



1 I, Robert W. Derlet, MD hereby declare as follows:

2 1. I submit this declaration in response to the revisions to the Draft Statewide Waiver  
3 of Waste Discharge Requirements for Waste Discharge Requirements for Nonpoint Source  
4 Discharges for certain activities on National Forest system lands within California. I have personal  
5 knowledge of the matters stated herein and, if called as a witness, could and would competently  
6 testify thereto.

7 2. I have a background that provides multiple direct connections with water quality and  
8 public health. For 25 years I have served as a faculty member at the School of Medicine, University  
9 of Davis, and am currently Professor Emeritus. I have extensive experience in teaching, patient care,  
10 and research, with over 200 published scientific research articles. Over the past decade I have  
11 engaged in original research related to risk factors for exposure by the public to fecal coliform, *E-*  
12 *coli* and other microorganisms in lakes and streams in the Sierra Nevada region. This has been a  
13 collaborative effort in cooperation with the John Muir Institute of the Environment, University of  
14 California, Davis, and with Dr. Charles Goldman, director of the Lake Tahoe research group. Most  
15 recently I have engaged in research investigating the role of algae as a host for coliform and *E-coli*  
16 bacteria in streams and lakes within California Sierra Nevada. In association with numerous  
17 cooperating researchers, I have authored multiple peer reviewed articles detailing the results from an  
18 extensive comparison of wilderness waters free from impact by humans or domesticated animals to  
19 those watersheds exposed to non-point pollution from human recreational backcountry use and  
20 waters exposed to livestock and pack animals. A copy of my CV is attached to this Declaration.

21 3. As noted above, I am providing this declaration in response to the revisions to the  
22 Draft Statewide Waiver of Waste Discharge Requirements for Waste Discharge Requirements for  
23 Nonpoint Source Discharges for certain activities on National Forest lands. The changes as released  
24 to the public for comment include limited revisions in response to various comments received. In  
25 this declaration, I will emphasize why the proposed revisions, especially the proposed modifications  
26 of monitoring for range management impacts to water quality, do not ensure that water quality will  
27 be adequately protected through implementation of the waiver and the connected Best Management  
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1 Practices (BMPs). I will address in particular the waiver revisions requiring annual fecal indicator  
2 bacteria (FIB) monitoring at three sites in the state, as well as additional direction for the Forest  
3 Service to do rangeland condition assessments, inspect permit compliance, and do end of season  
4 monitoring for forage utilization.

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6 4. The issue of fecal coliform contamination of forest streams is especially problematic  
7 for creating a significant risk to public health. As one key objective of my professional and research  
8 efforts, I have attempted to identify sources of fecal coliform contamination in streams and lake  
9 water utilized by recreational visitors to National Forest lands. Based on my personal research in the  
10 Sierra Nevada and the findings of my associates, I have determined that surface water from  
11 watersheds below cattle grazing areas is at high risk for containing *E-coli* contamination. I have  
12 previously communicated those findings to the State Water Board and to the U.S. Forest Service.  
13 Yet again this year when I personally visited National Forest lands for recreational activities, I  
14 observed livestock impacts that were having significant negative impacts on riparian vegetation,  
15 stream bank structure, and water quality. These impacts were visible in areas with varying levels of  
16 recreational visitation. My personal observations provide clear examples of why the revised changes  
17 to the waiver will likely fail to protect water quality. On October 12, 2011, I hiked into Hiram  
18 Meadows from the Arnot Creek Trailhead, within the Stanislaus National Forest. Livestock impacts  
19 were visible along several miles of trailside areas stretching through scattered meadows and  
20 streamside habitat -- all showing easily observed evidence of livestock impacts. The area I hiked  
21 spans the high saddle separating the Woods Creek and Jenkins Canyon watersheds (GPS center: Lat.  
22 38.41490936279297, Long. 119.8531036376953, NAD27). This is along a section of the Tahoe-  
23 Yosemite Trail.  
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27 5. The first snows of the season had fallen the week before, and I witnessed snow  
28 melting and mixing with fresh cattle manure. The visible evidence of cattle hooves trampling snow

1 into the soil and manure made for a muddy mixture that in many places was leaching directly into  
2 stream water. In areas just below snowline, the meadow and riparian vegetation had been grazed  
3 down to bare ground or trampled into the plant-mud-manure mixture. Relatively fresh manure was  
4 visibly present in numerous heavily trampled wet areas where leaching water was flowing off into  
5 the tributary streams. Throughout the miles of hiking I did along the trails in this area, the evidence  
6 of livestock degradation to riparian vegetation and to soil was highly visible. In particular,  
7 sloughing and pocking of the soil in wet areas had resulted in soil disturbance and erosion.  
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9         6.         Previously in September, during a day trip that I made to the Stanislaus National  
10 Forest, I spent time walking around two similar elevation meadows on the MiWok Ranger District in  
11 close proximity to Long Barn. The first meadow alongside Highway 108 was located directly east  
12 of the eastern entrance to Long Barn. That meadow is a National Forest meadow that is not grazed  
13 by livestock or pack stock. The visual impression as I approached the meadow was very positive  
14 because the meadow appeared to be extremely healthy in terms of vegetative cover. I observed that  
15 a variety of grasses as high as my knees or higher completely covered the meadow. Along the  
16 meandering stream channel, a thicket of lush willow growth sheltered the stream from the hot  
17 summer sun and provided a shady canopy alongside extremely vigorous growth of lower growing  
18 riparian plant species. No erosion or bare soil was visible anywhere in the meadow.  
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21         7.         In contrast, when I parked a short time later near Fahey Meadow and walked in a  
22 similar fashion around that meadow setting, I found a markedly different scene. Heavy grazing by  
23 livestock had eaten down grasses and forbs to short stubs that generally averaged less than 20 in  
24 height. There were many, many areas of bare soil with some of those bare patches heavily pocked  
25 with hoof prints of cattle. The wetland area surrounding the bubbling spring in the middle of the  
26 meadow was heavily chopped up and pocked from the hooves of cattle. Cow patties were visible  
27 within the wet portion of the spring and in many sites nearby, and it was upsetting to see manure  
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1 mixing with water that ultimately could find its way into California's water distribution system. No  
2 riparian bushes such as willows were present in any stream area exposed to livestock. The meadow  
3 area along the small stream draining from the spring was heavily grazed and in many spots showed  
4 lots of bare soil. This extreme disparity between the un-grazed meadow and the heavily grazed  
5 meadow revealed that despite the especially abundant plant growth that occurred during this year's  
6 wetter than normal growth season, livestock presence for an extended period of time still can result  
7 in easily observed significant watershed and water quality impacts.

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9 8. The revised waiver is based upon the Forest Service assuring the Water Board that  
10 Forest Service BMPs will successfully protect water quality. In my opinion based upon my on-the-  
11 ground field observations and many years of field research, those assurances are misleading and  
12 incorrect. Instead, it is my personal experience that BMPs currently in place repeatedly fail to  
13 protect water resources from the impacts generated by livestock grazing. This is not just a problem  
14 that I have observed on the Stanislaus National Forest. Highly visible impacts such as heavily  
15 grazed meadows, intensively grazed riparian areas, disturbed stream banks, and cow patties adjacent  
16 to or within National Forest waters are problems that can easily be seen throughout the National  
17 Forests I have visited in recent years. Specifically, in the higher elevation areas where tributary  
18 streams should be the cleanest and watershed values should be the most pristine, I have observed  
19 (both recently and many times previously) crumbled stream banks, overgrazed meadows, bare or  
20 partially denuded riparian areas, and repeated evidence of cow patties contaminating water. Thus, in  
21 tributary streams in the highest elevation locations where water quality is purest, livestock grazing  
22 on National Forest lands causes varying degrees of degradation.

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26 9. As a physician and research scientist, my priority is to not only provide care for  
27 patients who are suffering from illness or accidents, it is also to help members of the public to avoid  
28 unnecessary exposure to disease and/or pollutants. Various kinds of E-coli bacteria have gained

1 national attention in recent years due to highly publicized contamination of food or water. I am sure  
2 that the Water Board staff is aware that potentially harmful microbes include: Giardia, Shiga toxin  
3 E-coli, entero-invasive strains of E-coli, Listeria, Leptospirosis, Campylobacter, Salmonella, and  
4 others.

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6 10. The other half of the public-health-risk concern through exposure to the effects of livestock  
7 grazing is the Nitrogen, Phosphorus and other growth-stimulating substances that are routinely found  
8 in cattle manure. These substances stimulate algae growth. Excessive algae cause multiple problems  
9 in watersheds, for example supporting the survival of microbial pathogens. Over the past two  
10 summers my colleagues and I have expanded our decade of research effort to include analysis of  
11 algae in Sierra Nevada watersheds. During the summer of 2010, we found dangerous levels of E-coli  
12 attached to periphytic algae in Sierra watersheds where cattle graze. These microbes are easily  
13 released into neighboring water when disturbed. Our findings have been accepted for publication in  
14 the Journal of Environmental and Public Health. The title of that research report is: "Impact of  
15 Summer Cattle grazing on Sierra Nevada Watershed Aquatic Algae and Bacteria." The findings  
16 further underscore the potential public health risk caused by current U.S. Forest Service management  
17 policies that fail to prevent widespread contamination of water due to livestock permitted and  
18 managed on National Forest lands.<sup>1</sup>

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21 11. Despite the risk of harmful microbes and the connected issue of livestock waste  
22 adjacent to and in National Forest streams, the U.S. Forest Service's Water Quality Management  
23 Handbook fails to provide strong and effective management practices or responsive monitoring to  
24 minimize risk to the recreational public that visits National Forest lands. On the contrary, the vast  
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28 <sup>1</sup> In addition, with certain algal species, there is a secretion of toxins that are highly harmful to humans and wildlife. An example of this is the algae problem of the Lower Klamath River and warning signs posted by the North Coast Water Board warning of Microcystin toxins.

1 majority of Best Management Practices (BMPs) within the Handbook are nebulous, unquantifiable,  
2 non-measurable, and in many cases, totally unconnected to water quality objectives.

3         12. The potential for grazing on Forest Service lands to have significant impacts to water  
4 quality as I have observed and discussed above has not been avoided by the most recent revisions  
5 made to the waiver, including the changes relating to additional monitoring requirements for grazing  
6 activities. For example, out of more than 400 active grazing allotments in the Region, no more than  
7 three allotments would be required to be monitored in a manner that would be consistent with State  
8 protocols for assessing compliance with basin plan thresholds. Thus, 99% of grazed allotments  
9 would not be sampled for pathogens by monitoring that would provide be adequate to determine  
10 whether fecal coliform contamination exceeds recreational contact or other water quality thresholds.  
11 In sum, the additional monitoring requirements are incapable of detecting FIB contamination for  
12 more than 99% of allotments within Region 5. This is especially important because without valid  
13 monitoring for recreational contact thresholds, literally hundreds of thousands of recreational visitors  
14 to National Forest lands may potentially be exposed to unsafe fecal coliform levels without any  
15 evidence of the risk. Furthermore and even more important, even if FIB contamination is revealed at  
16 one or more of those three specific sites, no consequential actions to prevent future contamination is  
17 triggered. This is a major flaw in the current strategy and in my opinion is likely to lead to  
18 significant health and water quality impacts in the future.

19         13. The revised waiver also requires the Forest Service to inspect allotments to ensure  
20 compliance with stocking rates, allotment boundaries, season of use, and other permit requirements.  
21 The Forest Service is directed to do forage utilization monitoring at a minimum at the end of the  
22 grazing season. In my opinion, these changes are basically meaningless because the forage-  
23 utilization monitoring and the inspection requirements would not in any way measure water quality  
24 contamination from livestock waste. On the contrary, these additional monitoring requirements fail  
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1 to provide any direct connection to assessment of water quality. For example, increased grazing  
2 intensity may logically lead to a conclusion that there may be a longer presence of cattle in the  
3 nearby riparian areas. But a lack of excessive grazing does not in any way lead to a conclusion that  
4 cows did not contaminate streams and other wetlands through manure and trampling of vegetation .  
5 Thus, forage utilization monitoring provides no credible information to assess whether water quality  
6 is protected from livestock contamination. Finally, similar to the FIB monitoring at the three sites  
7 referenced previously, there is no mandated consequence for monitoring results that show permit  
8 violations or over-grazing of forage. Even when the additional monitoring may actually show that  
9 grazing permittees failed to meet forage utilization standards, there is still no mandated consequence  
10 that will provide any assurance that water quality will be protected  
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13 14. In my opinion, the lack of effective monitoring is a pivotal failure of the revised  
14 waiver and its reliance on the mostly non-measurable BMPs in the Water Quality Management  
15 Handbook. There is so little direct measurement of water quality that Regional or State water boards  
16 cannot know whether or not the BMPs are actually protecting water quality or protecting public  
17 health.  
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19 15. As the representative of public health and water quality on lands within the state, the  
20 State Water Board has an obligation to not only set clear limits on contaminants and require  
21 necessary monitoring to determine if threshold standards are met. To ensure that water quality  
22 contamination is avoided, the Board also has an obligation to provide consequences for activities  
23 that may exceed the standards. No such consequences are spelled out in the revised waiver.  
24 Accordingly, to correct the deficiencies in the waiver, the State Water Board either must require a  
25 significant revision of the current version of the Forest Service's Water Quality Management  
26 Plan/Handbook and the mostly non-measurable BMPs for range management; or must require the  
27 Forest Service to monitor water quality on each national forest at multiple representative locations  
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1 Further, that monitoring should be required to be done consistent with State protocols so that  
2 compliance with basin plan standards can be assessed.

3 16. The latest revision of the waiver is intended to provide needed oversight for an  
4 incredibly broad range of activities with potential to affect watersheds on National Forest lands.  
5 Those public lands provide drinking water for millions of people in this state. I am hopeful that the  
6 State Water Board will not ignore the problem of non-point pollution from cattle grazing on National  
7 Forest lands. Livestock grazing continues to contaminate water, degrade stream banks, cause  
8 erosion and sedimentation, and remove vegetation that is essential for holding soil during storm  
9 events and snowmelt. Unless the Water Board provides strong requirements to significantly alter the  
10 practices now taking place where livestock grazing occurs within national forest lands, it is almost  
11 certain that the Water Board will be giving approval to range management practices that will  
12 continue to result in degradation of water quality in public forest streams, lakes, and rivers.  
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16 17. I declare under penalty of perjury that the foregoing statements are true and correct to  
17 the best of my knowledge.  
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19 DATED: November 17, 2011  
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22 ROBERT W. DERLET, MD.  
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