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California State Board of Forestry and Fire Protection

Monitoring Study Group **STRATEGIC PLAN**



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TABLE OF CONTENTS

History/Background Information on the Monitoring Study Group	1
Current Vision for the MSG in Relation to the BOF	6
MSG Mission/Vision Statement.....	8
MSG Accomplishments.....	8
Changes in Regulations Affecting Monitoring in California.....	12
MSG Work in Relation to Other Monitoring Efforts in California.....	14
Summary of MSG Monitoring Results to Date in California.....	17
Suggested Monitoring Study Group Approach	19
Revised Monitoring Study Group Goals	20
References.....	23
Appendix: List of Monitoring Reports Produced from 1991 through 2006	
Appendix A. MSG Reports and Products (chronological)	25
Appendix B. Additional Papers and Reports from CDF-Funded Monitoring Projects.....	29
Appendix C. Brief Description of Science Review Team Concept.....	31

Cover photographs, clockwise from top left: (1) Hillslope Monitoring Program contractors Roger Poff and Cliff Kennedy collecting field data; (2) CDF's Watershed Specialist Clay Brandow collecting Modified Completion Report monitoring data on a Sierra Nevada THP; (3) Booms for continuous turbidity measurement in the Mill Creek tributary of the Garcia River watershed (photo provided by Ms. Teri Jo Barber, Ridge to River); and (4) the North Fork weir in the Caspar Creek watershed (photo provided by the USFS—Pacific Southwest Research Station, Redwood Sciences Laboratory).

HISTORY/BACKGROUND INFORMATION ON THE MONITORING STUDY GROUP

Monitoring of forestry practices in California has historically related to protection of water quality, since many of the rules developed by the Board of Forestry and Fire Protection (BOF) after passage of the Forest Practice Act in 1973 are focused on water quality protection. In 1983, the BOF passed watercourse protection rules specifying mitigation measures keyed to the beneficial uses of water. The State Water Resources Control Board (SWRCB) conditionally certified the Forest Practice Rules (FPRs) and review process as meeting Best Management Practices standards for Section 208 of the Federal Clean Water Act in 1984.

As a condition of Water Board certification, a monitoring and assessment program was required to be implemented. Due to funding constraints, a one-year qualitative assessment of forest practices was undertaken in 1986 by a team of four resource professionals (Johnson 1993). This effort included evaluation of 100 Timber Harvesting Plans (THPs) located throughout the state and completion of the “208 Report,” which found that the rules generally were effective when properly implemented on terrain that was not highly sensitive (SWRCB 1987).

In 1988, the BOF, California Department of Forestry and Fire Protection (CDF), and the SWRCB entered into a Management Agency Agreement (MAA) that required the BOF to improve forest practice regulations for better protection of water quality, largely based on needs described in the “208 Report.” At this point, the SWRCB approved certification. The U.S. Environmental Protection Agency (US EPA), however, withheld certification until the conditions of the MAA were satisfied, one of which was to develop a long-term monitoring program. The Monitoring Study Group (MSG) was created by the BOF to develop this program.

From 1989 to 1999, the MSG was an “ad hoc” committee of the BOF which met periodically to: (1) develop and implement a long-term program testing the effectiveness of the Forest Practice Rules, and (2) provide guidance to CDF in implementing the program. The overall goal of the MSG’s monitoring program was, and continues to be, to provide timely information on the implementation and effectiveness of forest practices related to water quality that can be used by forest managers, agencies, and the public in California. The MSG in the 1990’s was made up of a core group of approximately 15 individuals representing different state and federal agencies, the timber industry and the public. The MSG was, and continues to be, chaired by a BOF member and staffed by CDF. The only appointed member to the committee is the chair. Meetings were not open to the public from 1989 to 1999 (i.e., they were not officially noticed by the BOF), but selected members of the public were invited to participate.

At the July 1999 BOF meeting, the Board agreed that it was appropriate to upgrade the MSG to a Board of Forestry and Fire Protection Standing Committee.¹ Elevation of the MSG to a Standing Committee was expected to generate greater acceptance of the

¹ The other BOF Standing Committees are the Forest Pest Council, the Range Management Advisory Committee (RMAC), and the Professional Foresters Examining Committee (PFEC).

MSG's long-term monitoring program and its monitoring results—since it was anticipated that there would be a higher likelihood that all or most of the agencies and organizations would be active participants. Since that time, the MSG has continued to be made up of members of the public, resource agencies, and the timber industry, and meetings are publicly noticed. The only appointed member to the committee continues to be the chair. Each agency and organization has been responsible for determining the appropriate person to serve as its representative on the MSG (i.e., the BOF has not made formal appointments to the MSG).

MSG meetings have been held in several different locations from 1990 to 2006. Through 1996, the meetings were nearly always held in Sacramento. From 1997 through 2002, almost all of the meetings were held at CDF's Mendocino Unit Headquarters near Willits (known as Howard Forest). From 2003 to the present, the meetings have mainly been held either in the Willits area or Redding, with occasional field meetings (Figure 1, Table 1). MSG meetings are currently being held in different locations throughout the state (rotating from the North Coast, northern Sacramento Valley, and Sacramento), so that travel is shared equally among MSG members. Additionally, since 2005, there have been tele-conferencing arrangements made at nearly all of the meetings (i.e., speaker phones with call-in number and handouts circulated with the agenda). Since 2000, five MSG meetings have been held per year.

All relevant organizations have been invited to attend the meetings and, since 2000, these gatherings have been described as an open public forum to discuss monitoring being conducted by CDF, the timber industry, and others. Some agencies and organizations have provided excellent participation, while others have provided very little participation over the past six years. Attendance at meetings has varied greatly (ranging from about 15 to 40), with widely varying participation (i.e., representatives from some agencies have been consistent, while representatives from other agencies and organizations have varied from meeting to meeting).

The MSG has continued to provide guidance to CDF on developing and implementing monitoring projects. Recommendations to the BOF based on hillslope monitoring results have been made in 2003 and 2006, but overall, relatively few direct recommendations for the Board have been produced by the MSG. Over 40 MSG reports or other partially funded monitoring-related products have been produced in the past 15 years (see Appendix A), many of which have been posted on the MSG's website (http://www.bof.fire.ca.gov/board/msg_geninfo.asp).

When specific monitoring-related topics have required more focused attention, MSG subcommittees have been formed to complete the required tasks. Subcommittees have been formed over the past 15 years to address:

- Class III watercourse monitoring
- Reference watersheds
- THP-scale instream effectiveness monitoring
- Development of the Interagency Mitigation Monitoring Program (IMMP)

Figure 1. Photographs from three recent Monitoring Study Group meetings. Clockwise from the left: (1) Meeting held at CDF's Mendocino Unit Headquarters (Howard Forest) on September 16, 2004 [showing John Munn, CDF; Tom Spittler, CGS; Pete Cafferata, CDF, Tharon O'Dell (BOF); and guest speaker Dr. Matt O'Connor, O'Connor Environmental; photo provided by Clay Brandow, CDF], (2) Field meeting held on May 19, 2004 to observe watercourse crossings in Mendocino County [John Griffen, CDF (retired), providing historical context for a culverted crossing on Jackson Demonstration State Forest, photo provided by Brad Valentine, DFG]; (3) Field meeting held on March 14, 2006 at Swanton Pacific Ranch [Dr. Brian Dietterick, Cal Poly SLO, explaining how the North Fork Little Creek monitoring station operates to MSG participants].



Table 1. List of Monitoring Study Group meetings held from 1994 through mid-2006.			
Year/Date	Key Selected Topics	Location	Key Documents
2006			
7-Sep	UC Crossing Upgrade PPT; SF Wages Cr PPT	Willits	Harris crossing upgrade paper; Benda SF Wages sediment budget
23-May	Sediment Production from Forest Roads PPT	Redding	Coe Masters Thesis from Colorado State University on road sediment
14-Mar	Swanton Pacific Ranch Little Creek basin tour	Davenport	Little Creek Watershed Study Contract (Cal Poly and CDF)
24-Jan	CVRWQCB Waiver Monitoring, MCR final report	Redding	CVRWQCB Waiver Documents; MCR final report (Brandow and others)
2005			
29-Nov	Threatened and Impaired WS Rules discussion	Willits	BOF Threatened and Impaired Watersheds Rule Package
22-Sep	Review of MSG Strategic Plan; IMMP PPT	Redding	Jan 2000 MSG Group Strategic Plan; IMMP Gen. Framework Doc.
7-Jul	Harris Fragmentation Effects on Water Quality PPT	Redding	Harris PPT on Fragmentation Impacts on water quality
7-Apr	CDF/MSG Modified Completion Report results	Willits	Modified Completion Report Draft Final Report (posted)
2-Feb	French Creek Monitoring Project PPT, IMMP	Redding	Sommarstrom's French Cr monitoring study PPT (posted)
2004			
10-Nov	Garcia River and Judd Creek Study PPTs	Willits	Garcia River Final Report (2005), Judd Cr Study Plan (posted)
16-Sep	O'Connor PPTs on Class IIIs, McNeil samples	Willits	O'Connor papers in Redwood Region Symposium USFS-PSW GTR
19-May	Crossings observed in field (JDSF, CTM, MRC)	Mendocino Co.	Crossing photos from field trip posted with meeting minutes
25-Mar	Crane Mills Thomes IWMA, Benda wood budget	Redding	Barron Thomes Cr PPT; Benda CTM wood budget report (posted)
22-Jan	Madej/Cummins stream health; Hunsaker-KREW	Willits	Madej inorganic sediment paper (posted); Hunsaker and Eagan paper
2003			
16-Oct	Sullivan PPT on grab sampling/sediment sources	Willits	Sullivan PPT on grab sampling to locate sediment source areas
14-Aug	Klein Upper Mattole crossing removal monitoring	Arcata	Klein (2003) Sanctuary Forest, Inc Upper Mattole Report (posted)
17-Jun	MacDonald PPT CWEs; Flanagan PPT crossings	Redding	MacDonald and others (2004); Flanagan crossing failure PPT (posted)
21-Apr	Sullivan PPT on PALCO sediment monitoring	Willits	Sullivan PPT--PALCO lessons learned regarding sediment monitoring
11-Feb	O'Connor PALCO sed budget; Bawcom landslide	Willits	Freshwater Creek Watershed Analysis; Even-age unit landslide paper
2002			
13-Nov	Madej stream health; Wages Creek; HMP report	Willits	Madej final report; SF Wages Cr study plan (posted); HMP 2002 report
17-Sep	James, Benda, Hannaford--Judd Creek studies	Willits	James 2003 Southern Exposure PhD dissertation (UC Berkeley)
11-Jun	Levesque wood budget work; Wages Creek study	Willits	Benda CTM wood budget study (posted), GMA SF Wages study plan
23-Apr	GMA SF Ten Mile monitoring; Mill Cr fish studies	Willits	GMA Ten Mile monitoring results; Mill Creek Fish Studies PPT
19-Feb	Reference WS catalog; Kocher DFG monitoring	Willits	Reference watershed catalog; Harris and others DFG protocols
2001			
11-Dec	Diller Simpson aquatic monitoring; HMP results	Willits	Simpson/GDRCO Aquatic HCP; Caferata and Munn 2002 HMP report
22-Oct	CDF-FRAP EMDS/NCWAP; Spittler SHALSTAB	Willits	NCWAP Redwood Creek, Mattole River, Gualala River Final Reports
19-Jul	Poff HMP; Lewis TTS PPT; Madej stream health	Willits	HMP 2002 report; Lewis and Eads TTS papers; Madej (2005) [posted]
17-May	Ref. WS catalog; Dudik NCWAP; James SPI	Willits	Ref. WS catalog website; NCWAP reports; SPI monitoring website
23-Jan	THP-scale monitoring; MCR monitoring program	Willits	MOU Monitoring Workgroup final report; MCR Final Report (2006)

Table 1. List of Monitoring Study Group meetings held from 1994 through mid-2006 (continued).			
Year/Date	Key Selected Topics	Location	Key Documents
2000			
14-Nov	Landslide study proposal; Redwood Cr monitoring	Willits	Bawcom JDSF landslide study (2003); RCLA monitoring reports
26-Sep	MCR monitoring development; Poff HMP update	Willits	MCR final report (2006); HMP final report (2002)
25-Jul	WEMA monitoring input to BOF; MCR field test	Willits	BOF WEMP Rule Package; MCR final report (2006)
29-Jun	Barber Garcia instream monitoring; HMP/MCR	Willits	Maahs and Barber (2001) Garcia Report (posted); HMP/MCR reports
24-Feb	MCR development; Garcia Instream reports	Willits	MCR final report (2006); O'Connor (2000), McBain and Trush (2001)
1999			
4-Nov	MSG Strategic Plan; MCR development	Sacramento	MSG Strategic Plan (2000); MCR final report (2006)
12-Jul	MSG Ad Hoc--Standing Committee; PALCO HCP	Willits	MSG Strategic Plan (2000); PALCO HCP document
11-Mar	HMP query results; Maahs Garcia monitoring	Willits	HMP (2002); Maahs and Barber (2001) Garcia Final Report (posted)
1998			
8-Oct	HMP update; HMP QA/QC project; other updates	Sacramento	HMP (2002); Daus and Parenti HMP QA/QC final products
26-Aug	HMP query results; Maahs Garcia monitoring	Fortuna	HMP (2002); Maahs and Barber (2001) Garcia Final Report (posted)
1997			
12-Dec	HMP (1996/1997); Euphrat Garcia monitoring plan	Willits	HMP interim report (1999); Euphrat et al. (1997) Garcia Monitoring Plan
25-Jun	HMP 1996 results; Watershed Academy	Willits	HMP interim report (1999); Watershed Academy training materials
29-Jan	Lee PMP report; HMP and other project updates	Willits	Lee (1997) PMP final report (posted); HMP interim report (1999)
1996			
24-Jul	Garcia River restoration/TMDL/monitoring	Ukiah	Garcia TMDL document; Euphrat et al. (1997) Garcia Monitoring Plan
11-Apr	Lee PMP report; various monitoring projects	Santa Rosa	Lee (1997) PMP final report; DFG (1997) Instream Monitoring Report
27-Feb	Demonstration Watershed Concept; 1996 HMP	Sacramento	HMP interim report (1999); Mendocino and Humboldt RCD contracts
8-Feb	Lee PMP report; Erman PMP report	Sacramento	Lee (1997) PMP final report; Erman (1996) PMP final report
11-Jan	PMP reports, First-year HMP project	Sacramento	Lee (1997), HMP interim report (1999)
1995			
29-Mar	Hillslope, Instream and Geologic PMP work	Sacramento	Tuttle (1995) Hillslope; Rae (1995) Instream; Spittler (1995) PMP repts
4-Jan	Lee Long-Term Monitoring Program issue paper	Sacramento	Lee (1997) PMP final report; MSG Strategic Report (2000)
1994			
19-Dec	Reference streams; Instream and Hillslope PMP	Sacramento	Reference watershed catalog; Rae (1995), Tuttle (1995)
21-Nov	Administrative review; Instream and Hillslope PMP	Sacramento	Rae (1995), Tuttle (1995)
15-Sep	Whole THP survey; Class III monitoring, database	Sacramento	Hillslope Monitoring Program interim report (1999)
15-Jul	Instream and Hillslope PMP monitoring work	Sacramento	Rae (1995), Tuttle (1995)
10-May	Database work; instream and hillslope monitoring	Sacramento	Rae (1995), Tuttle (1995)
15-Mar	McKittrick-erodible WSs; hillslope monitoring	Sacramento	McKittrick (1994) Highly Erodible Watersheds; Tuttle (1995)

At the January 2000 BOF meeting, a Strategic Plan for the MSG was adopted by the Board, which included 10 main goals for the group:

- 1) Continue the Hillslope Monitoring Program (HMP) to test the implementation and effectiveness of forest practices used in THPs to protect water quality;
- 2) Integrate CDF's Modified Completion Report (MCR) monitoring process into the long-term monitoring program;
- 3) Develop a set of key monitoring questions that the MSG believes are critical for understanding and assessing the impact of timber harvesting on beneficial uses of water, and design projects to answer these specific questions;
- 4) Encourage the development of cooperative watershed monitoring projects that include instream trend monitoring for the 303(d) listed waterbodies;
- 5) Provide timely information from finished field work to both federal and state agencies, foresters, watershed groups, local government, and the public;
- 6) Develop information for training programs to reflect the results from finished field work;
- 7) Clarify the expectations of federal and state regulatory agencies about what questions must be answered regarding forest practices for water quality and fish habitat protection;
- 8) Coordinate with other state and federal agencies involved in resource protection on monitoring activities to avoid duplication of efforts and to increase public confidence;
- 9) Provide comment on the development of watershed assessment processes to assure that they are both scientifically credible and relevant to foresters, agencies, and the public; and
- 10) Keep informed of improvements suggested for cumulative watershed effects assessment and respond accordingly.

These goals have been achieved to varying degrees over the past six years. Briefly, goals 1 and 2 were accomplished, with the Hillslope Monitoring Program running from 1996 through 2002 and the first phase of the Modified Completion Report monitoring program operating from 2001 to 2004. Goal 3 was not attempted. Goal 4 was accomplished with five cooperative watershed projects (Caspar Creek, Garcia River [303(d) listed], South Fork Wages Creek, Judd Creek, and Little Creek). Goal 5 was achieved by writing interim and final reports that were distributed as hard copies and posted on the MSG website, as well by describing monitoring results in newsletters and mass mailing to Registered Professional Foresters (RPFs). Goal 6 was completed by holding workshops and field sessions that covered monitoring results, particularly related to watercourse crossings. Goals 7, 9, and 10 were largely not attempted by the MSG. Goal 8 was addressed with the formation of the MSG Subcommittee to create the Interagency Mitigation Monitoring Program (IMMP) in 2005.

CURRENT VISION FOR THE MSG IN RELATION TO THE BOF

At MSG meetings held in 2005 and 2006, it was determined by the Acting MSG chair, BOF Executive Officer George Gentry, that it was appropriate to revise and update the

first MSG Strategic Plan. Input on goals and objectives for the revised plan were discussed and agreement was reached on the goals listed in this document. Additionally, there was considerable discussion during these meetings about whether the MSG should become a structured committee with appointed members to provide advice to the BOF on technical aspects of proposed rule changes related to water quality, soil erosion, and watershed conditions, or remain an unstructured group without appointed members. Discussions at the recent MSG meetings led acting chair George Gentry to conclude that members enjoy the current informal, unstructured MSG configuration that leads to sharing of information, and that the group should remain without formally appointed members. This option will allow agencies and organizations to continue to place the amount of attention and commitment to the MSG that they believe is appropriate, based on existing personnel commitments. It will also allow the open, informal nature of the meetings to continue and permit the commitment of the people who have worked for many years on the committee to continue in an unthreatening manner.

Currently, the following agencies, companies and organizations are considered to be part of MSG, and representatives from these entities have participated at some or all of the MSG meetings over the past six years:

BOF	Board of Forestry and Fire Protection
CDF	California Department of Forestry and Fire Protection
CDF--FRAP	CDF Fire and Resource Assessment Program
SWRCB	State Water Resources Control Board
NCRWQCB	North Coast Regional Water Quality Control Board
CVRWQCB	Central Valley Regional Water Quality Control Board
DFG	California Department of Fish and Game
CGS	California Geological Survey
CDPR	California Department of Parks and Recreation
NOAA Fisheries	NOAA National Marine Fisheries Service
US EPA	US Environmental Protection Agency
UCB	University of California, Berkeley
HSU	Humboldt State University
Cal Poly SLO	California Polytechnic State University, San Luis Obispo
CFA	California Forestry Association
SPI	Sierra Pacific Industries
GDRCO	Green Diamond Resource Company
PALCO	Pacific Lumber Company
CTM	Campbell Timberland Management
MRC	Mendocino Redwood Company
RRC	Roseburg Resource Company
GRI	Gualala Redwoods, Inc.
BCLC	Big Creek Lumber Company
NCCFFF	Northern California Council Federation of Fly Fishers
HWC/SSRC	Humboldt Watershed Council/Salmon and Steelhead Recovery Coalition

Additional discussions have occurred during the past year in BOF Forest Policy Committee meetings about creating a new structure to elevate the MSG's profile and increase its involvement with BOF issues. The preferred alternative for doing this, while retaining the open, unstructured nature of the MSG, is to have the MSG report to a BOF-appointed science review team. This concept is discussed in Appendix C and in the BOF's recently revised Strategic Plan.

MSG MISSION / VISION STATEMENT

The Monitoring Study Group's monitoring program will provide timely information on the implementation and effectiveness of forest practices related to water quality that can be used by forest managers, agencies, and the public in California to improve water quality protection.

MSG ACCOMPLISHMENTS

MSG members have been in agreement since 1990 that monitoring information must be both scientifically credible and relevant to foresters, the state and federal resource agencies, and the public. To build a program with sufficient credibility, a volunteer panel appointed in 1990 by the BOF, known as the Best Management Practices Effectiveness Assessment Committee (BEAC), held public outreach meetings throughout the state. The public stated that protection of cold water fish habitat and domestic water supplies were critical, and that the monitoring program being developed must be able to detect changes in these beneficial uses resulting from timber operations (BOF 1991). Based on this public input, the MSG required that the long-term program include both implementation and effectiveness monitoring. It also set forth a design strategy that used pilot projects to develop appropriate techniques for both instream and hillslope monitoring.

The initial task of the Monitoring Study Group was to develop a monitoring program required by the US EPA for certification of the Forest Practice Rules (FPRs) as Best Management Practices (BMPs) under the Clean Water Act. This has been a goal of the Board of Forestry and Fire Protection and CDF since 1977, and continues to remain a goal in 2006, even though at the current time, there is no ongoing process from the State and Regional Water Boards to certify the FPRs as BMPs.²

A brief summary of program accomplishments to date follows (see Figures 2 and 3):

² Information provided by Ms. Palma Risler, US EPA, at the MSG meeting held on March 14, 2006 at Swanton Pacific Ranch near Davenport.

1990 – 1991. The MSG, working with William Kier Associates, held public outreach meetings throughout the state to capture public input on a monitoring program. Public input stressed the importance of protecting cold water fisheries habitat and domestic water supplies (BOF 1991).

1993. Based on information collected by William Kier Associates, the MSG issued a report outlining steps to be used in developing a Long-Term Monitoring Program. This report stressed the need for a pilot project to develop appropriate techniques for instream and hillslope monitoring (BOF 1993).

1993 – 1995. Pilot Monitoring Program (PMP) work was completed and final reports written. The California Department of Fish and Game (DFG) conducted an Instream Pilot Study, while Dr. Andrea Tuttle (Andrea Tuttle and Associates), CDF, and the Division of Mines and Geology (DMG—now known as the California Geological Survey), oversaw the Hillslope and Geologic Pilot project components (Rae 1995, Tuttle 1995, Spittler 1995). Gaylon Lee, SWRCB, wrote a summary report for the PMP (Lee 1997).

1996 – 2002. The Hillslope Monitoring Program (HMP) was conducted on a random selection of 350 plans using highly qualified independent contractors as third party auditors. First year data was collected only in Mendocino and Humboldt Counties, while in subsequent years, data was collected throughout the forested counties of California (BOF 1999, Cafferata and Munn 2002).

1997 – 2001. A pilot cooperative watershed assessment/monitoring plan and instream monitoring project were initiated in the Garcia River Watershed with the Mendocino Resource Conservation District (Euphrat and others 1998, Maahs and Barber 2001).

2001 – 2004. The first phase of the Modified Completion Report (MCR) monitoring program was conducted by CDF Forest Practice Inspectors. Data was collected on 281 randomly selected THPs located throughout the state (Brandow and others 2006).

2003 – 2005. The second phase of the Garcia River cooperative instream monitoring project was conducted with the Mendocino County Resource Conservation District to determine if sediment and turbidity conditions are improving for anadromous salmonids. Continuous recording turbidity data was collected in five tributary basins (Barber and Birkas 2006).

2003 – 2010+. THP-scale effectiveness instream monitoring projects are being conducted in the Judd Creek and South Fork Wages Creek watersheds cooperatively with SPI and CTM, respectively (James 2004, Graham Matthews and Associates 2004). Memorandum of Understandings (MOUs) exist between CDF and the companies for both projects.

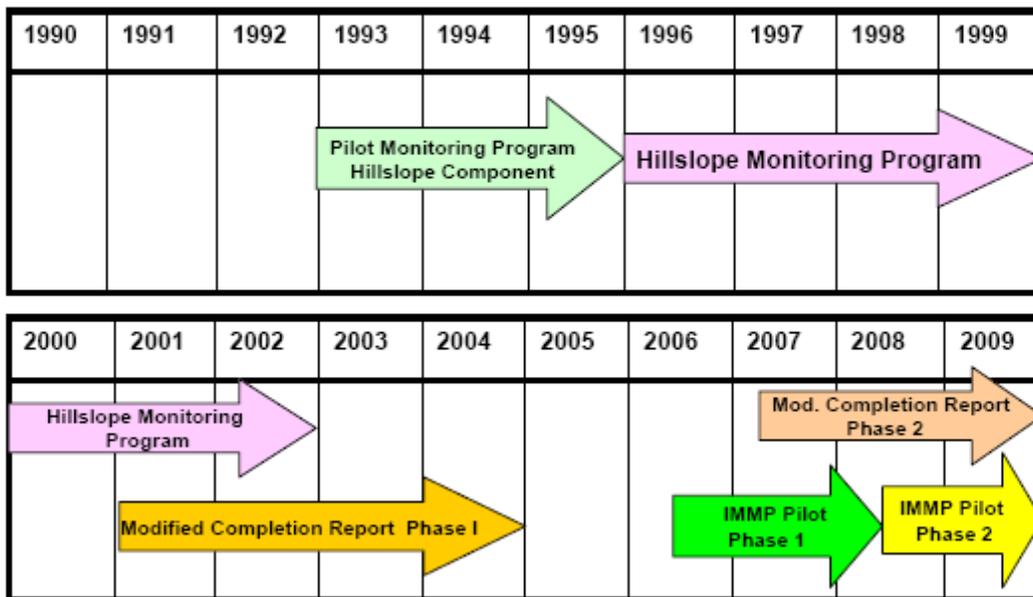
2005 – forward. The Interagency Mitigation Monitoring Program (IMMP) has been developed by the MSG IMMP Subcommittee to: (1) collect water quality related monitoring data on higher risk sites within plans, and (2) develop a process to reach agreement with an interagency team that can be applied to other forestry-related topics.

The first phase of the IMMP pilot project began in July 2006 and will extend through March 2007 [Resources Agency/CDF/DFG/CGS/CVRWQCB/NCRWQCB 2006].

2006 to 2008. Funding has been provided for the Little Creek watershed study located on the Swanton Pacific Ranch and operated by Cal Poly, San Luis Obispo. This project has four monitoring stations with recording turbidimeters to evaluate the effects of selective timber harvesting on water quality. It will determine if the current highly regulated practices in Santa Cruz County are adequately protecting the watershed from adverse sediment-related impacts.

2007 – forward. The second phase of the Modified Completion Report monitoring program will be conducted using a random sample of THPs to provide context for the non-random IMMP. CDF Forest Practice Inspectors will again collect the monitoring data, but for Phase II work, field work will be coordinated and overseen by CDF Monitoring Coordinators located at the CDF offices in Santa Rosa, Redding, and Sacramento. Proposed changes for the program include: (1) a reduced WLPZ sample size, (2) a revised, simplified road form and evaluation method focusing on drainage and discharge, and (3) a revised crossing form that clarifies which FPRs are to be rated for rule implementation.

Figure 2. MSG Hillslope Monitoring Timeline.



In addition to funding for monitoring from CDF's Forest Practice Program budget, CDF also funds water quality-related monitoring research that complements the MSG projects with two other programs: (1) the Soil Erosion Studies Program, and (2) the State Forests Research Program.³ Examples of monitoring projects funded from these programs include:

- Caspar Creek watershed study (Ziemer 1998, Lewis and others 2001, Keppeler and others 2003, Rice and others 2004, Lewis and Keppeler in press)⁴
- Sediment storage and transport in the South Fork Noyo River watershed, Jackson Demonstration State Forest (Koehler and others 2001, 2002, in press)
- Central Sierra Nevada sediment studies (MacDonald and others 2004, Coe 2006)
- Channel incision study in the Caspar Creek watershed (Dewey and others 2003, Dewey, in preparation)

These three funding sources complement each other and have been able to provide relatively robust support for both hillslope (or onsite) monitoring and longer-term instream monitoring projects. Appendix A lists MSG monitoring reports and supported project reports produced from 1991 through 2006, and Appendix B lists water quality-related monitoring reports produced from Soil Erosion Studies and State Forests Research funding.

CHANGES IN REGULATIONS AFFECTING MONITORING IN CALIFORNIA

The BOF and CDF face several challenges in keeping the Monitoring Study Group a relevant committee that can provide the Board and Department with meaningful monitoring results and input. In particular, it is imperative that the MSG provides a forum that promotes cooperation and trust among all of the Review Team agencies (CDF, CGS, DFG, and RWQCBs) so that: (1) the agencies do not collect duplicative monitoring data in an era of limited funding and reduced budgets, and (2) there is greater confidence in the monitoring results.

The need for each agency to conduct its own monitoring, or oversee monitoring data collection provided by landowners, has been driven by the following factors:

³ The Soil Erosion Studies Program is administered by Mr. John Munn, CDF, and the State Forests Research Program is administered by Mr. Tim Robards, CDF.

⁴ The Caspar Creek watershed study has been in operation since 1962 and is a cooperative project between CDF and the USDA Forest Service—Pacific Southwest Research Station. CDF support for Caspar Creek is from its Soil Erosion Studies Project (with Proposition 99 being the most recent funding source). Over 150 published papers reporting monitoring results are available on the Caspar Creek webpage at: <http://www.fs.fed.us/psw/topics/water/caspar/caspubs.shtml>.

- The listing and potential listing of numerous fish and wildlife species under the federal and state Endangered Species Acts.
- The listing of numerous California watersheds as impaired waterbodies under Section 303(d) of the Clean Water Act, leading to the establishment of Total Maximum Daily Load (TMDL) documents and implementation plans.
- Amendments to California Water Code section 13269 that has required the termination of existing waivers of waste discharge requirements (WDRs) on timberlands. In response to the new law, the Regional Water Boards have adopted new Region-specific conditional waivers of WDRs or general WDRs for silvicultural activities, along with monitoring requirements.

Results from past MSG monitoring programs (i.e., both the Hillslope Monitoring Program and the Modified Completion Report monitoring program) are similar and have been widely distributed to state and federal agencies, timberland owners, and the public. In general, implementation of California's Forest Practice Rules has been found to be high, and erosion features have usually been associated with improper application of the rules. Improvements in implementation of selected road and crossing Forest Practice Rules has been stated as being necessary.

Some state and federal resource agencies and environmental organizations, however, have remained skeptical about the effectiveness of forest practice rules in adequately protecting beneficial uses of water in California and the other western states (Ice and others 2004). Reasons for such uncertainty in this state are based on the monitoring methods used by past studies (e.g., lack of information about both fine sediment delivery to streams during winter storms and in-unit mass wasting [Stillwater Sciences 2002]) and the lack of multi-agency participation in the monitoring process. Concerns have also been expressed about how monitoring results have been used in the public arena. As a result, there is general agreement that new, more cooperative, broadly-based approaches are needed for onsite monitoring of water quality impacts from timber operations.

To illustrate the need for interagency cooperation, in a Memorandum of Understanding (MOU) between the SWRCB, designated RWQCBs, and CDF signed in March 2003, it was specified that DFG, CGS, the BOF, CDF, and other interested parties would participate in discussions on appropriate monitoring of timber harvesting activities. CDF Director Andrea Tuttle (at that time), in her cover letter for the MOU to Ms. Celeste Cantu, Executive Director of the SWRCB, stated that she would recommend to the BOF that they extend an invitation to the SWRCB to become a designated member of the MSG so that monitoring projects and protocols could be developed cooperatively. As stated above, the SWRCB has been an "informal" member of the MSG since 1989, but designated membership for agencies and organizations has not existed.

This need to work cooperatively is moving the MSG away from a group that offers guidance to the BOF and CDF on how to best structure and conduct *their* instream and hillslope monitoring work and towards a group developing new monitoring programs

where: (1) all of the Review Team agencies are equal partners in data collection, analysis and reporting, and (2) the agencies work cooperatively and as equal partners in supporting cooperative instream monitoring projects with landowners. It is anticipated that this new approach will provide a balance of interests for all the Review Team agencies and greater public confidence in the monitoring results.

MSG WORK IN RELATION TO OTHER MONITORING EFFORTS IN CALIFORNIA

Greater emphasis on water quality-related monitoring of forestry impacts continues in the second half of the 2000-2010 decade in California and the western United States, and it is anticipated that this trend will continue. Forestry-related water quality monitoring in California, in addition to that undertaken by the MSG, has increased significantly in recent years due to a number of factors, including new requirements by the Regional Water Quality Control Boards for monitoring of Timber Harvesting Plans, as well as requirements related to TMDLs, state and federal listed species, HCPs and other landscape-scale documents, etc.

In this state, monitoring the impacts of current forestry practices on water quality and anadromous fish habitat did not generally receive a high level of emphasis until the mid to late 1980s. Since then, numerous projects have been undertaken that have provided relevant information. In addition to the MSG's Hillslope Monitoring Program, Modified Completion Report Monitoring Program, and cooperative instream monitoring projects described above, some of these monitoring studies conducted since 1985 include:

- Qualitative review of 100 Timber Harvesting Plans throughout California in 1986, resulting in the "208 Report" (SWRCB 1987).
- The Critical Sites Erosion Study, which collected extensive data on management and design factors associated with large erosion events [e.g., mass wasting events] (Durgin and others 1989, Lewis and Rice 1989, Rice and Lewis 1991).
- The long-term Caspar Creek watershed study (began in 1962), including the North Fork Phase of the project, conducted from 1985 to 1996 (Ziemer 1998, Lewis 1998, Lewis and others 2001, Keppeler and others 2003, Lewis and Keppeler 2006). Funding provided by CDF's Soil Erosion Studies Program.
- Redwood National and State Park monitoring in the Redwood Creek basin to document water quality impacts and channel changes associated with road improvement and abandonment work (Klein 1987, Bloom 1998, Madej 2001).
- The USFS—Region V Best Management Practices Evaluation Program, which began in 1992. This ongoing monitoring program uses 29 different onsite monitoring protocols on 18 National Forests to evaluate BMP implementation and effectiveness (USFS 2004).
- Central Sierra Nevada sediment production and delivery studies conducted by Dr. Lee MacDonald, Colorado State University and graduate students Drew Coe

and Eric Chase from 1999 through 2004 (MacDonald and others 2004, Coe 2006, Chase 2006). These projects were jointly funded by the USFS and CDF's Soil Erosion Studies Program, or by the USFS alone.

- The Kings River Experimental Watershed Project (KREW), being conducted by the USFS—Pacific Southwest Research Station and the USFS Pacific Southwest Regional Office in the southern Sierra Nevada Mountains. This project began in 2001 and will document the effects of prescribed fire and forest thinning treatments on riparian and stream physical, chemical, and biological conditions (Hunsaker and Eagan 2003, Korte and MacDonald 2006, Korte in preparation).
- Several additional instream monitoring projects being conducted by the USFS Pacific Southwest Regional Office throughout California (USFS 2004). These studies include: (1) regional bioassessment programs [including using the River Invertebrate Prediction and Classification System (RIVPACS) approach], (2) a five-year study to evaluate cumulative watershed effects and BMP effectiveness on the Klamath National Forest, (3) Northwest Forest Plan Aquatic and Riparian Effectiveness Monitoring Plan (AREMP) studies on the Mendocino, Shasta-Trinity, Six Rivers, Modoc, and Klamath National Forests, (4) Quincy Library Group Forest Recovery Act instream monitoring on the Lassen, Plumas and Tahoe National Forests, and (5) instream monitoring for the Heavenly Valley TMDL.
- Development by timber companies of monitoring plan components of draft or approved Habitat Conservation Plans, Sustained Yield Plans, Programmatic Timber Environmental Impact Reports (PTEIRs), and other landscape level planning documents. For example, the Pacific Lumber Company (PALCO) operates over 20 continuous recording turbidity monitoring stations located in the Freshwater and Elk River watersheds in central Humboldt County, in part due to requirements included in the PALCO HCP signed in 1999.
- Continuous turbidity monitoring data collected by both private companies and public agencies, as well as data collected by watershed groups throughout the state (for example, see Eads and Lewis 2002, Klein 2003, Manka 2005, and Table 2). Significant investments in developing and maintaining instream monitoring stations have been made by PALCO, Sierra Pacific Industries (James 2003), Hawthorne Timber Company/Campbell Timberland Management, Green Diamond Resource Company, as well as others. Nearly all larger landowners are also collecting electronic water temperature data (Lewis and others 2000), and most collect aquatic habitat/fisheries data as well.
- Monitoring data being collected by landowners to fulfill monitoring requirements associated with Regional Water Quality Control Board-specific conditional waivers of Waste Discharge Requirements (WDRs) or general WDRs for silvicultural activities. Pursuant to the State Porter-Cologne Water Quality Control Act, the Regional Boards and the SWRCB have the authority to require monitoring and reporting as a condition of any applicable waiver of WDRs (data collection generally began during the winter of 2005/2006).

Table 2. List of watersheds in California with monitoring stations outfitted with continuous recording turbidimeters (as of April 2006).⁵		
County	Stream/Watershed	Monitoring Entity
Del Norte	Little Jones Creek, Smith River watershed	USFS-PSW
Mendocino	Caspar Creek--North and South Forks and tributaries	USFS-PSW; CDF
Mendocino	Garcia River tributaries	MCRCD; NCRWQCB; CDF; Ridge to River
Mendocino	South Fork Wages Creek	Hawthorne; Campbell Timberland Management; CDF
Mendocino	South Fork Ten Mile River and tributaries	Hawthorne/Campbell Timberland Management
Mendocino	Elder Creek, SF Eel River	USFS-PSW; USGS (discharge data)
Humboldt	Bull and Cuneo Creeks	USFS-PSW
Humboldt	Little River tributaries, Maple Creek, Ryan Creek	Green Diamond Resource Company
Humboldt	Elk River, Freshwater Creek and tributaries	PALCO
Humboldt	Freshwater Creek (Roelofs house, Howard Heights Bridge)	Salmon Forever
Humboldt	Elk River (lower NF, lower SF)	Salmon Forever
Humboldt	Elk River tributaries (Little SF Elk, Corrigan Cr., SB of NF Elk)	Humboldt State University
Humboldt	Canoe Creek, Decker Creek	California State Parks
Humboldt	Bear and Jordan Creeks	PALCO
Humboldt	Upper Jacoby Creek	USFS-PSW
Humboldt	Lower Jacoby Creek	Jacoby Creek Land Trust; Randy Klein
Humboldt	Redwood Creek tributaries	Redwood National and State Parks; GMA
Humboldt	Mad River tributaries	U.S. EPA; GMA
Santa Cruz	Little Creek	Cal Poly--San Luis Obispo
Trinity	Mill, Pine, Supply, Campbell, Hostler, Sockish, Tish Tang Crs.	Hoopa Valley Tribe
Trinity	Rush Cr., Indian Cr., main stem Trinity River	U.S. Bureau of Reclamation; GMA
Fresno	North Fork Kings River watershed (KREW Project)	USFS-PSW
Shasta	Clear Creek	Western Shasta RCD; GMA
Shasta	Millseat Creek	Sierra Pacific Industries
Shasta	Bailey Creek	Sierra Pacific Industries
Shasta	Hazel Creek	Sierra Pacific Industries
Tehama	Judd Creek, Antelope Creek watershed	Sierra Pacific Industries; CDF
Calaveras	Upper San Antonio Creek	Sierra Pacific Industries
El Dorado	Angora Creek, Lake Tahoe Basin	El Dorado County DOT; GMA

⁵ Dr. Rick Susfalk, University of Nevada, is conducting a comprehensive study (continuous recording turbidity, nutrients, etc.) in the Incline Creek watershed, Lake Tahoe Basin, Washoe County (Nevada). For more information, see: <http://www.inclinecreek.dri.edu/>.

One goal of the Monitoring Study Group is to provide a forum to discuss the various monitoring studies being conducted throughout the state, in an effort to share results and to help coordinate this work to avoid duplication of effort. This has been accomplished since 2000, when the MSG became a BOF Standing Committee and the emphasis of the group was shifted from exclusively providing input to the BOF and CDF on how to develop and implement monitoring programs to that of public sharing of information, as well as guidance on monitoring program development and implementation (see Table 1).

SUMMARY OF MSG MONITORING RESULTS TO DATE IN CALIFORNIA

The **Hillslope Monitoring Program (HMP)** ran from 1996 to 2002, when funding was no longer available. Data was collected on 350 randomly selected plans throughout the state by highly qualified independent contractors, and interim and final reports were prepared by CDF (BOF 1999, Cafferata and Munn 2002). The HMP was a statewide evaluation of the implementation and effectiveness of the state's Forest Practice Rules (FPRs). Data was collected on: (1) randomly located road, skid trail, and watercourse and lake protection zone (WLPZ) segments, as well as randomly located landings and watercourse crossings, and (2) large erosion events where they were encountered. Data showed that implementation of the rules was high (averaging 94%), and that individual practices required by the rules were effective in preventing hillslope erosion when properly implemented. Erosion features were almost always associated with improperly implemented FPRs. Roads and their associated crossings were found to have the most frequent problems and the greatest sediment delivery to watercourses (Ice and others 2004).

The first phase of the **Modified Completion Report (MCR)** monitoring program was implemented from 2001 to 2004 as a more cost-effective approach than the HMP, utilizing CDF Forest Practice Inspectors rather than contractors to collect onsite monitoring data as part of required Work Completion Reports (Brandow and others 2006). A random draw of 12.5% of all completed THPs were evaluated (281 THPs), and high risk and highly sensitive parts of the Timber Harvesting Plan (THP) were sampled (roads, crossings, and WLPZs), based on the HMP results. Evaluations were completed at road and crossing sites after logging was completed, and for some plans, a second time after one to two over-wintering periods. Post-harvest canopy measured with a sighting tube was found to be high (approximately 80% and 70% for watercourses in the coastal and interior parts of the state, respectively). These results are very similar to those reported as part of the HMP. Nearly all the road rule implementation departures were related to drainage-related requirements, and departures were much more likely to result in erosion, sediment transport, and transport to channels than properly implemented measures. Crossing effectiveness ratings were generally similar to HMP results and showed that diversion potential, culvert plugging, and drainage structure function near crossings are problem areas.

Key summary points from these monitoring programs and other monitoring work conducted in California are as follows:

- **Individual practices required by the Forest Practice Rules are generally effective in preventing hillslope erosion when properly implemented. Overall, implementation of the Forest Practice Rules related to water quality has been found to be high, averaging 94%.**
- **Hillslope erosion features are usually associated with improperly implemented Forest Practice Rules, and sediment transport to watercourse channels is much more likely at road-related features where there are departures from the applicable Forest Practice Rules.**
- **Post-harvest watercourse protection zone total canopy is high, exceeding 80% in the Coast Forest Practice District, and is roughly 70% in the interior areas.**
- **Watercourse crossings have frequent problems (approximately 20% have major Forest Practice Rule departures), and areas at or very near crossings are primary sediment entry locations.**
- **Roads require better implementation of Forest Practice Rules related to drainage, and watercourse crossings require better implementation of FPRs related to the design, construction, and maintenance of crossings.**
- **Implementation of the modern Forest Practice Rules (after 1975) have substantially reduced water quality impacts (determined from the Caspar Creek Watershed Study results).**
- **In the Sierra Nevada, roads, high-severity wildfires, and off highway vehicle (OHV) trails are the dominant sediment source areas (MacDonald and others 2004).**

The main conclusions from the hillslope monitoring completed so far relate to the need for improved road drainage and better watercourse crossing design, construction, and maintenance. The following measures have been suggested in training sessions for Registered Professional Foresters (RPFs) related to roads:

- (1) Adequate long-term road maintenance,
- (2) Improved construction/maintenance of road drainage structures built near crossings,
- (3) Complete hydrologic disconnection of existing roads--removing the inside ditch, where possible,
- (4) Outsloped roads with rolling dips where possible,
- (5) Reduced road contributing area by increasing frequency of road drainage structures, and
- (6) Surfacing roads, particularly near watercourses.

To improve crossing function, it has been suggested that:

- (1) New and upgraded crossings be designed using appropriate techniques for wood and sediment passage, and 100-year flood flows, as required by 14 CCR 923.3(e) [943.3(e), 963.3(e)].
- (2) Improved winter and annual maintenance programs,
- (3) Improved crossing abandonment techniques,
- (4) Inventory of high risk crossings and development of a schedule for their replacement (usually as part of a Road Management Plan), and
- (5) Minimization of the number of crossings when planning new roads.

The monitoring results to date have been used in several ways. These include:

- BOF adopted rule language in 2000 requiring RPF supervision of active timber operations to improve rule implementation [14 CCR 1035.1(e)].
- Training sessions on watercourse crossings, including California Licensed Forestry Association (CLFA) workshops, a field Monitoring Study Group meeting to discuss crossings, development of a document for RPFs on designing watercourse crossings (Cafferata and others 2004), and in Interagency Training Workshops on crossings held in 2006.
- Development of a Board of Forestry and Fire Protection website to disseminate monitoring information by posting MSG meeting announcements, monitoring reports and papers, PowerPoint presentations from MSG meetings, instream monitoring project study plans, monitoring protocols, etc. (see: http://www.bof.fire.ca.gov/board/msg_geninfo.asp).
- Development of Road Management Plan procedures proposed for adoption as Forest Practice Rules by the Board of Forestry and Fire Protection.

SUGGESTED MONITORING STUDY GROUP APPROACH

The long-term monitoring program envisioned in this MSG Strategic Plan will utilize a broad combination of approaches to generate information on Forest Practice Rule implementation and effectiveness related to water quality. As currently envisioned, the major components of the program will include:

- 1) Implementation of the second phase of the **Modified Completion Report Monitoring Program**, using a randomly selected 10% sample of completed plans,
- 2) Implementation of the **Interagency Mitigation Monitoring Program (IMMP)** pilot phase to develop a performance-based approach for evaluating effectiveness of practices implemented at higher risk sites on a non-random election of plans, to be followed by a full phase implementation of the program,

- 3) Continued support for **cooperative instream monitoring projects** to address both long-term instream trend monitoring and effectiveness of the FPRs at the THP-scale⁶, and
- 4) Continued funding of selected **high-priority monitoring projects** that can answer key questions regarding forest practice implementation and effectiveness or provide information on innovative monitoring techniques.⁷

Additionally, the MSG will function to:

- (5) Provide an open public forum for sharing monitoring-related information,
- (6) Utilize subcommittees to produce work products and to provide advice to BOF technical committees,
- (7) Disseminate monitoring information in a timely manner to all stakeholders, and
- (8) Use monitoring results in training programs developed for resource professionals in California.

REVISED MONITORING STUDY GROUP GOALS

The goals of this Strategic Plan derive from the Mission/Vision for the MSG--To provide timely information on the implementation and effectiveness of forest practices related to water quality that can be used by forest managers, agencies, and the public in California to improve water quality protection. Listed in order of highest priority to lowest, the revised MSG goals are:

The Monitoring Study Group will:

- 1) Provide timely and professionally sound advice to the Board of Forestry and Fire Protection, or as directed, to a BOF-appointed science review team, on subjects related to water quality, soil erosion, and watershed conditions.**

⁶ A set of goals and objectives for MSG cooperative instream monitoring projects was developed in 2003. This document states that the goal of MSG instream monitoring projects shall be to determine if the Forest Practice Rules, when properly implemented, minimize negative impacts to water quality. Objectives include: (1) having projects designed to monitor the effectiveness of the FPRs and/or changes in water quality trends associated with forest practices, (2) adequate peer-review of the project study design, (3) documentation of project costs, and (4) adequate dissemination of project results.

⁷ Components 3 and 4 will be sufficiently flexible to respond to changing needs over time and available funding.

- 2) **Provide guidance for programs testing the effectiveness of California's Forest Practice Rules related to water quality protection, which may lead to the development of a monitoring program that will fulfill U.S. EPA requirements for certification of the California Forest Practice Rules as Best Management Practices (BMPs). Additionally, these programs are being developed to provide feedback for adaptive management and verify that the California Forest Practice Rules are adequately protecting water quality. Examples of these types of programs include, but are not limited to:**
 - a. **Developing a Phase II Modified Completion Report monitoring program using California Department of Forestry and Fire Protection (CDF) Forest Practice Inspectors to evaluate implementation and effectiveness of the California Forest Practice Rules related to water quality for randomly selected plans (THPs, NTMPs, PTEIR PTHPs, etc.).**
 - b. **Developing and implementing the Interagency Mitigation Monitoring Program (IMMP) involving the Review Team agencies (CDF, CGS, DFG, and the Regional Water Boards) to collect data on the implementation and effectiveness of key plan components affecting water quality. The IMMP emphasizes evaluation of high risk sites (i.e., non-random selection) and evaluation of additional mitigation measures and special plan requirements related to protection of water quality.**
- 3) **Provide an open public forum for: (a) presentation of progress and final reports related to water quality monitoring efforts, and (b) discussion of monitoring projects being conducted by CDF, state and federal agencies, the timber industry, universities, and others in a collegial, unthreatening atmosphere where ideas and information are easily shared.**
- 4) **Coordinate efforts between state and federal agencies involved in monitoring the water quality effects of forest management to avoid duplication and increase public confidence.**
- 5) **Provide a forum for coordinating support for existing and new cooperative instream watershed monitoring projects located in non-federal forested watersheds throughout California. Current examples of watersheds with cooperative instream monitoring projects include: (1) Caspar Creek, (2) Garcia River, (3) South Fork Wages Creek, (4) Judd Creek, and (5) Little Creek. These projects provide linkages between onsite monitoring and in-channel conditions, and will complement the onsite monitoring efforts listed in item (2) above.**
- 6) **Provide advice regarding appropriate data analyses for past, current, and future state-sponsored monitoring programs related to water quality (including, but not limited to the Hillslope Monitoring Program, Modified**

Completion Report Monitoring Program, and the Interagency Mitigation Monitoring Program). Results are to be reported when sufficient data analysis and summary has occurred.

- 7) Provide timely information about finished and on-going monitoring projects to the Board of Forestry and Fire Protection through monthly updates and a yearly summary presentation (to be presented at the end of the calendar year). Also, provide information on finished and on-going monitoring projects to state and federal agencies, Registered Professional Foresters (RPFs), Licensed Timber Operators (LTOs), watershed groups, local government, and the public through a variety of information dissemination mechanisms (e.g., MSG website, newsletters, Mass Mailings, workshop presentations, conferences, etc.)**
- 8) Facilitate use of results generated from monitoring projects in training programs for resource professionals throughout the state to improve water quality protection.**

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Appendix. List of Monitoring Reports Produced from 1991 through 2006.

Appendix A. Monitoring Study Group Reports/Products and MSG Supported Reports

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Appendix C. Brief Description of the Science Review Team Concept

As stated in the main part of this Strategic Plan, discussions have occurred during the past year in BOF Forest Policy Committee meetings about creating a new structure to elevate the MSG's profile and increase its involvement with BOF issues. The preferred alternative for doing this, while retaining the open, unstructured nature of the MSG, is to have the MSG report to a BOF-appointed science review team (SRT). This concept is generally analogous to that currently in use in the state of Washington.

The Adaptive Management Program (AMP) in Washington provides science-based recommendations and technical information to assist their Forest Practice Board in determining if and when it is necessary or advisable to alter forest practice rules. Additionally, the AMP was established to provide guidance for aquatic resources to achieve resource goals and objectives. The AMP is divided into three functions: Policy, Science, and Implementation. The science function is addressed by a group known as the **Cooperative Monitoring, Evaluation, and Research (CMER) Committee**.

CMER reviews existing science and produces unbiased technical information for consideration by the Timber/Fish/Wildlife (TFW) Policy Committee and the Board. "Best available science" is to be used and is considered to be relevant science from all credible sources, including peer-reviewed government and university research, other published studies, and CMER research projects. CMER is responsible for understanding available scientific information, selecting the best and most relevant information, and synthesizing it into reports for Policy and the Board. The TFW Policy Committee makes recommendations to the Board for decision. The Washington Department of Natural Resources (DNR) implements and regulates forest practices. Because CMER is charged with producing credible, peer-reviewed technical reports based on best-available science, participating groups are encouraged to nominate research scientists with publication experience and technical scientists with experience in conducting and reviewing research work.

The Board of Forestry and Fire Protection's goal for California is to form a Science Review Team (SRT), composed of leading natural resources scientists in this state.⁸ The MSG would report to SRT, informing the formal committee of monitoring results from hillslope and instream monitoring efforts underway. The SRT would provide technical direction to the MSG for development of new and existing monitoring projects and provide sound technical advice to the BOF regarding watershed-related resource issues. This is roughly analogous to input to CMER from the Upslope Processes and Instream Scientific Advisory Groups in Washington. The SRT would report directly to the BOF, establishing a "firewall" between policy and science (Figure 4), and would be composed of leading natural resources scientists in California. The BOF would approve nominations for the SRT members, who would be associated with universities, private companies, federal and state agencies, etc. Adequate funding is the main challenge for

⁸ Note the approach of using a science review team (or Technical Advisory Committee/TAC) is currently being used in California to review the scientific literature pertinent to forest practice effects on riparian buffers and functions, as they apply to the Threatened or Impaired Watersheds Rule Package (T/I rules). This TAC effort will serve as a pilot for establishing a more formal long-term group.

establishing this group in California. Efforts will be made in 2007 to establish a long-term SRT for this state.

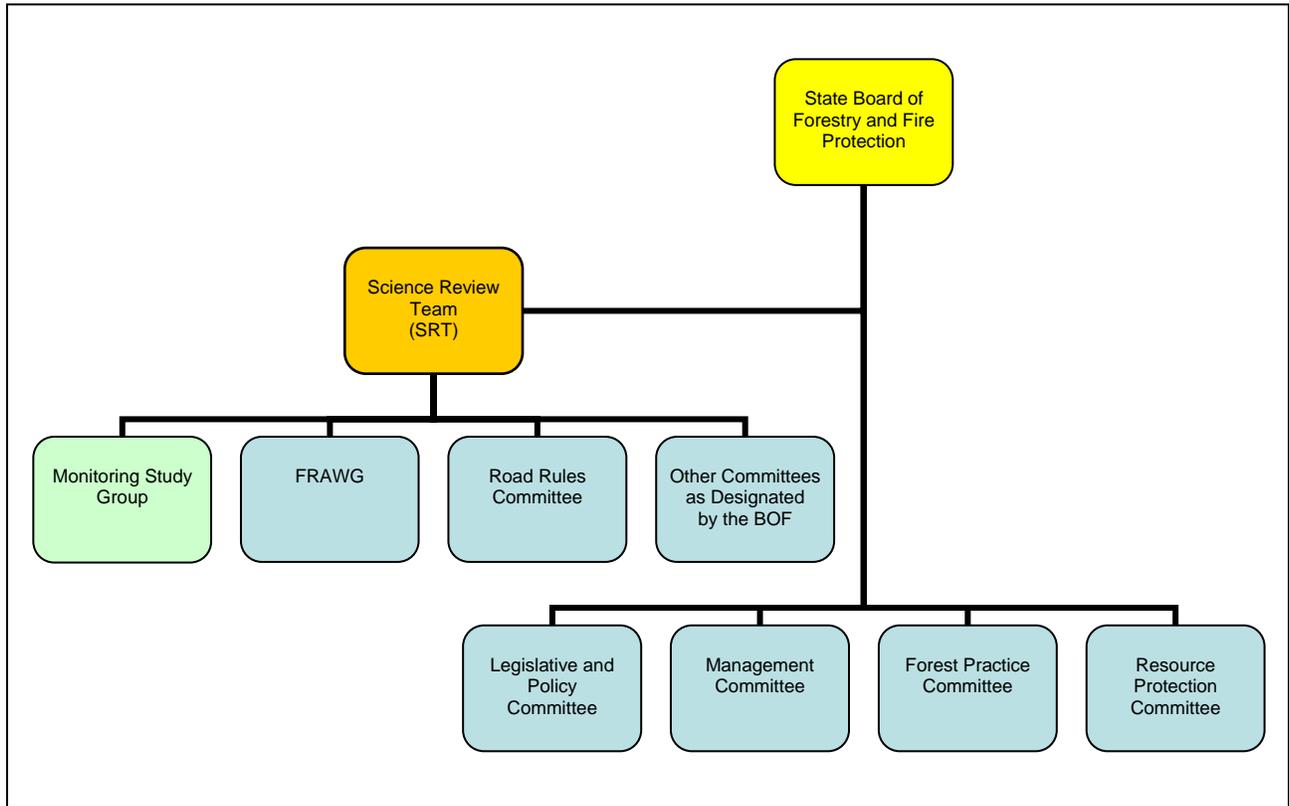


Figure 4. Flowchart illustrating the possible relationship between the BOF and a science review team.⁹

⁹ The proposed Science Review Team, as currently envisioned, would coordinate research and demonstration opportunities for the Board across many disciplines. MSG's mission to provide timely and professionally sound advice to the Board is not altered (see Goal Number 1 of the MSG Strategic Plan).