 – 10,500 per acre	90 – 99%
Straw	$8,000 – 10,500 per acre	90 – 99%
Wood Fiber	$8,000 – 10,500 per acre	90 – 99%
Coconut Fiber	$13,000 – 14,000 per acre	90 – 99%
Coconut Fiber Net	$30,000 – 33,000 per acre	90 – 99%
Straw Coconut	$10,000 – 12,000 per acre	90 – 99%
Non-Biodegradable		
Plastic Netting	$2,000 – 2,200 per acre	< 50%
Plastic Mesh	$3,000 – 3,500 per acre	75 – 80%
Synthetic Fiber w/Netting	$34,000 – 40,000 per acre	90 – 99%
Bonded Synthetic Fibers	$45,000 – 55,000 per acre	90 – 99%
Combination Synthetic and Biodegradable Fibers	$30,000 – 36,000 per acre	85 – 99%

Source: Erosion Control Pilot Study Report, Caltrans, June 2000, Table 4-1; Updated May 2004

TABLE 4:
SOIL BINDERS COMPARISON TABLE

Soil Binder (w/o mulch)	Unit Cost Installed	Relative Erosion Control	Degradability /Longevity	Water Quality Impact	Ease of Cleanup	Mode of Application	Effect on Runoff	Drying Time (hours)
Plant Material-Based (PBS) • Guar, Psyllium, Starch, Chitosan	$700-900/ac	85-95%	3-6 months	L	+	B	0/-	12-18
Plant Material-Based (PBL) • Pitch or rosin-based	$1,200-1,500/ac	60-65%	6-12 months	H	-	B	+	19-24
Polymeric Emulsion Blends (PEB) • Acrylic copolymers, copolymers and hydrocolloids • Polyacrylamides (PAM)	$700-1,500/ac	30-95%	1-2 years	M	V	B	+ and/or – depending on chemistry	4-24 Depending on chemistry
Petroleum/Resin-Based (PRB) • Variable chemistry	$1,200-1,500/ac	25-40%	1-2 years	H	-	B	+	0-4
Cementitious Binder-Based (CBB) • Generally used with trace mulch	$800-1,200/ac	75-85%	1-2 years	M	+	H	+	4-8

Source: Erosion Control Pilot Study Report, Caltrans, June 2000, and Soil Stabilization for Temporary Slopes, Caltrans 1999. Adapted and Updated January 2005

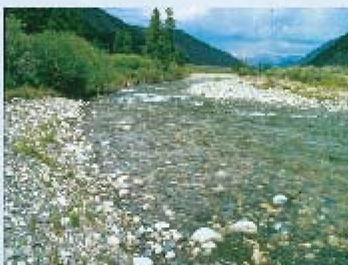
Criteria Definition

Unit Cost Installed:	Cost of materials and labor to effect installation on a per acre basis
Relative Erosion Control:	Reduction in soil loss when binder compared to bare soil (control) under similar conditions of soil, slope length and steepness and rainfall simulation
Degradability/Longevity:	Based on manufacturers' standard recommended application rate and information/data sheets
Water Quality Impact:	Low, Medium or High based on the results of testing at the SDSU Soil Erosion Research Laboratory for Caltrans (See SSTS 1999). For detailed information on chemical constituents, ask the manufacturer for MSDS sheets and evidence of water quality testing.
Ease of Cleanup:	Positive (+) indicates that cleanup of overspray onto sidewalks, walls, etc. is generally not an issue. Negative (-) indicates that cleanup can be problematic. Variable (v) indicates that the chemistry of the particular binder can make a difference. Check with the manufacturer.
Mode of Application:	Indicates whether or not specific application equipment is required. Hydromulcher (H) indicates the need to mix and keep material in suspension by internal agitation; Water truck (W) means that the material is specifically designed for use with a standard water tank truck; Both (B) means that the material can be used in either a hydromulcher or a water truck with a recirculation pump or other means of preliminary mixing of binder with water.
Effect on Runoff:	A positive sign (+) indicates runoff is increased; a negative sign (-) means runoff is reduced; the symbol (0) indicates no-effect.

APPENDIX E
SCCWRP HYDROMODIFICATION STUDY

Technical Report 475
December 2005

Managing Runoff to Protect Natural Streams: The Latest Developments on Investigation and Management of Hydromodification in California



Eric D. Stein

Susan Zaleski

Southern California Coastal Water Research Project

Managing Runoff to Protect Natural Streams: The Latest Developments on Investigation and Management of Hydromodification in California

Proceedings of a Special Technical Workshop
Co-sponsored by:

- ***California Stormwater Quality Association (CASQA)***
- ***Stormwater Monitoring Coalition (SMC)***
- ***University of Southern California Sea Grant (USC Sea Grant)***

Eric D. Stein
Southern California Coastal Water Research Project (SCCWRP)

Susan Zaleski
University of Southern California Sea Grant (USC Sea Grant)

December 30, 2005

Technical Report #475

EXECUTIVE SUMMARY

Stream channel downcutting, widening, and erosion due to increased surface runoff present the most profound and difficult to manage problems resulting from conversion of natural land surfaces to developed areas. Land use changes that reduce the capacity for infiltration and evapotranspiration of rainfall may result in an increase in the magnitude and frequency of erosive flows and changes in the proportion and timing of sediment delivery downstream. These effects, termed *hydromodification*, can adversely impact the physical structure, biologic condition, and water quality of streams.

This document summarizes the presentations and discussions from a workshop convened to provide an overview of key technical and managerial issues associated with hydromodification, with specific focus on California's climatic setting. The goal of this workshop was to identify key conclusions regarding the mechanisms and causes of hydromodfication and to provide managers and decision makers with a list of recommended priorities for future work in terms of both technical and managerial products.

Recent studies indicate that California's intermittent and ephemeral streams are more susceptible to the effects of hydromodification than streams from other parts of the United States (US). Physical degradation of stream channels in the central and eastern US can initially be detected when watershed impervious cover approaches 10%, although biological effects (which may be more difficult to detect) may occur at lower levels. In contrast, initial response of streams in the semi-arid portions of California appears to occur between 3% and 5% impervious cover.

Managing the effects of hydromodification requires attention to changes in runoff volume, magnitude of flows, frequency of erosive events, duration of flows, timing of high flows, magnitude and duration of base flows, and patterns of flow variability. Slope, composition of bed and bank materials, underlying geology, watershed position, and connections between streams and adjacent floodplains are also key considerations in the management of hydromodification effects.

A contemporary toolbox for assessing the effects of hydromodification consists of three technical approaches: continuous simulation modeling, physical process modeling using geomorphic metrics, and risk-based modeling. Independently and in a range of combinations, these approaches are instrumental to understanding and predicting channel responses. In conjunction with these approaches, the following research areas are recommended for enhanced understanding and assessment of hydromodification:

- Establishment of appropriate reference conditions for various stream types
- Establishment of linkage between geomorphic changes and biologic effects
- Development and calibration of linked models that provide long-term simulation of hydrologic, and resultant physical changes in channel morphology

Furthermore, ongoing monitoring programs should be established for reference streams, streams subject to effects of hydromodification, and streams where various hydromodification management strategies have been employed.

Hydromodification is best addressed with a suite of strategies including site design, on-site controls, regional controls, in-stream controls, and restoration of degraded stream systems. To improve the effectiveness of hydromodification management, it is important to identify the most appropriate set of strategies based on the type of channel, setting, stage of channel adjustment, and amount of existing and expected impervious cover in drainage catchments. Management of hydromodification could be improved by integrating it into a multi-objective strategy that addresses hydrology, water quality, flood control, and stream ecology. In addition, streams should be surveyed and classified in order to identify areas with the greatest risk of impact from hydromodification. Output from dynamic modeling can be used to develop easy to use management guides, and standard monitoring protocols and performance criteria need to be developed. These management tools should be geared toward application by land-use planners and regulators at the municipal and state levels. Finally, a hydromodification workgroup should be formed to facilitate communication and exchange of ideas and information on technical and management strategies relevant to hydromodification.

ACKNOWLEDGEMENTS

This document summarizes two days of collaborative, prescient, and enlightening discussion on one of the most daunting challenges facing aquatic resource managers. We would like to thank all workshop presenters and panelist for sharing their insight and expertise to help develop the conclusions and recommendations contained in this document. We would like to especially thank the workshop organizing committee who made this event possible. Finally, we thank the California Association of Stormwater Quality Agencies, the southern California Stormwater Monitoring Coalition, and University of Southern California (USC) Sea Grant for their generous funding and support.

Workshop Presenters and Panelists

Mark Abramson
Heal the Bay

Aaron Allen
United States Army Corps of Engineers

Jill Bicknell
EOA, Inc. (for Santa Clara Valley Urban Runoff Pollution Prevention Program)

Jon Bishop
Los Angeles Regional Water Quality Control Board

Brian Bledsoe
Colorado State University

Derek Booth
University of Washington

Dan Cloak
Dan Cloak Consulting (for Contra Costa County)

Susan Cloke
Los Angeles Regional Water Quality Control Board

Laura Coley-Eisenberg
Rancho Mission Viejo

Rene DeShazo
Los Angeles Regional Water Quality Control Board

Tony Donigian
AQUA TERRA Consultants

Rebecca Drayse
TreePeople

Jeff Haltiner
Philip Williams and Associates

Larry Kolb
San Francisco Bay Regional Water Quality Control Board

Shelley Luce
Santa Monica Bay Restoration Commission

Craig MacCrae
Aquafor Beech

Gary Palhegyi
GeoSyntec Consultants

Marolyn Parson
National Association of Homebuilders

Jeff Pratt
Ventura County Watershed Protection District

John Robertus
San Diego Regional Water Quality Control Board

Mark Subbotin
Newhall Land and Farming Company

Xavier Swamikannu
Los Angeles Regional Water Quality Control Board

Jason Uhley
Riverside County Flood Control and Water Conservation District

Organizing Committee

Eric Stein – Chair
Southern California Coastal Water Research Project

Chris Crompton
Orange County Resources and Development Management Department

Bill DePoto
Los Angeles County Department of Public Works

Mike McCann
San Diego Regional Water Quality Control Board

Gary Palhegyi
GeoSyntec Consultants

Xavier Swamikannu
Los Angeles Regional Water Quality Control Board

Matt Yeager
San Bernardino County Flood Control District

Susan Zaleski
University of Southern California Sea Grant

TABLE OF CONTENTS

WORKSHOP OVERVIEW

The process of urbanization has the potential to affect stream courses by altering watershed hydrology. Development and redevelopment can increase impervious surfaces on formerly undeveloped (or less developed) landscapes and reduce the capacity of remaining pervious surfaces to capture and infiltrate rainfall. In addition, in semi-arid regions, development is usually accompanied by significant supplemental landscape irrigation that maintains high soil moisture conditions. Development practices also tend to reduce or eliminate native vegetation, thus reducing evapotranspiration of rainfall. Consequently, as watersheds develop, a larger percentage of rainfall becomes runoff during any given storm; runoff reaches stream channels much more rapidly, resulting in peak discharge rates that are higher than those for an equivalent rainfall prior to development. These changes to the runoff hydrograph have been termed *hydromodification.*

Hydromodification can result in adverse effects to stream habitat and water supply, and stream erosion associated with hydromodification often threatens infrastructure, homes, and businesses. In response to these effects, state and local agencies have developed, or are developing, standards and management approaches to control and/or mitigate the effects of hydromodification on natural and semi-natural stream courses.

On October 2 and 3, 2005, 26 speakers and 175 participants gathered in Ontario, California to discuss the results of recent research inside and outside of California. This technical workshop was convened to provide an overview of the key technical and managerial issues associated with hydromodification, with specific focus on California’s climatic setting. The specific objectives of the workshop were:

- Exchange of information on technical and managerial approaches to hydromodification
- Identification of common conclusions regarding a general understanding of hydromodification
- Recommendation of priority needs for future work relevant to technical and managerial products in response to hydromodification issues

The workshop consisted of two evening and one all-day session. The first night, a small group of scientists and managers gathered to discuss key knowledge gaps and technical information needs. The day session was open to all attendees, who interacted with a slate of speakers summarizing technical, regulatory, and management approaches to responding to the effects of hydromodification. The workshop concluded with an evening session in which a small group discussed priority needs for future research and management tool development. The agenda for the workshop is provided in Appendix A.

This document summarizes key conclusions resulting from the presentations and discussions that occurred during the workshop. The document also provides managers and decision makers with a list of recommend priorities for future work in terms of both technical and managerial products related to hydromodification response.

INTRODUCTION TO HYDROMODIFICATION

Hydromodification is defined by the Environmental Protection Agency (EPA) as the "alteration of flow characteristics through a landscape which has the capacity to result in degradation of water resources" (http://www.epa.gov/owm/mtb/cwns/1996rtc/glossary.htm). Most often, hydromodification results from changes in land use practices or direct management of surface runoff. Consequences of hydromodification can include stream channel incision, aggradation, desiccation, and/or inundation.

Land use practices over the past several hundred years have resulted in hydromodification of western landscapes (Haltiner et al. 1996, Leopold 1968). Historically, many small streams were not connected to main river channels, but rather existed as shallow swales and wetland systems connected to larger rivers via subsurface flow. Surface hydrologic connections occurred intermittently following periodic large storm events. Increased surface runoff and channel disturbance, beginning during the cattle-grazing era circa 1700 – 1900, resulted in many of these systems becoming permanently channelized (Cooke and Reeves 1976). Channel modification through either direct alteration, or as a consequence of changes in patterns of surface runoff, e.g. through increases in impervious cover, continues today.

Hydromodification has typically resulted in channel incision and bank erosion in the upper and middle portions of the watershed, and in deposition, aggradation, and increased channel meandering in the downstream, flatter portions of the watershed. Often, as the main channel has incised, the lowered base level results in the formation of "knickpoints" (abrupt drops in the channel floor) that migrate upstream into the headwater areas. Often, these migrating "knickpoints" result in severe gully formation in lower order streams, i.e. first- through third-order streams, based on the Strahler stream ordering system. These smaller headwater streams are important from a watershed perspective because much of the sediment generation, carbon export, and initial nutrient processing occur in the upper watershed (Rheinhardt et al. 1999). The vast majority of stream miles in any given watershed exist as small headwater streams (Beschta and Platts 1986); consequently, impacts to these streams can result in profound cumulative effects to sediment and water movement patterns throughout the watershed. In many areas, the majority of remaining semi-intact streams is in the upper portions of watersheds. Notably, these areas are the most susceptible to land use change and associated effects of hydromodification. When development occurs in headwater areas rather than lower in the watershed, it tends to result in larger increases in peak discharge due to cumulative decreases in the time of concentration of rainfall to runoff (Beighley and Moglen, 2002).

Small, frequent runoff events, i.e. two-year frequency storms and smaller, demonstrate the most dramatic effects due to increased imperviousness, effects of supplemental irrigation, or other changes in land use practices (Beighley et al. 2003, Donigian and Love 2005, Hollis 1975). These small events account for the majority of long-term movement of sediment and consequently are the most deterministic of the geomorphic stability of the stream channels (Wolman and Miller 1960). However, small increases in basin impervious cover can also result in dramatic increases in runoff during 0.5-5 year flow events. For example, an increase of a few percent in impervious cover can increase the magnitude of a 1- or 2-year flood event by 20-fold (Hollis 1975, Urbonas and Roesner 1992).

Studies from parts of the country with climates more humid than California's indicate that physical degradation of stream channels can initially be detected when watershed impervious cover approaches 10%, although biological effects, which may be more difficult to detect, may occur at lower levels (CWP 2003). Recent studies from both northern and southern California indicate that intermittent and ephemeral streams in California are more susceptible to the effects of hydromodification than streams from other regions of the US, with stream degradation being recognized when catchment's impervious cover is as little as 3-5%[1] (Coleman et al. 2005). Furthermore, supplemental landscape irrigation in semi-arid regions, like California, can substantially increase the frequency of erosive flows (AQUA TERRA Consultants 2004). However, because all streams are constantly undergoing change and adjustment, effects of impervious cover should be investigated in terms of changes in the rate of channel response in addition to the absolute magnitude of response.

Managing the effects of hydromodification requires attention to more than just the peak runoff. The work (or energy) that affects physical and biological channel structure results from movement of water and sediment controlled by runoff volume, flow magnitude and duration, frequency of erosive events, timing of high flows, and magnitude and duration of base flows (Konrad and Booth 2005, Montgomery and MacDonald 2002, Paul and Meyer 2001, Roesner and Bledsoe 2003). Changes in patterns of flow variability and increases in the frequency of high flows have been shown to have measurable effects on the community composition of stream biota (Konrad and Booth 2005). Because streams are coupled hydrologic, geomorphic, biologic systems, it is important to understand the various effects of all changes in surface runoff patterns and to develop appropriate management strategies for each potential effect.

As channels incise, they often go through a series of adjustment stages from initial downcutting, to widening, to establishing new floodplains at lower elevations (Figure 1). This process can occur over years or decades depending on the type of channel and flow regime. Sand-dominated channels may pass through the full sequence of stages in a few decades, whereas channels in more resistant materials, such as clay, may take much longer, in some cases 50–100 years (Roesner and Bledsoe 2003). Therefore, it is important to understand a channel's stage of adjustment, and target management strategies to account for current and expected future evolution of the channel form.

[1] Most studies evaluate the response of stream channels to "total impervious cover". However, a more appropriate assessment would be based on "effective impervious cover", i.e., the amount of impervious cover that is hydrologically connected to the stream channel. Assessment based on effective impervious cover is more likely to result in observed channel response at lower levels of imperviousness.

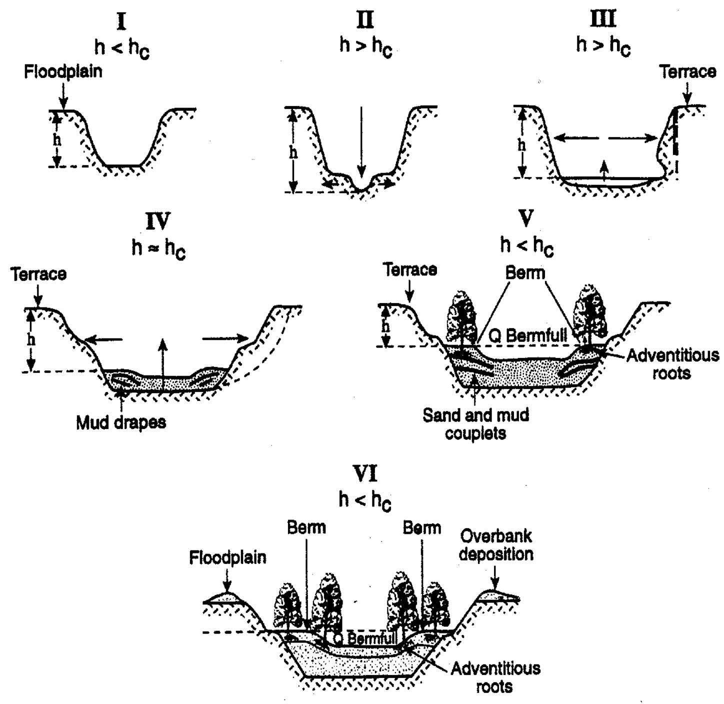


Figure 1: Stages of sand-bed channel adjustment (Schumm et al. 1984).

The pattern and rate of channel response to hydromodification will vary based on channel type and recent disturbance history (Montgomery and MacDonald 2002). Underlying geology, composition of bed and bank materials, slope, watershed position, and floodplain connectivity all affect channel response. Several stream classification systems have been developed over the years, including Shumm (1963), Montgomery and Buffington (1993), Rosgen (1994), and Church (2002). Most of these systems classify streams based on their sensitivity to change and therefore can be used to help assess, prioritize, and customize hydromodification management approaches. For example, Montgomery and Buffington (1993) define the following five channel types, listed from most to least resilient:

- Cascade
- Step pool
- Plane bed
- Pool riffle
- Dune ripple

Classification systems provide a useful starting point for evaluation of channel response to hydromodification; however, the classification systems above were developed in regions more humid and/or mountainous than those typical to California. Given differences in substrate and the extreme range of flows typically observed in arid regions, it is important to develop and regionally calibrate a classification system for dryland channels. Furthermore, the assessment of channel condition and the development of management strategies must be interpreted in terms of both spatial context (i.e. valley slope and position within the watershed) and temporal context (i.e. disturbance history) of the stream (Montgomery and MacDonald 2002). For example, channel incision may be most dramatic in the middle portions of the watershed; however, these reaches may have stabilized, while the most active erosion and sediment production is occurring in smaller headwater channels. For these reasons, simplistic classification and assessment schemes based on channel appearance must be supported by in-depth geomorphic assessment, historical studies, and thorough understanding of physical and hydrologic processes.

Ultimately, some management strategies may vary based on the channel type, as well as the degree of current and anticipated hydromodification, while others may be more uniformly applied. For example, controlling the magnitude and duration of runoff may be an effective strategy for all stream types, while bioengineered streambank stabilization may only be effective for specific stream types under specific circumstances.

TECHNICAL APPROACHES TO ASSESSING HYDROMODIFICATION

The contemporary toolbox for assessing the effects of hydromodification consists of several technical approaches that may be combined in various ways. Continuous simulation hydrologic models can be used to assess elements in rainfall-runoff cycles and to describe conditions of flow in stream channels. These approaches can be used to assess the way changes in land cover may affect stream flow and to develop management strategies aimed at preventing or reducing such effects. A second, more involved approach, physical process modeling uses hydrologic models to predict changes in stream flow and to predict how these changes may affect the physical structure of the channel itself. This approach may couple hydraulic and sediment transport models, and/or incorporate geomorphic metrics to predict whether or not a channel will remain stable when subjected to the effects of hydromodification. Finally, risk-based assessments are used to account for the uncertainty associated with long-term cumulative effects of altered hydrology on stream channel flow, sediment transport, and stream geomorphology.

Continuous Simulation Modeling

Continuous simulation modeling provides a powerful tool for investigating the way rainfall-runoff patterns change over time with respect to normal climatic cycles and changes in land use practices. Hydrologic models integrate land use, precipitation, soils, topography, and other physical factors to simulate resultant runoff patterns. These models can be used to evaluate the way changes in the extent and distribution of impervious cover may affect flow magnitude, timing, frequency, and duration. In addition, continuous simulation models can be used to assess changes in the shear stress of channel beds and banks over time. Predicted shear stress (τ_{actual}) values can be compared to critical shear stress ($\tau_{critical}$) values associated with the onset of erosion in order to predict conditions that may result in initiation of scour. Recent studies in Ventura County have successfully used $\tau_{actual}/\tau_{critical}$ values between 1.2 - 1.5 as a threshold for initiation of channel scour along with an assessment of the frequency of occurrence of these erosive flow events (AQUA TERRA Consultants 2004). When using hydrologic models it is important to simulate runoff and erosion patterns over periods of at least 20-30 years. Short-term or single-event modeling is not sufficient to capture the continuous erosion and aggradation processes that occur during large and small storm events over extended periods of time.

Physical Process Modeling/Geomorphic Metrics

Physical process modeling aims to establish relationships between impervious cover, runoff patterns, and channel response based on field observations of changes in channel form over time. These field observations are used to derive mathematical relationships that can be used to predict channel response to changes in land use practices. Erosion Potential (E_p) is a geomorphic metric that has been used in several recent studies relevant to the effects of increased runoff associated with increases in impervious cover. The E_p represents the ratio of pre- and post-development erosive forces for a given stream type, expressed as:

$$E_p = \frac{W_{post}}{W_{pre}}$$

Where: W_{post} = Cumulative erosive energy or work after development
W_{pre} = Cumulative erosive energy or work before development

Where: Erosive energy is defined as the energy that is above the threshold of erosion for the stream boundary materials, also referred to as excess specific stream power

Values for E_p are derived for both the channel bed and bank, and the boundary that is more susceptible to erosion is used as the basis of setting response thresholds. The E_p of a stream channel should be evaluated based on long-term simulations (e.g. 50 yrs) or based on empirical data collected over extended periods of time. Geomorphic metrics can be used to project changes in channel cross-section area over time in response to increases in impervious cover, as shown in Figure 2, which describes the expected effect of increases in total impervious cover (TIMP) on channel cross-sectional area. Channel response thresholds can be inferred according to inflection points on the curve. In this plot, the upper curve is derived from southern California data; the lower curve is derived from data observed in other parts of the US. Expected threshold of response for southern California streams is approximately 4% (Coleman et al. 2005).

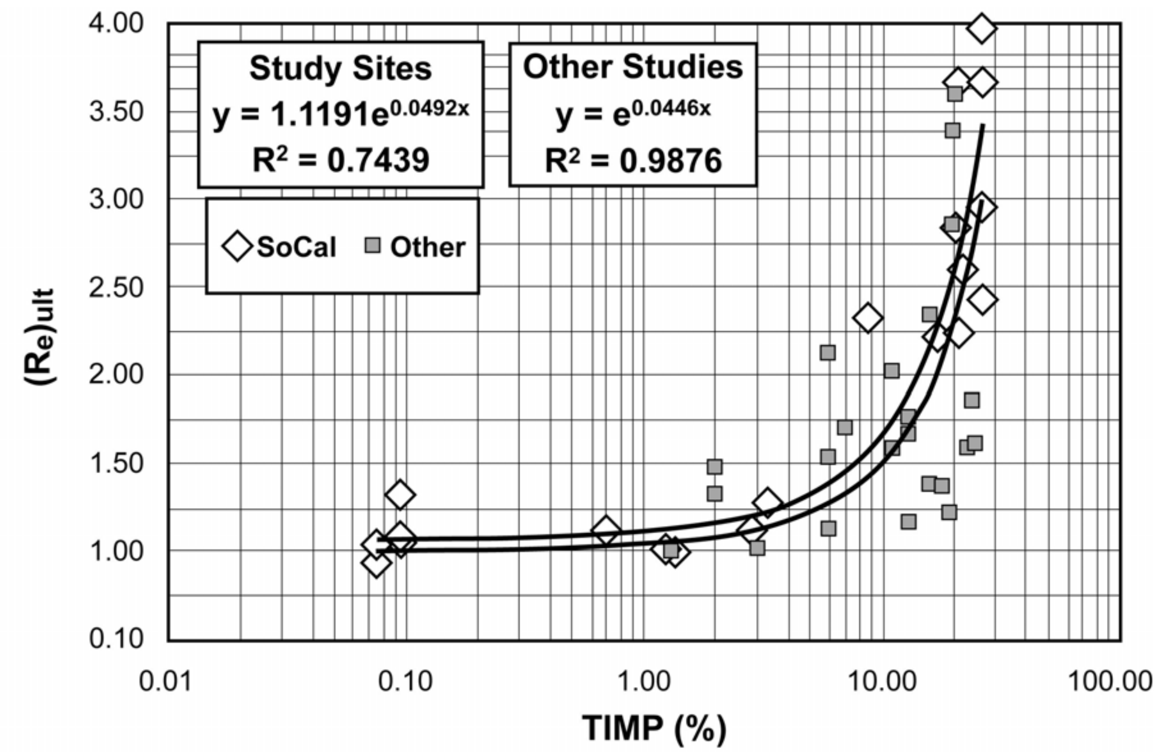


Figure 2: Enlargement curve showing expected effect of increases in total impervious cover (TIMP) on channel cross-sectional area. (Re) is the ratio of ultimate channel cross-sectional area to current cross sectional area. Upper curve is derived from data from southern California, lower curve is derived from data from other parts of the US. Expected threshold of response for southern California streams is approximately 4% (from Coleman et al. 2005 and C. MacRae).

It is important to note that curves such as those shown in Figure 2 assume a consistent hydrologic response to increased impervious cover. Long-term hydrologic simulations should be coupled with physical process models to fully explore these relationships and help validate the curves. Furthermore, different channel types respond differently to changes in runoff. Therefore, an enlargement curve, such as the one shown in Figure 2 for a single channel type, should be developed for each major channel type in a region in order to help focus the timing and location of strategic runoff management measures.

Risk-based Modeling

Unlike physical process modeling, which aims to establish response thresholds, risk-based modeling estimates the probability of channel response to increases in erosion potential associated with anticipated changes in runoff as a result of increases in impervious cover. Managers can then determine acceptable risk levels. Typically, risk-based modeling uses the output of continuous simulation or physical process models to generate time-series data relevant to flow and sediment transport. Often this type of modeling includes linear and logistic regressions, in addition to probability networks. These data are then used to estimate the risk of channel response with respect to anticipated changes in runoff volume and sediment. Figure 3 provides an example of the way logistic regression analysis can
be used to estimate the likelihood of channel instability based on progressive degrees of erosion potential.

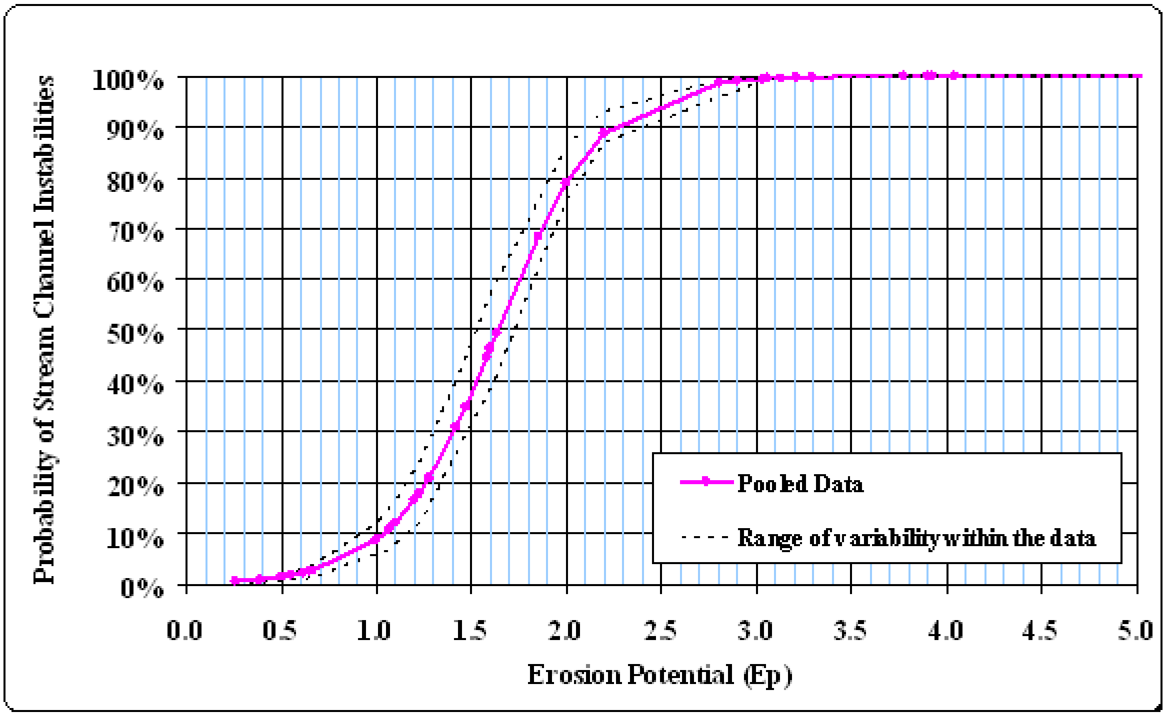


Figure 3: Logistic regression analysis showing the probability of various channel erosion potentials (from B. Bledsoe).

For studies conducted in the San Francisco Bay Area, an E_p value of 1.2 was proposed as an acceptable threshold based on a 15% probability of channel instability[2]. This was typically associated with approximately 3 - 6% impervious cover for channels in sand substrates and 10-12% for channels in clay substrates.

[2] The negotiated Ep value of 1.0 was adopted for the final Hydromodification Management Plan for Santa Clara Valley and included in a permit amendment for agencies in that area.

PRIORITY TECHNICAL NEEDS AND INFORMATION GAPS

Workshop participants identified five priority areas for additional research and data collection:

- Regional reference conditions for various stream channel types
- Links between geomorphic change and biologic effects
- Dynamic simulation models calibrated for local conditions
- Potential consequences of increased storm water infiltration from urbanized areas
- Ongoing monitoring programs to assess hydromodification impacts and to develop effective management strategies

Regional reference conditions for various stream channel types need to be established

Because most areas in the western US have been subjected to historic grazing or logging, many channels in this region have undergone some degree of change over time. Furthermore, the dynamic nature of this region's fluvial systems means that these streams are constantly undergoing some degree of change. Understanding the historic conditions of stream channels can provide valuable insight; however, historic conditions may not be the most appropriate "reference" in light of current constraints. Rather, reference should be considered a condition where stream channels are in a state of dynamic equilibrium under contemporary natural watershed processes. Once a regional reference condition is defined, data on flow, sediment movement, and geomorphology should be collected on an ongoing basis from representative reference stream reaches. These data will facilitate modeling that more effectively differentiates natural cycles from human-induced changes, especially during long wet or dry cycles where changes may be dramatic but infrequent.

Links between geomorphic change and biologic effects need to be more clearly defined

Hydromodification can cause a variety of physical changes to streams. However, hydrologic changes that are most relevant to biologic communities have not been well defined. For example, it is unclear how changes in base flow duration; peak flow magnitude, duration, and timing; or flow variability affect the structure and function of stream communities. Ultimately, there is a need to develop biologic indices to assess the effects of hydromodification and more effectively direct management strategies.

Dynamic simulation models need to be developed and calibrated for local conditions

Although continuous hydrologic simulation and physical process models have been developed for California streams, these models have not been routinely linked to the assessment of stream channel response to various forms of hydromodification. Hydrologic, physical process, and risk-based models are much more effective when used in combination and appropriately calibrated and validated for California streams. The resultant tool(s) can greatly improve assessments that predict the likelihood of stream channel response to anticipated changes in hydrology associated with changes in land use patterns. Model output may also be useful in the development of objective criteria for establishing land use practices that minimize hydromodification effects, designing tools for best management practices (BMP) design, and evaluating the performance of management measures.

Potential consequences of increased storm water infiltration from urbanized areas need to be investigated

Infiltration of substantial volumes of storm water runoff from developed land surfaces may introduce unacceptable levels of contaminants into groundwater and/or shallow aquifers. The risk of groundwater contamination and the fate of pollutants introduced into subsurface waters need to be investigated by increased monitoring, development of coupled surface water-groundwater models, and implementation of demonstration projects.

Ongoing monitoring programs to assess hydromodification impacts and develop effective management strategies need to be designed and implemented

First, more extensive flow monitoring needs to be instituted to compensate for the difficulty of calibrating hydrologic models for un-gauged headwater streams. Second, regular geomorphic data needs to be collected from reference streams as well as streams subject to the effects of hydromodification. Routine measurement of channel cross-sections and substrate will greatly improve understanding of channel adjustment processes and allow better discrimination between natural and anthropogenic changes. Third, streams subject to various hydromodification management strategies need to be monitored and documented to support adaptive management and education on emerging techniques and strategies.

REGULATORY AND MANAGEMENT STRATEGIES

Regulatory Approaches to Address Potential Effects of Hydromodification

A variety of regulatory programs and tools exist to help in the regulation of hydromodification effects, including:

- Clean Water Act Section 401 certifications
- Total Maximum Daily Loads (TMDLs)
- Municipal storm water (MS4) permits under Section 402 of the Clean Water Act, and the associated Standard Urban Storm Water Mitigation Program (SUSMP) requirements
- Watershed Urban Runoff Management Plans (WURMPs) and the Watershed Management Initiative (WMI) which encourage municipalities to work cooperatively to manage issues such as hydromodification

In addition, California Environmental Quality Act/National Environmental Policy Act (CEQA/NEPA) processes can be used to better address hydromodification issues, especially with regard to cumulative effects.

Looking to the future, Regional Water Boards in California are considering development of numeric criteria and objectives for new development and redevelopment projects to offset and/or mitigate hydromodification effects. These objectives may involve requirements for managing flow and/or reducing effective impervious cover as well as strategies to maximize infiltration and reuse of storm water. Some Regional Boards are also considering ways to better coordinate with other regulatory agencies that have authority over hydromodification and stream alteration. Similarly, some State and Regional Water Boards are evaluating their existing regulatory authority over hydromodification and considering ways to strengthen their authority, particularly under section 401 of the Clean Water Act, or as part of Basin Plans.

Management Approaches to Address the Effects of Hydromodification

Hydromodification is best addressed by using a suite of strategies, including site-design, restoration of degraded stream systems, as well as in-stream, on-site control, and regional controls. Managers need to identify the most appropriate set of strategies based on channel type and setting, channel adjustment stage, and amount of existing and anticipated impervious cover in the drainage catchment. However, attempting to have the post-development condition match pre-development runoff magnitude and duration should be an initial consideration for all circumstances.

Management strategies should address not only changes in peak flows but also changes in flow duration and sediment yield. Research to support development of several recent Hydromodification Management Plans indicates that post-project BMPs should ensure no change in runoff volume and cumulative duration of all flows greater than the critical flow for bed or bank mobility. Case studies of three Hydromodification Management Plans/Strategies are provided in Appendix B.

Over the long term, land-use planning, runoff management, as well as channel and floodplain restoration, should be the cornerstones of any hydromodification management strategy. The planning cycle for new development or re-development projects should begin with hydromodification management assessment as part of the preparation of General and Specific Plans, master drainage plans, and zoning designations. Hydromodification effects must be managed with respect to long-term cycles; therefore, strategies should be adaptive. As conditions change and stream channels evolve, the management approaches must be adjusted. However, it is important to recognize that because changes to watershed hydrology are continual; it is unlikely that any management strategy will be able to achieve full hydrologic mitigation. Over the long term, some lasting physical and biological effects should be expected. Management goals should realistically reflect these anticipated changes.

The Center for Watershed Protection, the National Association of Homebuilders, the Water Environment Research Foundation, the Bay Area Stormwater Management Agencies Association, and others have developed resources that land managers can use to guide improved site design. A list of some of these resources is provided in Appendix C.

PRIORITY MANAGEMENT NEEDS

In response to rapidly developing technical tools, regulations, and management goals, workshop participants identified the following management and information priorities:

1. Establish mapping and classification of streams based on their susceptibility to hydromodification effects. Susceptibility should be evaluated with respect to both stream properties, potential for future increases in impervious cover, and concomitant changes in land use practices, such as supplemental irrigation. Such a system would help managers prioritize streams requiring protection and hydromodification management.
2. Model stream systems in ways that are useful for regulators to make decisions. Once models are validated with local data, output should be:
   - Readily understandable and usable by planners and managers
   - Easily interpreted by regulators for development of consistent requirements and evaluation criteria for the specific region
   - Readily used to develop standardized flow control sizing and design tools for BMPs, where applicable
3. Develop a series of management tools that can be easily used to make recommendations or set requirements relative to hydromodification for new development and re-development projects. These tools would utilize the results of monitoring, modeling, and assessment completed under previous projects to develop a series of plots, nomographs, checklists, or similar managerial tools. It is envisioned that ideally, tools should be developed for three different levels of analysis:

   <u>Screening tools</u> – Checklists or similar tools that allow planners and managers to evaluate whether or not a project is likely to involve substantial hydromodification issues.

   <u>Effects tools</u> – For projects that are considered likely to have hydromodification effects based on the results of the screening tool, this tool would serve as a nomograph or series of plots used to evaluate the expected magnitude or intensity of effects associated with a particular project. This tool could also be used to identify projects that should be subjected to subsequent in-depth analysis.

   <u>Mitigation tools</u> – Once the expected magnitude of effects are determined, this tool would be used to guide recommended mitigation and management measures. This tool could be a series of fact sheets, design criteria, and sizing standards to be used to aid in the development of standards or mitigation requirements.
4. Construct metrics and monitoring protocols to measure the effects of hydromodification on biological communities including riparian habitat.
5. Determine standard monitoring protocols for hydromodification effects and facilitate regional information sharing on project performance.
6. Evaluate the relative costs and benefits of hydromodification management at the site level (e.g. low impact development), and at the regional level (e.g. large retention and infiltration facilities). The economic costs of hydromodification have not been well documented, nor have the economic benefits of managing the physical and biological

effects of hydromodification. Information is also needed on the cost to maintain and manage hydromodification BMPs.

7. Establish recommended short-term measures for use while longer-term solutions, such as low-impact development and alternative site design are evolving.

In addition to management and information priorities, several institutional barriers were identified that may hinder effective management of hydromodification effects. Steps to overcome such barriers include:

A. Hydromodification management needs to be part of an integrated multi-objective management strategy. Stream planning and management should integrate hydromodification, water quality, flood control, and habitat management strategies as a whole rather than addressing each issue in isolation. Increased coordination between agencies, departments, and stakeholders should be strongly supported. Specifically, agencies that have authority over hydromodification and stream alteration should work toward coordinating regulatory approaches to achieve greater consistency.

B. Local ordinances need to be revised to facilitate integrating water quality and water quantity management into project design. These ordinances should be flexible enough to allow for variances from standard design requirements, such as curb and gutter and street width parameters, to help reduce impervious cover and increase infiltration.

C. Hydromodification needs to be addressed in both General and Specific Plans in terms of the location and design of new development. Site-by-site or project-specific approaches tend to be less effective and more costly to implement.

D. Better linkage between theory and practice need to be established through case studies, academic research, demonstration projects, and long-term BMPs monitoring.

E. Management of hydromodification needs to be incorporated into regional resource planning efforts, such as the Corps of Engineers Special Area Management Plans (SAMPs) or US Fish and Wildlife Service's Multi-species Habitat Conservation Plans. These regional planning efforts may be effective tools to address cumulative effects of hydromodification at the watershed scale.

F. A more effective public communication and education strategy needs to be developed. Property owners, local businesses, and community groups need to be better educated about the causes and effects of hydromodification in the context of the watersheds where they live and work. Simple definitions of streams and watersheds should be provided as part of the education strategy. Hydromodification effects need to be linked to health, aesthetic, recreational, and economic endpoints. Citizens should be made aware of simple actions, such as redirecting downspouts, using xeriscaping, and installing planter boxes, that help reduce hydromodification effects.

G. An ongoing working group should be established to coordinate research, monitoring, technology transfer, education, and management approach evaluation that includes all stakeholder groups.

CONCLUSIONS AND RECOMMENDATIONS

Presentations and discussions during the two-day hydromodification workshop resulted in the following key conclusions and recommendations:

Conclusions

- Physical degradation of stream channels in semi-arid climates of California may be detectable when basin impervious cover is between 3% and 5%. However, biological effects are probably occurring at lower levels.
- Frequent, 0.5-5 years, small runoff events, are most affected by hydromodification.
- Not all streams will respond in the same manner. Certain management strategies need to account for differences in stream type, stage of channel adjustment, current and expected amount of basin impervious cover, and existing or planned BMPs.
- Management strategies should address effects on flow magnitude, duration, and volume.
- Assessment of potential effects and suitability of possible management approaches must account for decadal scale climatic cycles and associated stream channel response.
- Improved site design is likely to be the most effective hydromodification management strategy and should be incorporated at the planning stage of a project.
- It is unlikely that all the effects of hydromodification can be fully mitigated. Changes in impervious cover will result in some changes to the flow patterns and ecology of the affected stream. Realistic management goals should be established to acknowledge long-term effects of increased impervious cover.

Recommendations

- Integrate management of hydromodification into a multi-objective strategy that addresses hydrology, water quality, flood control, stream ecology, and overall watershed and land use planning.
- Institute interim management measures until runoff management becomes a more standard and accepted element of site design, for example, low impact development principles become commonly accepted and implemented in all site designs.
- Establish and implement a stream channel classification system based on expected vulnerability of different streams to hydromodification-induced change.
- Establish appropriate regional reference conditions should for each stream type based on the established classification system.
- Develop and calibrate dynamic simulation models for local streams. Models that combine continuous hydrologic simulations, physical process models, and risk-based modeling will be the most effective.
- Establish ongoing regional hydromodification monitoring programs. These programs should collect flow and geomorphic data from reference streams, unmitigated streams impacted by hydromodification, and streams subject to hydromodification management measures. Helping to separate natural variability from urban-induced changes in stream condition should be a primary goal of such ongoing monitoring programs.
- Develop indices to assess the biological effects of hydromodification.

- Develop protocols for measuring the economic costs and benefits of hydromodification management. Assemble case studies that document these economic costs and benefits.
- Initiate a hydromodification workgroup to facilitate exchange of ideas and information on technical and managerial approaches.
- Increase public education about what can be done at homes, businesses, and in the community to address hydromodification effects.

LITERATURE CITED

AQUA TERRA Consultants. 2004. *Urbanization and Channel Stability Assessment in the Arroyo Simi Watershed of Ventura County CA*. FINAL REPORT. Prepared for Ventura County Watershed Protection Division, Ventura CA.

Beighley, R.E. and G.E. Moglen, 2002. Trend Assessment in Rainfall-Runoff Behavior in Urbanizing Watersheds. *ASCE Journal of Hydrologic Engineering*, 7(1):27-34.

Beighley, R.E., J.M. Melack, and T. Dunne, 2003. Impacts Of California's Climatic Regimes And Coastal Land Use Change On Streamflow Characteristics. *Journal of the American Water Resources Association*, 39(6):1419-1433.

Beschta, R.L. and W.S. Platts, 1986. Morphological Features of Small Streams: Significance and Function. *Water Resources Bulletin*, 22(3):369-379.

Center for Watershed Protection (CWP). 2003. *Impacts of Impervious Cover on Aquatic Systems*, Ellicott City, MD.

Church, M., 2002. Geomorphic Thresholds In Riverine Landscapes. *Freshwater Biology*, 47(4):541-557.

Coleman, D., C. MacRae, and E.D. Stein, 2005. *Effect of Increases in PeakmFlows and Imperviousness on the Morphology of Southern California Streams. A Report from the Stormwater Monitoring Coalition*. Southern California Coastal Water Research Project Technical Report #450, Westminster, CA.

Cooke, R.U. and R.W. Reeves, 1976. *Arroyos and Environmental Change in the American Southwest*. Oxford University Press, New York, NY.

Donigian, A.S. Jr. and J.T. Love, 2005. The Use of Continuous Watershed Modeling to Address Issues of Urbanization and Channel Stability in Southern California. In *Proceedings of the Environmental and Water Resources Institute World Water and Environmental Resources Congress 2005: Impacts of Global Climate Change*, Walton, R. (Ed.), American Society of Civil Engineers, Anchorage, AK, May 15-19, 2005.

Haltiner, J.P., G.M. Kondolf, and P.B. Williams, 1996. Chapter 11: Restoration Approaches in California. In: Brooks and Shields (eds). *River Channel Restoration*, John Wiley & Sons, New York, NY.

Hollis, G.E., 1975. The Effect of Urbanization on Floods of Different Recurrence Interval. *Water Resources Research*, 11(3): 431-435.

Konrad, C.P. and D.B. Booth, 2005. Hydrologic Changes in Urban Streams and Their Ecological Significance. *American Fisheries Society Symposium*, 47:157-177.

Leopold, L.B., 1968. *Hydrology for Urban Land Planning: A Guidebook on the Hydrologic Effects of Urban Land Use: U.S. Geological Survey Circular 554.* U.S. Geological Survey. Reston, VA.

Montgomery, D.R. and J.M. Buffington, 1993. *Channel Classification, Prediction of Channel Response, and Assessment of Channel Condition*. Report TFW-SI-110-93-002 prepared for the SHAMW committee of the Washington State Timber/Fish/Wildlife Agreement, Seattle, WA.

Montgomery, D.R. and L.H. MacDonald, 2002. Diagnostic Approach to Stream Channel Assessment and Monitoring. *Journal of the American Water Resources Association,* 38(1):1-16.

Paul, M.J. and J.L. Meyer, 2001. Streams in the Urban Landscape. *Annual Review of Ecology and Systematics*, 32:333-365.

Rheinhardt, R.D, M.C. Rheinhardt, M.M. Brinson, and K.E. Faser, 1999. Application of Reference Data for Assessing and Restoring Headwater Ecosystems. *Restoration Ecology*, 7(3):241-251.

Roesner, L.A. and B.P. Bledsoe, 2003. *Physical Effects of Wet Weather Flows on Aquatic Habitats: Present Knowledge and Research Needs*. Water Environment Research Foundation, Report #00-WSM-4. Alexandria, VA.

Rosgen, D.L., 1994. A Classification Of Natural Rivers. *Catena* 22:169-199.

Schumm, S.A., 1963. *A Tentative Classification Of Alluvial River Channels*: U.S. Geological Survey Circular 477.

Schumm, S.A. M.D. Harvey, and C.C. Watson, 1984. *Incised Channels: Morphology, Dynamics, And Control,* Water Resources Publications, Littleton, CO.

Urbonas, B. and L.A. Roesner, 1992. Hydrologic Design for Urban Drainages and Flood Control, In *Handbook of Hydrology* Maidment, D.R. (ed.) McGraw Hill Publishers, New York, NY.

Wolman, M.G. and J.P. Miller, 1960. Magnitude and Frequency of Forces in Geomorphic Processes*; Journal of Geology*, 68(1):54-74.

APPENDIX A – WORKSHOP AGENDA

HYDROMODIFICATION WORKSHOP AGENDA – October 2-3, 2005

SUNDAY EVENING, INVITED SESSION

5:00- 5:15 **Welcome and Introductions** – Eric Stein (Chair), *Southern California Coastal Water Research Project*

5:15 – 5:30 **Regulatory Perspective** – John Robertus, *San Diego Regional Water Quality Control Board*

5:30 – 6:30 ***Status of Science on Evaluating/Studying Hydromodification*** (panel discussion)

- Jeff Haltiner, *Philip Williams and Associates*
- Gary Palhegyi, *Geosytec Consultants*
- Craig MacCrae, *Aquafor Beech*
- Brian Bledsoe, *Colorado State University*
- Derek Booth, *University of Washington*

7:30 – 8:30 **Dinner and Open Discussion of Data Gaps and Areas for Future Research**

MONDAY, OPEN SESSION

8:30 – 8:40 **Welcome and Opening Remarks** – Chris Crompton (Chair), *SMC*

8:40 – 9:15 **Introduction to Hydromodification** – Jeff Haltiner, *Philip Williams and Associates*

9:15 – 10:15 ***Why is Hydromodification Such a Big Deal?*** (mini-panel discussion)

- Policy Perspective – Susan Cloke, *Los Angeles Regional Water Quality Control Board*
- Regulatory Perspective – John Robertus, *San Diego Regional Water Quality Control Board*
- Homebuilders Perspective – Marolyn Parson, *National Association of Home Builders*
- Natural Resource Perspective – Shelley Luce, *Santa Monica Bay Restoration Commission*

10:15 – 10:30 **Break ~**

10:30 – 12:30 **Hydromodification Research and Studies**

- Risk-Based Channel Stability Analysis for Urbanizing Watersheds – Brian Bledsoe, *Colorado State University*
- Changes in Streamflow Patterns from Urbanization: A Humid-Region Perspective – Derek Booth, *University of Washington*
- Modeling Urbanization Impacts and Channel Stability in Ventura County – Tony Donigian, *AQUA TERRA Consultants*
- Southern California Peak Flow study results and conclusions – Craig MacRae, *Aquafor Beech*
- Santa Clara Valley HMP Studies- Gary Palhegyi, *GeoSyntec Consultants*

12:30 – 1:30 **Lunch ~**

1:30 – 2:15 **Regulatory Response to Hydromodification**

- Northern California Perspectives – Larry Kolb, *San Francisco Bay Regional Water Quality Control Board*
- Southern California Perspectives – Xavier Swamikannu, *Los Angeles Regional Water Quality Control Board*

2:15 – 3:30 **Implementation of Hydromodification Management Practices**

- Contra Costa County – Dan Cloak, *Dan Cloak Consulting (for Contra Costa County)*
- Santa Clara Valley – Jill Bicknell, *Santa Clara Valley Urban Runoff Program*
- Newhall Land and Farming– Mark Subbotin, *Newhall Land and Farming Company*
- Control of Hydromodification Through Land Planning – Laura Coley-Eisenberg, *Rancho Mission Viejo*

3:30 – 4:30 **Panel Discussion on Implementation Issues –** Facilitated by Matt Yeager, *San Bernardino County Flood Control District*

- Rene DeShazo, *Los Angeles Regional Water Quality Control Board*
- Mark Abramson, *Heal the Bay*
- Marolyn Parson, *National Association of Home Builders*
- Jeff Haltiner, *Philip Williams and Associates*
- Jill Bicknell, *Santa Clara Valley Urban Runoff Program*

MONDAY EVENING, INVITED SESSION

5:30 – 6:00 **Welcome & Summary of Open Session** – Matt Yeager, *San Bernardino County Flood Control District*

6:00 – 7:00 **Dinner ~**

7:00 – 8:00 **Key Needs of Managers for Addressing Hydromodification** (panel discussion)

- Jeff Pratt, *Ventura County Watershed Protection District*
- Bill DePoto, *Los Angeles County Dept. of Public Works*
- Aaron Allen, *US Army Corps of Engineers - Regulatory Branch*
- Laura Coley-Eisenberg, *Rancho Mission Viejo*
- Jon Bishop, *Los Angeles Regional Water Quality Control Board*
- Rebecca Drayse, *TreePeople*

8:00 – 8:30 **General Conclusions and Outline for Workshop Report**

APPENDIX B – CASE STUDIES

Case Study 1 – Contra Costa County

Contra Costa County's Hydromodification Management Plan was developed in response to the National Pollutant Discharge Elimination System (NPDES) permit requirements from the San Francisco Bay Regional Water Quality Control Board. The goal of this Hydro-modification Management Plan (HMP) is to protect urban watersheds from ongoing hydro-modification by applying these requirements to development projects that are greater than or equal to 1 acre. They assist applicants to comply by providing designs and sizing factors. Permit conditions require municipalities to propose a plan to manage increases in flow and volume where increases could:

- Increase erosion
- Generate silt pollution
- Impact beneficial uses

The goal of these plans is to ensure that post-project runoff does not exceed pre-project rates and durations. Contra Costa's plan encourages Low Impact Development Integrated Management Practices (LID IMPs) and allows proposals for stream restoration in lieu of flow control where benefits clearly outweigh potential impacts. The plan includes four options for compliance:

1. Demonstrate project will not increase directly connected impervious area
2. Implement pre-designed hydrograph modification IMPs
3. Use a continuous simulation model to compare post- to pre-project flows
4. Demonstrate increased flows will not accelerate stream erosion

Management approaches are selected according to risk:

- Low risk = channelized systems
- Medium risk = channels in substrates with high bed and bank resistance
- High risk = all other channels

Project proponents need to develop a comprehensive analysis of management options for all high risk channels.

Case Study 2 – Santa Clara Valley

The Santa Clara Valley Urban Runoff Pollution Prevention Program's (SCVURPPP's) NPDES permit requires that increases in runoff peak flow, volume, and duration shall be managed for all projects involving one or more acres of impervious cover, where increased flow and/or volume can cause increased erosion of creek beds and banks. SCVURPPP's overall approach to creating a HMP was to conduct geomorphic and hydrologic assessments of three representative watersheds in the valley, conduct channel stability analyses to establish thresholds for hydromodification control, develop design criteria for flow control measures, and provide guidance for best management practice implementation[3].

The performance criteria in the HMP state that post-project runoff shall not exceed estimated pre-project rates and/or durations, where the increased storm water discharge rates and/or durations will result in increased potential for erosion. Projects shall not cause an increase in Ep of the receiving stream over the pre-project (existing) condition. Furthermore, the Ep value should not be increased at any point downstream of the project. These requirements can be met with a combination of on-site and off-site control measures.

On-site controls should be designed to match flow-duration curves of post-development conditions to pre-development conditions for all flows between 10% of the 2-year peak flow and the 10-year peak flow. Example sizing of flow-duration basins are shown in Table B-1. Management measures are considered "practicable" if construction cost of treatment plus flow controls is less than or equal to 2% of project cost, excluding land value.

Table B-1: Basin Sizing Case Studies from the Santa Clara Valley Urban Runoff Program Hydromodification Management Plan (SCVURPPP Final HMP Report, 2005).

	Thompson	San Jose	Alameda
Basin Depth	4 feet	2.25 feet	2 feet
Basin Area	30 acres	0.06 acre	0.8 acre
Basin Size % DCIA	5.7% (4% catchment)	3.7% (1.7% catchment)	10% (7% catchment)
Drain Time	3 days (90% of the time)	< 1 day	1 day
Q_{cp} (low flow)	2.4 cfs	0.1 cfs	0.25 cfs
Infiltration Rate (rainfall)	0.2 inch/hour	0.2 inch/hour	0.5 inch/hour
Infiltration Rate (flow)	5.5 cfs	0.012 cfs	--

*cfs = cubic feet per second

This hydromodification management plan lays out on-site and in-stream options. Projects in highly urbanized areas with more than 90 % build out and a large percentage of impervious cover are exempt. Additional information on this program is available at www.SCVURPPP.org.

Case Study 3 – Newhall Land

Newhall Ranch is a specific plan approved for 26,000 homes in the Santa Clara watershed. Runoff from the proposed new development will be addressed by a Natural River Management Plan and a Newhall Ranch Stormwater Plan developed by the land owner.

[3] The Final HMP Report (April 2005) is available at http://www.eoainc.com/hmp_final_draft

The Natural River Management Plan is a long-term (20-year) master plan that provides for the construction of various infrastructure improvements to the Santa Clara River and tributaries. The plan maintains 15 miles of the Santa Clara River and its tributaries in a natural state with 75- to 200-foot setbacks from the river that sustains habitat quality and meets requirements for flood control. The plan calls for buried bank stabilization, instead of hardened systems, to meet county flood protection requirements and maintain habitat functions in riparian areas. Trenches have been dug far up from the streambed, filled with a compound called "sand cement" – similar to sandstone, then topped with soil, and replanted with native plant species.

The Newhall Ranch Stormwater Plan is a regional approach to storm water management that incorporates both water quality treatment and hydromodification control. The goals of this plan include:

- Reduction in percentage of impervious cover in the upper watershed using cluster design of development and maximizing open space
- Utilization of BMPs for both water quality and hydromodification source control
- Design of in-stream solutions that protect or enhance habitat.
- Incorporation of the "avoidance, minimization, mitigation" hierarchy in plan development

Case Study 4 – Rancho Mission Viejo

Rancho Mission Viejo, a private landowner, has voluntarily developed a set of land planning principles as part of a comprehensive land-use planning and resource management program for 25,000 acres in Orange County California. These planning principles will serve as self-imposed requirements, intended to minimize the effects of future development on natural streams in planning areas. Using these principles, the landowners are proposing to focus development on ridges, which are underlain by less pervious material, thereby preserving valleys which contain pervious areas that support infiltration important to creek functions.

Planning Principles:

<u>Geomorphology/Terrains</u>

- Recognize and account for the hydrologic response of different terrains at the sub-basin and watershed scale

<u>Hydrology</u>

- Emulate, to the extent feasible, the existing runoff and infiltration patterns in consideration of specific terrains, soil types, and ground cover
- Address potential effects of future land use changes on hydrology
- Minimize alterations of the timing of peak flows of each sub-basin relative to the mainstem creeks
- Maintain and/or restore the inherent geomorphic structure of major tributaries and their floodplains

<u>Sediment Sources, Storage, and Transport</u>

- Maintain coarse sediment yields, storage and transport processes

Groundwater Hydrology

- Utilize infiltration properties of sandy terrains for groundwater recharge and to offset potential increases in surface runoff and adverse effects to water quality
- Protect existing groundwater recharge areas supporting slope wetlands and riparian zones and maximize alluvial groundwater recharge to the extent consistent with aquifer capacity and habitat management goals

Water Quality

- Protect water quality using a variety of strategies, with particular emphasis on natural treatment systems, water quality wetlands, swales, and infiltration areas

APPENDIX C – ADDITIONAL RESOURCES

BASMAA's Start at the Source: Design Guidance Manual for Stormwater Quality Protection, 1999. Prepared by Tom Richman & Associates and CDM. Available from www.basmaa.org .

BASMAA's Using Site Design Techniques to Meet Development Standards for Stormwater Quality: A Companion Document to Start at the Source, 2003. Prepared by CDM. Available from www.basmaa.org

Better Site Design: A Handbook for Changing Development Rules in Your Community
Available for $35.00 from the Center for Watershed Protection at www.cwp.org, under the "Publications" tab.

Redevelopment Roundtable, Consensus Agreement, Smart Practices for Redevelopment and Infill Projects.
Available for free download from the Center for Watershed Protection at www.cwp.org, under the "Publications" tab; it is listed with the "Better Site Design" publications.

Builders for the Bay Program
Information about this program, which is joint project of the Alliance for the Chesapeake Bay, the Center for Watershed Protection and the National Association of Home Builders, can be found at http://www.cwp.org/builders_for_bay.htm.

The Practice of Low Impact Development
Available for $5.00 from the U.S. Department of Housing and Urban Development, at http://www.huduser.org/publications/alpha/alpha.html. It is also available for $50.00 from the NAHB Research Center's bookstore at www.nahbrc.org.

National Association of Homebuilders Research Center
"Builder's Guide to Low Impact Development" and "Municipal Guide to Low Impact Development". Available for free download from
http://www.toolbase.org/tertiaryT.asp?TrackID=&CategoryID=36&DocumentID=3834

"Growing Greener: Putting Conservation into Local Codes". Available for free download from http://www.dcnr.state.pa.us/growinggreener/growinggreener.htm.

Low-Impact Development Design Strategies: An Integrated Approach; Low-Impact Development Hydrologic Analysis
Both are available for free download from US Environmental Protection Agency's website at http://www.epa.gov/owow/nps/lid/.

Truckee Meadows Structural Control Design Manual: Guidance on Source and Treatment Controls for Storm Water Quality Management - Kennedy/Jenks Consultants
http://ci.reno.nv.us/gov/pub_works/stormwater/management/controls/pdfs/TOC.pdf

National NEMO (Non Point Education for Municipal Officials) Network - Educational Materials on the link between land use and water quality
http://nemonet.uconn.edu/

Physical Effects of Wet Weather Flows on Aquatic Habitats: Present Knowledge and Research Needs , by L.A. Roesner and B.P. Bledsoe – Water Environment Research Foundation, 2003.
http://www.werf.org

Impacts of Impervious Cover on Aquatic Systems – Center for Watershed Protection, 2003.
http://www.cwp.org/

Appendix F
Information Data Gathering Needs*

PCGP Topic	Information Needs
Technology-based Numeric Action Levels	• Rainfall pH ranges in California that would be necessary for setting a numeric action level. • Ambient pH ranges for receiving waters for storm and dry weather conditions in California • Additional justification for development of action levels for TPH—namely, existing data showing impairment or (at a minimum) non-compliance issue related to TPH and existing water quality standards.
Technology-based Numeric Effluent Limitations	• Scientific justification for setting pH NEL including data and statistical methods used to set NEL. • Rainfall pH ranges in California that would be necessary for setting a numeric action level. • Ambient pH ranges for receiving waters for storm and dry weather conditions in California.
Risk-based Permitting Approach	• Extent of soil types and areas with greater than 10% fines in California. • Justification for validity of the 10% fines criteria; evaluate other thresholds. • Use of the "T" factor used in Attachment F and its applicability, if any, for use in evaluating construction site erosion potential. • Scientific validity of using the RUSLE/MUSLE equations to correlate predicted runoff TSS with receiving water turbidity.

*The list below is not exhaustive. Additional data needs and information needs are discussed throughout CBIA's comments on the PCGP.

PCGP Topic	Information Needs
Minimum Requirements Specified	• Justification for sediment basin design requirements/sizing to provide guidelines that optimize basin effectiveness and improve performance of traditional sediment basins.
Project Site Soil Characteristics Monitoring and Reporting	• Natural levels of contaminants in soils—consider conducting a statewide sampling program for characterizing natural levels of soil pollutant concentrations such as lead, copper, cadmium, and zinc for use in setting action levels.
Active Treatment System (ATS) or Specific Source Control Requirements	• Ecological role of sediment in California. • Typical natural loads in various area or types of areas. • Typical sources of sediment besides construction and their relative contribution to sediment in streams. • Distribution of sediment grain sizes in California stream systems (i.e. fines v. coarser grained sediments). • Under what conditions clear water is needed during precipitation events. • Effects of storm water that is “too clean” (e.g., downstream erosion, loss of beach replenishment). • Impact on stream biota caused by changing turbidity during storm runoff. • Turbidity of major rivers during storm conditions and dry weather flows. • Availability of ATS and operators in California. • Cost ranges of using ATS in California given the different rainfall amounts throughout the state. • Number of labs in California that have the ability to complete toxicity tests required of ATS.
New and Re-development Performance Standards for Hydromodification Impacts	• Actual extent and cause of channel destabilization problems in CA. • Determination of what stream systems are at risk for hydromodification impacts in California.

PCGP Topic	Information Needs
Rain Event Action Plan	• Range of rainfall intensities and storm volumes that mobilize sediments. • Technical justification for using the 10-yr, 24 hour storm event and its relationship to site “risk”. • Frequency with which a 30% POP produces rain and how much rainfall actually was recorded.

APPENDIX G

NAUTILUS ENVIRONMENTAL REPORT

Nautilus Environmental

April 16, 2007

Mr. Wayne Rosenbaum
Foley Lardner LLP
402 W. Broadway, Suite 2100
San Diego, CA 92101

Re: Draft NPDES permit: toxicological monitoring requirements for stormwater at construction sites employing Active Treatment Systems

Dear Mr. Rosenbaum:

The following are comments provided by James Elphick and Dr. Howard Bailey of Nautilus Environmental on the proposed toxicity testing requirements for regulation of Active Treatment Systems to control turbidity under the Draft General NPDES permit for stormwater discharges associated with construction activities. The comments are focused primarily on application of chitosan-based treatment systems.

Proposed permit conditions relating to toxicity testing

The Draft Permit indicates that Active Control System technologies must be employed at construction sites to control turbidity associated with suspended particulate under some conditions, and that toxicity testing be conducted in order to measure whether there is acute or chronic toxicity in the discharge when Active Control Systems are employed.

The permit requires that the site have sufficient capacity to contain water from a 48-hr period of runoff. The duration of acute and chronic toxicity tests identified in the permit range between four and seven days. Consequently, it may not be possible to test a stormwater sample and ensure that it does not exhibit toxicity prior to discharge if the sites only have sufficient capacity to store stormwater for a 48 hr period. Thus, it appears that the permit, as currently written, may result in situations where discharge occurs prior to obtaining results from toxicity tests.

Monitoring stormwater for toxicity in order to control the potential for residual treatment chemical may also result in confounding results due to the presence of other contaminants in the stormwater which are unrelated to application of the Active Control System.

Chitosan treatment for turbidity control

Chitosan products are manufactured by partial deacetylation of chitin, obtained from exoskeletons of crustaceans such as shrimp and crabs. Amino groups on the chitosan molecular structure are positively charged at neutral pH, resulting in affinity of the molecule for negatively charged moieties. It is this charge that makes chitosan effective at controlling turbidity associated with negatively charged particulate, such as clay.

Environmental risk associated with chitosan is related primarily to the potential for overdosing or spills. If applied appropriately, chitosan should interact with suspended solids and be removed from solution with the solids by settling or sand filtration. The ideal dose rate of chitosan is likely to be a function of the suspended sediment load (e.g., as measured by turbidity) and the average charge or other characteristics of the particulate. Thus, soil type is likely to affect both the required dosing and the potential for residual chitosan after treatment.

Chitosan is typically non-homogenous, with the structure dependent on the source of the chitin (e.g., crab or shrimp shells), the average length of the chitin chains and the degree of deacetylation applied during manufacture. Consequently, different products may or may not behave similarly with respect to toxicity, depending on the similarity of manufacturing, source of chitin, and so on. Available data are currently insufficient to determine if these variables result in a substantial variation in the toxicity of this chemical from different sources.

Approach to regulation in Washington State

The Washington State Department of Ecology has implemented guidelines to evaluate the environmental safety of treatment chemicals used to control suspended particulate at construction sites. The approach taken by the State has involved evaluations of treatment technologies in order to determine their environmental safety, and has required that a number of toxicity tests be conducted using treatment chemicals to establish the most sensitive end-point and the toxic threshold for the treatment chemical. These data have then been compared with application rates and concentrations of residual chemical to establish the environmental safety associated with treatment.

There are currently two treatment systems involving discharge to surface waters that have been approved for conditional use in Washington, both of which involve use of chitosan acetate as a flocculent, followed by enhanced sand filtration. The State is satisfied that the treatment systems, when applied according to the specified application rates and procedures outlined in the Conditional Use Level Designation (CULD) will not result in residual toxicity in discharges to surface waters (Randall Marshall, Washington Department of Ecology, pers. comm.). There are currently no approved methods which do not involve a sand filtration step.

Analytical procedures available for application in the field appear to be limited to a "presence/absence" test. The CULD documentation for these products have indicated that development of analytical methodology would be beneficial.

Please feel free to contact me at marilyn@nautilusenvironmental.com or 858.587.7008 should you have any questions regarding these comments.

Yours truly,

Marilyn O'Neill
Founder & CEO
Nautilus Environmental

APPENDIX H

FUSCOE ENGINEERING REPORT

TECHNICAL MEMORANDUM

Preliminary Draft NPDES Permit for Construction Activities

PREPARED FOR: Mary Lynn Coffee, Nossaman, Guthner, Nox & Elliott, LLP

PREPARED BY: Ian Adam, Fuscoe Engineering, Inc.

DATE: May 4, 2007

This technical memorandum has been prepared to provide comments specific to Sections IX.K.2 and IX.K.3 of the Preliminary Draft NPDES Permit for Construction Activities, issued by the State Water Resources Control Board on March 2, 2007. In general, Sections IX.K.2 and IX.K.3 require the preservation of pre-construction drainage divides and times of concentration for the post-construction conditions.

In typical development projects, including sites larger than 2 acres and sites larger than 50 acres, drainage is generally directed to the low point(s) of the project site consistent with the natural topographic relief of the land. Within the grading footprint of the project, internal drainage divides are often subject to change from the pre-development condition to meet local and regional flood control and drainage design standards, as well as allow for the proper distribution of high flows and low flows to protect existing floodways from erosion and localized flooding at the downstream end. In addition, internal drainage divides are often changed in order to convey flows to other features that assist in controlling the time of concentration, peak flow rate, and/or water quality requirements. Examples of these features include natural drainage systems such as swales, wetlands, water quality basins, rain gardens, infiltration areas and permeable pavement, as well as other sustainable development features. Further modifications may also be made to divert all or a portion of flows to a larger regional treatment system that may accept flows from more than one project site for treatment and/or flood control purposes in protecting the downstream receiving waters. Although low flows may be diverted from the primary drainage path to these features, higher flows will typically remain in the primary drainage pathway and discharge location, and the diverted flows would either return to the main drainage line or remain within the feature to support habitat and infiltrate into the soil.

For projects where the discharge point must be altered, additional stabilization and protection measures are implemented to minimize erosion and scour, as well as to ensure the receiving water has adequate capacity to accept the altered flows in accordance with current local agency flood control requirements. Where capacity is insufficient, additional measures must be taken to control the time of concentration and/or volume of runoff to the receiving water.

The requirement to preserve all pre-development drainage divides under the post-development condition is inconsistent with existing design standards and other existing regulatory requirements such as the requirements for low-flow water quality treatment BMPs and habitat creation and/or restoration opportunities. The ability to manipulate the internal drainage divides within a property allows for the creation of local habitat and water quality areas supported by low flow drainage diversions and the separation of high (i.e. large storm events) storm flows directed towards larger or more regional storm drain facilities. If all existing drainage divides must be preserved, an excessive burden may be placed on new developments, and may restrict the construction of wetlands, restored habitat areas, sustainable development features, as well as other natural drainage features that provide additional benefits to water quality and habitat.