Potential Administrative and Economic Impacts of NPDES Permit Requirements for Forest Roads in the South

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Executive Summary

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Background

The federal Ninth Circuit Court of Appeals has issued a decision that could effectively require many timberland owners and logging companies to obtain permits for stormwater runoff from logging roads in the western U.S., and could possibly prompt the Environmental Protection Agency (EPA) to issue similar rules for the rest of the country. This analysis summarizes the possible effects of a requirement to obtain National Pollutant Discharge Elimination System (NPDES) permits for forest roads in the South based on the best available information and data about such a program.

The adverse economic impacts of a permit requirement for forest roads—for landowners, loggers, forest products firms, and state agencies—were substantial, as detailed in this full report. In brief, the individual costs for obtaining detailed NPDES permits could be $16,000 to $24,000 per operation, leading to very large decreases in net revenues and eliminating all profits for small and probably large landowners. Aggregate costs for the South will vary depending on how the permitting requirements and standards are defined and applied, but could range from $420 million to $4 billion per year.

Methods

The methods for the analysis were to:

1) estimate the possible actions and costs that would be required to obtain a general NPDES permit;
2) estimate the number of timber harvest operations, road construction activities, or stream crossings per year that might require a permit;
3) estimate the costs for individuals or organizations that would prepare permit requests per state and for the South as a whole for obtaining permits based on parts 1 and 2; and
4) estimate other forest owner and state agency costs that may be incurred to develop NPDES road permits.

For part 2 above, three methods were used to estimate the number of permits that might be required per state:

1) the number of timber harvests of average size ownerships needed to match the state total area harvested per year;
2) the number of miles of forest roads that would occur per year on the harvested area, and
3) the number of stream crossings that would occur per year on the harvested area.

These metrics indicated that there would range between a low estimate of 33,000 operations, based on the number of miles of road or stream crossings, or an upper bound of 183,000, based on the annual number of timber harvests each year, that would require a NPDES forest road permit per year in the South. The range is based on an the average tract size, the amount of roads, or the amount of stream crossing as the basis that triggers a NPDES permit in the South, since the precise structure of such a regulatory system is undefined.

Results

Plans for general multi-sector stormwater permits require detailed descriptions and maps of facilities or construction activities; identification and description of potential pollutant sources; description and implementation of stormwater control measure; schedules and procedures for monitoring; inspection; documentation regarding other federal laws; and certification/application costs. The preparation of NPDES permits was estimated to be about $16,000 per permit for larger forest owners who already had staff and experience with industrial NPDES permits, and about $24,000 for smaller forest owners who lacked staff or experience, and would probably have to employ consultants to prepare plans.
Based on the cost per permit and the number of permits that could be required, the aggregate costs for landowners, procurement dealers, loggers, and forest products firms could range from a minimum of $420 million per year in the South to a maximum of $4 billion per year. A median estimate of about $2 billion per year is reasonable if every operation is required to obtain a NPDES permit. The aggregate costs for landowners per state were $7 million per year for the least cost option in the smallest state, and exceeded $300 million per year in the larger states with the larger number of permits required scenarios. The administrative costs for state agencies to run the regulatory programs would also cost millions of dollars per year in large states, and as much as $1 million per year in small states.

Conclusion

A requirement for detailed multi-sector NPDES permits such as those currently in use would be extremely burdensome for large forest owners and operators, and disastrous for small owners and operators. On a basis of the forest land area owned, and the smaller estimate of permits required based on roads or stream crossings, the minimum number of permits cost for larger forest owners, would cost $2.08 an acre per year. For small forest owners, the minimum annual cost would average $3.13 per acre owned per year. For the higher estimate of permits required based on the number of harvest operations, large landowners would average $14.36 per acre owned each year, and small forest owners would average $21.54 per acre owned. These costs, coupled with already significant property taxes, would be punitive, sometimes even exceeding the value of the timber growth each year.

On a per harvest basis, the costs of preparing, implementing, and monitoring NPDES forest roads permit would decrease net timber sales returns:

- 19% for larger harvest tracts of 80 acres, and
- 71% for average size forest tracts of 32 acres typical of smaller forest owners.

In total these costs for landowners, loggers, procurement organizations, forest products firms, and states would greatly decrease net returns or even eliminate profits for forest investors, causing capital flight, as well as decrease U.S. competitiveness, manufacturing, and employment in the forestry sector. This study did not attempt to estimate additional costs to timber landowners resulting from litigation and permit challenges that are often associated with NPDES permitting in other industrial applications. But these would be a significant deterrent to landowners as well. Perhaps a NPDES permit program could be instituted by the EPA in such that fewer permits would be required, or much simpler permit applications are developed. However, even if the EPA preferred simpler approaches, the courts and environmental interest groups might force strict enforcement of NPDES regulation unless current law is amended.

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Introduction

The federal Ninth Circuit Court of Appeals has issued a decision that could effectively require many timberland owners and logging companies to obtain permits for stormwater runoff from logging roads in the western U.S. (MacCurdy 2011), and could possibly prompt the Environmental Protection Agency (EPA) to issue similar rules for the rest of the country. The case of *Northwest Environmental Defense Center v. Brown* addressed whether logging roads are exempt from requirements to obtain permits under the National Pollutant Discharge Elimination System (NPDES). Since 1976, EPA has employed the Silvicultural Rule (40 CFR sec. 122.27 (b)(1)), which defines timber "harvesting operations, surface drainage, or road construction and maintenance from which there is natural runoff" to be "non point source silvicultural activities" excluded from NPDES permitting requirements (Stoel Rives 2010).

This Ninth Circuit's ruling was first issued in August of 2010, and then revised and reissued by the same court on May 17, 2011. The Court reiterated that logging road stormwater collection systems unambiguously constitute "point sources" under the Clean Water Act (CWA) and are an "industrial activity" under the CWA stormwater provisions. Thus they would require permits under the CWA's NPDES program. While such roads, when properly constructed, may actually reduce erosion of sediment to adjacent streams, the court noted that the roads and associated stormwater collection systems include ditches, culverts, and channels that collect and convey stormwater runoff from the roads to tributary streams and adjacent rivers. The Northwest Environmental Defense Center (NEDC) brought the citizen suit under the CWA, alleging that sediment discharges in the stormwater from logging roads negatively impact aquatic life, such as salmon and trout, and require permits under the NPDES program. The District Court of Oregon dismissed NEDC suit, holding that the Silvicultural Rule exempted the discharges from the NPDES program. However, the Ninth Circuit reversed this decision in 2010, and affirmed that same decision in May 2011 after the defendants requested a rehearing (MacCurdy 2011).

Issues

The full implementation of a requirement to obtain a NPDES permit of some type for forest roads could be difficult and costly for forest landowners, logging companies, and forest products firms. Responses to the Ninth Circuit's ruling could include implementation by EPA of a regional or national NPDES permit scheme for forest roads; appeal of the decision to the U.S. Supreme Court; or an amendment to the Clean Water Act to specifically exempt forest roads and silvicultural operations from NPDES permit requirements. Each of these options is being considered, but all will take time, expense, and debate.

In the short run, better information is needed on the likely time and costs that might be required by the persons or organizations responsible for the implementation of a NPDES requirement for forest roads and culverts in the country. This will help inform the discussion about the merits of the requirement, as well provide both EPA and the forestry sector a basis for estimating the costs of this potential new permit requirement. This white paper estimates the potential activities and costs of a NPDES permit requirement for the U.S. South. The South is particularly important since it harvests about 64% of the timber in the United States (Smith et al. 2004), and has the largest number of small private landowners in the U.S., with 4.9 million nonindustrial owners (Butler 2008). Thus it would be affected greatly by a permit requirement and the removal of the Silvicultural Rule.

Implementation of the Ninth Circuit's ruling has many technical challenges that are relevant in this analysis. These include definitions of roads, what triggers a permit requirement, who is responsible for obtaining and administering permits, and the scale of operation that would require a permit.

First, the question of what is a forest or logging road is crucial. The court noted that logging roads may be used for other purposes, but logging was the *sine qua non* for which the roads in Oregon were built, so the permit requirement was germane (MacCurdy 2011). However, what level of road is a road and requires a NPDES permit? A primary road? Secondary? Woods haul road? Hunting access road? This question may be more difficult in the South, where there are many semi-permanent but quite modest roads in the woods, which have little formal maintenance and often no culverts in them. We will have to make some assumptions about this in order to examine the costs of a road permit requirement.

Second, would a NPDES permit requirement in the South only occur when the forest road has a ditch or drainage that effectively channels stormwater flow to a stream? Or only if there is a stream crossing involved? Is it ditches and culverts that make a road a point source, requiring a permit? It would be ironic that these structures are designed to minimize erosion; perhaps one could avoid a permit by having poor quality roads with much more nonpoint source pollution. Again, we will make some assumptions about the amount of permanent forest roads and associated ditches and culverts to assess possible permit costs.

Third, what would a permit require? Would they be general permits for large areas and multiple ownerships, or individual permits for each harvest operation? The court case and language infers that permits would follow the general multi-sector industrial stormwater permit. Other alternatives could

exist, but have not been discussed to date. Any approach is apt to require a long list of actions to qualify for a permit. Thus selecting the actions required is important to determine the costs of a possible EPA rule on logging road permits. We made assumptions about possible actions and time necessary based on the existing industrial multi-sector permit requirements.

Fourth, who would be required to obtain a permit? Would this be the responsibility of the landowner, the logging company, the wood dealer, or the forest products firm that buys the wood? Each of these will have to develop varying levels of new knowledge about this process and its requirements. Large forest products firms which already operate under NPDES general permits for their manufacturing facilities will likely have some familiarity with the permitting process. Large timber investment and management organizations (TIMOs) and real estate investment trusts (REITs) may not be familiar with NPDES permits, but probably have moderate technical staff and capacity that could prepare such documents such as a the stormwater pollution plans. Permits may require more work and staff for wood dealers, who might have permits for woodyards, but not much else. And they would require developing entirely new capacity for loggers in the Southeast, not to mention huge changes and expenses for small landowners.

Methods

This study proceeded in five broad components, which each included several steps. The specific components are listed next.

1) We obtained general background information on general NPDES permits for EPA, which might be models for activities occurring with forest road permits. As noted these included industrial multi-sector stormwater permit requirements, for EPA at the federal level and for selected southern states as examples.

2) Based on the background information, we prepared a table with a list of the potential actions that a general or individual permit could require and the time that would take the responsible party to complete, based on EPA and example state industrial general permits. This list of actions included the potential time required for a large land owner—with about 50,000 total acres of land or so and their own technical staff—and for small landowners, with usually much less than that—say 50 or so acres—which is more common of nonindustrial private forest landowners (NIPFs). Then we estimated the cost of a permit based on this time assumption times an hourly rate for preparing the permit.

3) In order to estimate how many permits might be required, we obtained information on the amount of timber harvests in the South. These data were obtained from the USDA Forest Service Forest Inventory and Analysis (FIA) reports on the amount of timber harvests that have

occurred annually, which will provide estimates of the area of timber harvested per state and per forest survey unit for each year.

4) We also needed to estimate how much road area will be required per amount of forest area, and the amount of water control structures such as ditches and culverts associated with those roads. In order to do this, we obtained estimates of the amount roads per area of forest from a survey of TIMOs and REITs in the Southeast, made by the National Association of Forest Owners (NAFO). We used this for applications to nonindustrial private forest owners as well.

5) We then allocated the number of roads or stream crossings per harvest area (component 4) according to the harvest areas per state (component 3), and multiplying it by the vector of costs (component 2) to determine possible costs per harvest area and the South as a whole.

6) Finally, based on this analysis, we drew conclusions about the potential costs of a general permit requirement for forest roads and its implications for southern forestry.

Results

Permit Requirements

We obtained general permit requirements from the EPA site for Stormwater Pollution Prevention Plans (SWPPP) for a multi-sector general permit and (EPA 2011a; http://cfpub.epa.gov/npdes/stormwater/msgp.cfm), as well as examples from the states of Mississippi and Georgia. EPA delegates this permit authority entirely to the (southern) states for private lands, but several states apparently use the actual forms and requirements prepared by EPA – Georgia has the EPA forms on their site. Appendix A contains the template that EPA distributes for its Industrial SWPPP site.

The long list of possible actions in Table 1 that plans could require is based on multi-sector industrial permits. It is uncertain which of these actions might be required to develop, implement, monitor, and continuously improve the actions of a stormwater permit for forest roads. Thus we included a wide range of activities required in SWPPPs. The list in Table 1 seems extensive, but it is much shorter than the 21 page EPA industrial SWPPP template excerpted verbatim in Appendix A. Based on the list in Table 1, we estimated the time required per activity based on typical forestry operations and discussions with consultants. The estimates provide a reasonable range of effort that would determine the costs.

As shown in the tables, we estimated the amount of time that it would take for two broad classes of landowners to develop these plans. Experienced, large landowners would take less time, and would have the staff to perform these activities. Small landowners would take more time since they would not know how to perform the EPA SWPPP actions, and they would either have to dedicate some new or existing staff to the projects, or hire environmental consultants to perform and write the analyses required.

Table 1. Summary of Potential NPDES Industrial Multi-sector Stormwater Pollution Prevention Plan (SWPPP) activities (EPA 2011a) that would incur some additional time or cost for private landowners beyond current practices, and estimated time by owner size class

Activity	Estimated Additional Time Required (Hours)	
	Large Owners	Small Owners
Read documents, understand process, prepare for NPDES permit requirements, understand plan preparation and submission procedures, understand permit coverage and duration	20	80
Section 1: Describe facility and provide contact information	40	80
Name, address, location, latitude/longitude		
Discharge information, MS4 water, "impaired" water, pollutant, Tier 2 or 2.5 water, effluent guidelines, primary industry SIC code		
Facility owner, operator, SWPPP contact		
Stormwater pollution prevention team		
Activities of the facility		
General location map & site map with details		
Size, location, impervious and pervious surfaces, directions of stormwater flow, existing structural controls, locations of receiving waters, stormwater conveyances, including ditches, pipes, and swales; locations of pollutant sources, significant spills or leaks; stormwater monitoring points, inlets and outfall, municipal storm sewer systems, etc.		
Locations of activities exposed to precipitation: fueling stations, vehicle maintenance, loading/unloading areas, waste treatment, storage, disposal, liquid storage tanks, processing and storage areas, access roads, bulk transfer areas, etc.		
Section 2: Potential Pollutant Sources	40	40
Industrial activity and associated pollutants		
Spills and leaks		
Non-stormwater discharges documentation		
Salt storage		
Sampling data summary – summarize all your data collected from your outfalls during the previous permit term		
Section 3: Stormwater Control Measures	40	40
Minimize exposure		
Good housekeeping		
Maintenance		
Spill prevention and response		
Erosion and sediment controls		
Management of runoff		
Salt storage piles		
MSGP sector-specific non-numeric effluent limits		
Employee training		
Non-stormwater discharges		

Waste, garbage, and floatable debris		
Dust generation and vehicle tracking of industrial materials		
Section 4: Schedules and Procedures for Monitoring	80	120
Procedures for 5 types of analytical monitoring required: benchmark, effluent limitations, state or tribal specific, impaired waters, and other		
Collect and analyze samples		
Substantial or identical outfall exception procedures – location, description of industrial activity, control measures, exposed materials, estimate of runoff coefficient of the drainage area, etc.		
For each type of (5) monitoring, include sample locations, pollutant parameters to be sampled, monitoring schedules, numeric limitations, limitations		
Inactive and unstaffed sites exception, substantially identical outfalls exception		
Inspections	40	60
Routine facility inspections, quarterly visual assessment, comprehensive site inspections		
Section 6: Documentation to Support Eligibility Considerations Under Other federal Laws	20	20
Endangered species		
Historic properties		
NEPA review		
Section 7: SWPP Certification	8	8
Additional efforts to understand, submit, follow, and amend SWPPPs	12	32
Total Estimated Time Required (hours)	300	480

The table summarizes the potential activities, times, and costs that could be incurred by a large or small landowner to comply with the NPDES Point Source permit requirements. This assumes that large owners (approximately 50,000 acres or more of land owned in total) have had previous permitting experience, have existing staff and capacity for handling environmental management systems and permits, have Geographic Information Systems and land management staff, and could incorporate this time and its costs into their ongoing operations. Conversely, it assumes that for small owners, almost all of the work required would be starting from scratch, with the landowners or other organizations needing to either develop the capability to understand and file the permits, or hiring some external consulting organization to perform that work for them.

Southern Timber Harvests

Based on our summary of FIA data, we made estimates of the area of timber harvests made each year by state and survey unit based on data summaries provided by Sheffield (2011). Table 2 summarizes detailed statistics about the timberland area, harvest area, nonindustrial private forest owners, and

estimated average number of harvests per year based on the data from Sheffield and a report by Butler (2008).

Definitions.—Key definitions for Table 2 and this paper are timberland area, nonindustrial private forest owners, and forest industry/corporate owners. Total timberland area by survey unit and state summarizes the area that meets the definition of timberland—the potential to grow 20 cubic feet of wood per acre per year, with more than 1 acre in size. Private forest owners are families, individuals, corporations, and other private groups that own forest land. In the new 2011 *timber harvest* statistics, corporate owners are corporations and other private groups that own forest land; in the past these included forest products companies with forestland that also owned and operated primary wood-processing facilities. Now they include Timber Investment Management Organizations (TIMOs) and Real Estate Investment Trusts (REITs). Nonindustrial private forest owners (NIPFs) are families and individuals who own forest land. The older 2004 *forest landowner* data uses slightly different definitions (Butler 2008). Forest industry owners included only corporations with primary wood-processing facilities; NIPF owners included all corporations that own forest land. This difference does not practically affect the key calculations on average tract size, as will be explained.

The total timberland harvest area by sector summarizes the sum of the final harvest, partial harvest, and thinning areas for each state (Sheffield 2011). These data are provided in columns for corporate, nonindustrial private, and the total for all owners, which includes public owners. A separate column for public owners—mostly national forests—is not included because it is a small amount (4% for the South), and not usually relevant for road permits in the South.

Average Number of Timber Harvests.—The timberland area and number of nonindustrial private forest owners in the South by state was taken from Butler (2008), which was then used to calculate the average tract size owned, based on the *forest ownership* data. The estimate of the average number of private timber harvests per year was computed as the total harvest area in each year divided by the average tract size owned for nonindustrial private forest owners. Note that the average tract size is quite small, at an average of 32 acres per owner in the South, which would translate into 183,142 total timber harvests per year. In practice, timber harvests might occur on larger tracts, but there are not data available to estimate this harvest tract size directly in the South. Thus the computed estimate of total timber harvests per year would probably represent the upper bound of the number of road permits required, but it is the best publicly available data for the South.

Two relevant research comparisons provide benchmarks for the accuracy of number of harvests estimated per Table 2. Butler (2008) reports that there are 4,960,000 private forest owners in the South and 4,945,000 nonindustrial private forest owners in the South. Thus there would be 15,000 forest industry owners—corporations and other private forest groups—that own forest land and own and operate primary wood processing facilities. This translates into about 1,000 industrial owners per state, which would yield an average of 2,404 acres per owner. However, this does not mean that there will 2,400 acre harvests, which are clearly infeasible. Even a 60 acre average harvest size, which is still large, would yield an estimate of at least 98,000 harvests in the South each year.

Table 2. Timber harvest area, average ownership size, and estimated number of harvests per year by state in the U.S. South

State/Survey Unit	Total Timberland Area (thousand acres)[2]	Total Timberland Harvest Area (thousand acres)[1]			Nonindustrial Owners		Average Number of all Harvests per Year[3]
		Corp-orate	Non-industrial Private	Total All Owners	Number (thou-sands)	Average Tract Size, (Acres)[2]	
Florida (Coastal Plain)	15,912	43.9	237.9	324.5	509	19	17,079
Georgia (total)	24,395	113.7	672.32	809.71	524	35	23,134
Coastal Plain	10,687	72.98	353.80	439.10	-	-	-
Piedmont	10,901	34.15	292.54	337.63	-	-	-
Mountains	2,807	6.57	25.98	32.98	-	-	-
North Carolina (total)	18,108	76.97	312.12	398.01	525	27	14,741
Coastal Plain	8,820	72.66	182.59	263.28	-	-	-
Piedmont	5,346	3.06	106.92	109.96	-	-	-
Mountains	3,942	1.25	22.61	24.77	-	-	-
South Carolina (total)	13,003	33.63	393.21	445.66	301	32	13,927
Coastal Plain	8,352	30.18	248.52	294.10	-	-	-
Piedmont	4,651	3.45	144.69	151.56	-	-	-
Virginia (total)	15,390	12.58	232.77	253.59	410	30	8,453
Coastal Plain	3,622	5.94	73.3	79.86	-	-	-
Piedmont	6,120	5.74	111.5	120.42	-	-	-
Mountains	5,647	0.9	47.97	53.3	-	-	-
Southeast States (all)	86,807	280.78	1,848.32	2,231.47	2,269	28	79,695
Coastal Plain	47,393	225.66	1096.11	1,400.84	-	-	-
Piedmont	27,019	46.4	655.65	719.57	-	-	-
Mountains	12,395	8.72	96.56	111.05	-	-	-
Alabama (total)	22,723	160.86	659.16	834.79	412	43	19,413
Coastal Plain	12,778	119.42	437.66	565.79	-	-	-
Piedmont	7,849	40.47	192.42	238.95	-	-	-
Mountains	2,096	0.97	29.08	30.04	-	-	-
Arkansas (total)	18,423	257.70	346.24	645.80	345	32	20,181
Coastal Plain	2,143	13.16	27.19	41.21	-	-	-
Piedmont	10,104	236.11	244.76	511.70	-	-	-
Mountains	6,177	8.42	74.3	92.88	-	-	-
Kentucky (total)	12,201	3.2	196.62	207.01	473	22	9,409
Western/Plains	701	1.25	7.24	9.73	-	-	-
Piedmont	5,740	1.95	88.05	92.12	-	-	-
Mountains	5,759	0	101.35	105.17	-	-	-
Louisiana (total)	14,305	242.82	267.66	533.54	131	63	8,469
Coastal Plain	9,569	162.02	146.78	325.92	-	-	-

Piedmont	4,466	80.80	120.87	207.63	-	-	-
Mississippi (total)	19,557	93.22	462.30	586.37	370	41	14,301
Coastal Plain	6,454	35.58	137.23	187.33	-	-	-
Piedmont	13,103	57.64	325.07	399.04	-	-	-
Oklahoma (Piedmont)	5,103	27.52	72.92	103.83	71	84	1,236
Tennessee (total)	13,574	12.45	206.22	226.15	534	21	10,769
Western – Plain	2,314	1.20	50.11	54.10	-	-	-
Piedmt/Highland	7,823	9.89	133.05	147.63	-	-	-
Mountains	3,410	1.36	23.07	24.43	-	-	-
Texas (Coastal Plain)	11,980	91.1	396.91	491.58	354	37	13,286
South Central (all)	117,569	888.87	2,607.73	3,629.07	2,690	35	103,688
Coastal Plain	45,939	423.73	1,203.12	1,675.66	-	-	-
Piedmont	54,187	454.38	1,177.14	1,700.9	-	-	-
Mountains	17,442	10.75	227.8	252.52	-	-	-
Total South (all)	204,376	1,169.65	4,456.05	5,860.54	4,945	32	183,142
Coastal Plain	93,332	649.39	2,299.23	3,076.50	-	-	-
Piedmont	81,206	500.78	1,832.79	2,420.47	-	-	-
Mountains	29,838	19.47	324.36	363.57	-	-	-

[1]Forest Inventory and Analysis Data (Sheffield 2011); physiographic region based on assignment of entire survey unit into one class; totals include all final harvest, partial harvest, and thinning. They also include public lands, but it is very small amount.

[2]Total timberland area (Sheffield 2011) / number of NIPF owners, from the National Woodland Owner Survey (Butler 2008)

[3]Area harvested per year / average tract size per state

Another recent research article summarized efforts at estimating the average tract size harvested in the increasingly fragmented forest landscapes in the South, based on data in South Carolina (Moldenhauer and Bolding 2009). They estimated that currently (as of 2009), 14% of the timber harvests were estimated to be less than 10 acres in size; 17% from 10 to 20 acres; 33% from 20 to 40 acres; 26% from 40 to 80 acres; and 9% greater than 80 acres. These estimates were translated into a logger spending less than 3 days on a tract of less than 10 acres; 4 to 6 days on a 10-20 acre tract; 7 to 10 days on a 20-40 acre tract; 11 to 15 days on a 40-80 acre tract; and more than 15 days on a tract large than 80 acres. Thirty acres was the median tract size, which is quite similar to our estimate of 32 acres in ownership size based on data from the FIA and Butler (2008). Moldenhauer and Bolding (2009) found that loggers predicted that the average tract size would decrease, with more small tracts likely in the future. Based on this research, our estimate of about 180,000 harvests per year in the South would be very accurate.

Two states—Virginia and North Carolina—monitor forest harvests, as a comparison. Virginia requires a notification before timber harvests take place, and receives about 2,000 notifications per year, compared to the 8,400 estimated based on average tract size owned or the South Carolina study. At 2,000 notifications per year, this would imply that the average tract size harvested is 127 acres (253,590 acres/2,000), which seems improbable in such a fragmented and often mountainous state. North

Carolina inspects a sample of forest operations in the state for compliance with their Forest Practice Guidelines (FPGs). In 2010, it inspected 3,202 sites, including 2,741 active or completed timber harvest sites. This sample does not include all harvests, and is much less than the 14,741 timber harvests based on average landowner size. These harvest inspection data, coupled with the South Carolina and Virginia logger surveys, suggest that if the average tract between 20 and 80 acres, again leading to an average estimate of 100,000 to 180,000 timber harvest operations per year in the South.

Amount of Forest Roads and Stream Crossings

The large amount of data in Table 2 can be used to calculate the total number of roads and culverts that might be subject to permits, as shown in Table 3. This is derived by the number of acres harvested per year by state, the number of roads per unit area, and the number of stream crossings, as provided by the NAFO (2011) survey.

Table 3. Timber harvest area, estimated number of harvests per year, and road and stream crossing requirements by state in the U.S. South

State/Survey Unit	Total Timber-land Area (thous-and acres)	Timber Harvest, All Owners (thousand acres)	Annual Harvest Share of Total Area (%)	Number of Timber Harvests Per Year at Average Tract Size	Forest Roads		Stream Crossings	
					Acres Per Mile[1]	Miles Per State[2]	Acres per Cros-sing[1]	Crossings Per State[2]
Florida	15,912	324.5	2.04	17,079	174	91,448	183	86,951
Georgia	24,395	809.71	3.32	23,134	162	150,586	126	193,611
North Carolina	18,108	398.01	2.20	14,741	188	96,319	249	72,723
South Carolina	13,003	445.66	3.43	13,927	176	73,881	333	39,048
Virginia	15,390	253.59	1.65	8,453	129	119,302	194	79,330
Southeast	86,807	2,231.47	2.57	79,695	168	516,708	171	507,643
Alabama	22,723	834.79	3.67	19,413	143	158,902	201	113,050
Arkansas	18,423	645.80	3.51	20,181	200	92,115	125	147,384
Kentucky	12,201	207.01	1.70	9,409				
Louisiana	14,305	533.54	3.73	8,469	222	64,437	144	99,340
Mississippi	19,557	586.37	3.00	14,301	191	102,393	77	253,987
Oklahoma	5,103	103.83	2.03	1,236	184	27,734	88	57,989
Tennessee	13,574	226.15	1.67	10,769	147	92,340	782	17,358
Texas	11,980	491.58	4.10	13,286	159	75,346	255	46,980
South Central	117,569	3,629.07	3.09	103,688	178	660,500	138	851,949
Total South	204,376	5,860.54	2.87	183,142	175	1,167,863	146	1,399,836

[1]NAFO (2011) survey of operational forest roads and stream crossings for member companies
[2]Total forest area per state divided by area of stream crossing per mile or road or number of stream crossings

The NAFO survey reported the total number of acres (31,271,647), miles of road (220,587), and number of stream crossings (360,687) in the nation for most of its member organizations, divided by state. The

survey was designed to identify the minimum number of sites that were likely to need permit coverage under a possible system. It focused on permanent roads and potential stream crossings; assumed that the reported area would need to be monitored to assess whether discharge was occurring; and included perennial or intermittent streams and wetlands if they were shown on the available maps.

As shown in Table 3, the area per mile of road or per number of stream crossings in each state is quite large. Given these assumptions, states would have a range of between 27,000 and 150,000 miles of primary forest roads per state, depending on the size of the state and density of the road network. There is more variation in the amount of stream crossings, ranging from 17,000 per state to almost 254,000. There are also secondary and temporary haul roads associated with timber harvest in the South that may cross streams, which were not estimated due to lack of available data. Inclusion of these would lead to greater permit costs than reported here.

The estimated aggregate number of estimated harvest operations, roads, and stream crossings by state per year are summarized in Table 4. This was computed based on the percent of the area harvested each year in each state, multiplied by the total miles of road or number of stream crossings in the state as a whole and the South in total.

Table 4. Estimated number of timber harvests, miles of roads, and number of stream crossings per year for annual timber harvest operations by state in the U.S. South

State/Survey Unit	Total Timberland Area (thousand acres)	Annual Harvest as Share of Total Area (%)	Number of Timber Harvests Per Year at Average Tract Size	Road Miles Per State/ Region (miles)	Harvest Road Miles per Year (miles)[1]	Harvest Stream Crossings Per State/ Region	Harvest Stream Crossings Per Year (number)[2]
Florida	15,912	2.04	17,079	91,448	1,865	86,951	1,773
Georgia	24,395	3.32	23,134	150,586	4,998	193,611	6,426
North Carolina	18,108	2.20	14,741	96,319	2,117	72,723	1,598
South Carolina	13,003	3.43	13,927	73,881	2,532	39,048	1,338
Virginia	15,390	1.65	8,453	119,302	1,966	79,330	1,307
Southeast	86,807	2.57	79,695	516,708	13,283	507,643	13,050
Alabama	22,723	3.67	19,413	158,902	5,838	113,050	4,153
Arkansas	18,423	3.51	20,181	92,115	3,229	147,384	5,166
Kentucky	12,201	1.70	9,409				
Louisiana	14,305	3.73	8,469	64,437	2,403	99,340	3,705
Mississippi	19,557	3.00	14,301	102,393	3,070	253,987	7,615
Oklahoma	5,103	2.03	1,236	27,734	564	57,989	1,180
Tennessee	13,574	1.67	10,769	92,340	1,538	17,358	289
Texas	11,980	4.10	13,286	75,346	3,092	46,980	1,928
South Central	117,569	3.09	103,688	660,500	20,388	851,949	26,298
Total South	204,376	2.87	183,142	1,167,863	33,489	1,399,836	40,141

[1]Number of miles of roads per state times the percent of the annual harvest as a share of total area

[2]Number of stream crossings per state times the percent of the annual harvest as a share of total area

[3]Totals are South-wide weighted averages, and thus are not are not equal to sum of each state

As noted in Table 4, the upper bound of harvest numbers in each state and case would be (1) the total harvest area per year divided by the average tract size. Depending on the state, either (2) the number of miles of road or (3) the number of stream crossings on the share of the forests that are harvested each year provide the other two measures. These estimated numbers are probably smaller than would occur in practice on an individual case basis, because there are likely to be more roads on smaller tracts than on the large corporate tracts represented by the NAFO data. But they at least represent a lower bound of the number of cases where some type of permit for roads may be required for each separate owner.

Using any criterion listed above—number of timber harvests per year, miles of forest road per state, or number of stream crossings per state—the total number of permits required would be very large, numbering from less than 1,000 in the two smallest states, to most cases in the thousands, to nine cases with more than ten thousand per state.

For the South in aggregate, we estimated that the upper bound of the number of timber harvests would be 183,000 annually based on the average tract size owned of 32 acres. Based on a 60 acre tract size, there would be 100,000 timber harvests per year. This includes final harvests, partial harvests, and thinnings. Calculating the number of harvests based on a percent of area harvested basis, there were 5.9 million acres of timber harvested annually, out of in 204 million acres of timberland, or 2.87% of the total forest area is harvested per year. Using this percentage times the number of miles of road would lead to 33,500 permits at the rate of one permit per mile of road. Using the harvest percent times the number of stream crossings would yield the need for more than 40,000 permits required per year at the rate of one per stream crossing. And it is possible that more (or less) permits would be required at the rate of one per mile of road or per stream crossing. And there could be more roads and stream crossings than just the main forest roads.

Individual Permit Costs

We used the permit requirements estimated in Table 1 to provide a basis as the type of roads permit that could be required by EPA. As noted, for existing large firms, completing these permit requirements would be easier than for small forest landowners or even small logging firms and wood procurement organizations. Thus Table 1 has time estimates for these based on different levels of existing capacity. Those ranges are used in Table 5 below to estimate costs for preparation of reports based on a conservative average of $50 per hour for preparation of the reports by internal staff, or by external environmental or forest consulting firms.

Table 5 summarizes the estimated time and costs per case by type of activity for preparing plans, compliance with the measures, monitoring and inspection, and administration and documentation. It also includes a one-time application fee of $2,000. Costs for compliance with stormwater control measures (e.g., Table 1, Section 3) were not included, since it was assumed that compliance with existing forestry best management practices (BMPs) already meets these standards. However, the list of

requirements for the multi-sector industrial permits is different than traditional forestry BMPs, and if applied in this case, might expand the set of required BMPs quite a bit, and add new costs. Furthermore, the stormwater control list clearly requires more record keeping about the application of BMPs and related measures, which would definitely take more time. Also, current multi-sector permits in some states require annual permit application fees, not just for one time.

Table 5. Estimated road permit preparation time and costs and application fees per case

Time and Cost	NPDES Industrial Multi-Sector SWPPP Permit	
Time Required (Hours)	Large Owners	Small Owners
Describe Facility, Identify Pollutant Sources, Prepare Plans	100	200
Stormwater Control Measures, BMPs, Compliance	40	40
Monitoring and Inspection	120	180
Administration & Documents	60	60
Total without Compliance	260	440
Costs Required / Plan ($)[1]		
Describe Facility, Identify Pollutant Sources, Prepare Plans	5,000	10,000
Stormwater Control Measures, BMPs, Compliance	na	na
Monitoring and Inspection	6,000	9,000
Administration & Documents	3,000	3,000
Permit Application Fee	2,000	2,000
Total without Compliance	16,000	24,000

[1]Time required per SWPPP activity times $50 per hour

The total costs presented in Table 5 range from $16,000 per permit for large industrial owners with their own technical staff and prior experience to $24,000 for small owners that would not have their own technical staff or prior experience, and would have to spend large amounts of their own time to understand and complete SWPPP plans, or hire external consultants.

These costs are probably the case for typical operations for the initial permit efforts. Those landowners with industrial operations will likely have an easier start up due to their familiarity with the process. For other large owners, there would be more time required and higher costs at least in the short run as they learned how to operate in this system. Over time, they should learn how to work with those permits better, and their costs could decrease to be more like large owners. However, small owners are not likely to maintain these staffs, or have harvests every year, so the "new" costs may be more typical as different small owners perform this every year, or pay for consultants to do so, who will need to at least fill in the new particular details for each road/stream crossing/owner combination.

The hourly cost for complying with the new permits is probably conservative at $50 per hour. This would include a base wage, fringes, and administrative overhead for a large firm with existing (or new) staff. For a consulting firm, it would be the fully loaded rate; $50 per hour is modest today. For an individual logging firm or procurement organization, this might approximate the managerial level

salaries. For nonindustrial private owners, this would be a moderate wage rate reflecting their opportunity cost for preparing and complying with a permit. Higher salaries and opportunity costs are quite possible.

We checked on the cost for preparing analyses such as NPDES permits with other environmental consultants, who estimated that a NPDES permit might require at least $10,000 to $20,000 if it were prepared by a consulting firm. Forestry firms might be on the lower end of that scale; engineering and environmental consultants on the higher end.

Other Landowner, Organization, or State Administration Costs

There also may be other costs associated with a general permit that we did not include in the lists above. There would be some fixed overhead costs that might not be included in the time estimates, such as a pro rata share of organizational administration, taxes, infrastructure, or other support functions. There may be added compliance or permit costs in designated waters such as Clean Water Act impaired waters, or such as the Neuse River Buffer rules in North Carolina.

In addition, the costs listed above were only for the time to complete a permit, not the opportunity cost of a large amount of time to do so before one could actually harvest timber. Realistically, completing such a permit would require weeks or months to finish, and perhaps longer for review and approval before one could begin to harvest timber.

For small landowners the added time of preparation and waiting for timber harvests would prohibitive, and it could affect large landowners adversely as well. Delays in making sales could cause timberland owners to miss the rare opportunities for good prices due to modest demand increase or weather conditions. The long delay also would require far more planning and organization than typical of small owners.

Higher costs, much more paperwork and administrative requirements, and more delay would create many adverse effects. At a minimum, they increase the size of the smallest economically feasible timber harvest, forcing some small owners to forgo sales. The higher administration costs and less wood available would lead to higher timber and forest product prices. Small landowners would lose the most income, and added requirements and involved bureaucracy would create confusion at best, if not hostility, from small forest owners.

Most states in the South do not have a regulatory forestry program per se, other than the modest one in North Carolina that is implemented through the voluntary use of BMPs, or a “bad actor” law in Virginia that can be used to prosecute loggers who do not comply with the voluntary forestry BMPs. Thus the administrative costs for states are uncertain, but would be significant, as discussed in the next section.

The transition to a permit for roads instead of the use of voluntary forestry BMPs also would a drastic change for large and small southern forest owners, procurement organizations, and landowners. Each state in the South currently has BMPs, and studies consistently show high rates of compliance, up to 89% nationally, with those voluntary guidelines (Ellefson et al. 2001, Ice et al. 2010). These BMPs have

added costs to forestry operations (Cubbage 2004), but have achieved most forest water quality protection goals for citizens, landowners, and state natural resource agencies.

Requiring a mandatory permit for forest harvesting would be onerous and expensive. Increasing the regulatory burden, especially at a time of unprecedented weak timber markets, will create implementation problems. The BMPs would become de facto mandatory requirements in this system, subject to possible inspections and fines. There also could be more general public involvement and oversight by other federal and state agencies of the permit process, and opportunity to challenge permits or bring further lawsuits. In addition, a federal permit requirement expands the opportunity for citizens to file lawsuits. These lawsuits could be against the program administration in an effort to impose increased regulation or against the permit holders for procedural or substantive violations, including even paperwork mistakes. Such litigation will generate its own set of uncertainties and costs, such as attorneys' fees and fines, not to mention lost operating time if a court issues an injunction. These extreme changes would adversely affect the operating environment for forest landowners, loggers, timber buyers, and forest products firms, at a time when decreased timber demand and increased property taxes to support local services are already causing severe economic problems for forest landowners.

Aggregate Regional Costs

Table 6 summarizes the aggregate costs of for preparing, submitting, monitoring, and reporting on roads permits by state and ownership class. The range here is represented by the number of cases where permits would be required, with the least number of permits represented by miles of roads or by stream crossings, and the largest number by the number of harvest sites based on average tract size. Then the cost per owner is entered, and the total cost is the product of these columns.

Table 6 indicates that the cumulative costs per state to forest owners of preparing many individual NPDES permits would be substantial under any assumption used—at least $420 million per year for the entire South in the cheapest case, up to $4.4 billion for the South in the most expensive case.

We also weighted the permit cost estimates based on the timber harvest shares, of 25% for industrial/corporate owners and 75% for nonindustrial forest owners. Using these proportions and the least cost/highest cost estimates, total costs for the South could range from a minimum of $580 million per year in the South to a maximum of $4.0 billion per year. These calculations indicate that South-wide permit preparation and implementation cost of about $2 billion per year as being a reasonable average estimate if every operation needed to obtain a NPDES permit.

The costs per state ranged from a low of $6.9 million per year for Tennessee for small nonindustrial private forest owners, which comprise the brunt of the ownership there, and $9 million for mostly corporate owners in Oklahoma. Major forest products states with large amounts of large timberland owners would incur large minimum annual costs, such as $28 million in Florida, $80 million in Georgia, $26 million in North Carolina, $66 million in Alabama, and $49 million in Mississippi.

Table 6. Estimated number of permits and aggregate costs for annual timber harvests by state in the U.S. South

State/Survey Unit	Fewest Miles of Road or No. Stream Crossings per Year	Most Permits: Timber Harvests per Year by Tract Size	All Large Owners Annual Costs per State (million $)		All Small Owners Annual Costs per State (million $)	
			Least Cost: Road or Stream Crossing Basis[1]	Most Cost: Average Tract Size Basis[3]	Least Cost: Road or Stream Crossing Basis[2]	Most Cost: Average Tract Size Basis[4]
Florida	1,773	17,079	28.37	273.26	42.55	409.90
Georgia	4,998	23,134	79.97	370.14	119.95	555.22
North Carolina	1,598	14,741	25.57	235.86	38.35	353.78
South Carolina	1,338	13,927	21.41	222.83	32.11	334.25
Virginia	1,307	8,453	20.91	135.25	31.37	202.87
Southeast	11,014	79,695	176.22	1,275.12	264.34	1,912.68
Alabama	4,153	19,413	66.45	310.61	99.67	465.91
Arkansas	3,229	20,181	51.66	322.90	77.50	484.34
Kentucky	-	9,409		150.54		225.82
Louisiana	2,403	8,469	38.45	135.50	57.67	203.26
Mississippi	3,070	14,301	49.12	228.82	73.68	343.22
Oklahoma	564	1,236	9.02	19.78	13.54	29.66
Tennessee	289	10,769	4.62	172.30	6.94	258.46
Texas	1,928	13,286	30.85	212.58	46.27	318.86
South Central	15,636	103,688	250.18	1,659.01	375.26	2,488.51
Total South	26,650	183,142	426.40	2,930.27	639.60	4,395.41

[1]Cost per case of $16,000 for large owners times the miles of road or number of stream crossings
[2]Cost per case of $24,000 for large owners times the miles of road or number of stream crossings
[3]Cost per case of $16,000 for large owners times the average number of harvests per state by tract size
[4]Cost per case of $24,000 for large owners times the average number of harvests per state by tract size

The possible upper range of the costs for preparing road permits per year for the assumption of mostly small owners—which is actually the most representative of the harvest levels—is worse. Recall that from Table 3, nonindustrial private (non-corporate) owners harvested 76% of the forest area in the South. Corporate (large) owners harvested more volume, but the permit requirements would be distributed roughly according to area, not volume. Thus the much larger annual costs, of $7 million to $120 million per state, would be a more probable reflection of the eventual costs if permits were required for the least expensive alternative for determining their needs. Even larger costs, ranging from $200 million to $550 million per state per year, are possible under the assumption of every timber harvest needing a permit.

Clearly, these are very large potential costs that would be incurred by southern landowners if a NPDES permit were required for every mile of forest roads, every stream crossings, or every relevant timber harvesting operation.

Administrative Procedures and Costs

If instituted, the administrative costs for permits also would be substantial for the state and federal agencies involved. As noted, the South does not have large regulatory or enforcement staffs per se for BMPs and water quality, although most state forestry agencies have one or more water quality specialists. North Carolina might have the most persons directly assigned to forest water quality monitoring, with two state office personnel and 8 regional water quality professional staff to implement their voluntary state BMPs and underlying state Forest Practice Guidelines (FPGs). These staff inspect up to 4000 timber harvesting operations per year now, under a voluntary BMP system that is used to meet the required FPG water quality standards.

The addition of required inspections for all harvest operations, and the possibility of reviewing and processing the large NPDES permits for all operations, would require more staff and expense for North Carolina. Other southern states usually only have one or two water quality professional staff, and use service foresters to make periodic inspections as needed. They would require much larger additions than in North Carolina to their staff to implement such a program.

Cost estimates to implement a regulatory program such as a comprehensive state forest practice act (SFPA) might be an indicator of the state agency costs for a NPDES road permit program. Ellefson et al. (2005) reported that in 2003, California had 125 regulatory staff to administer their SFPA; Oregon had 94; and Washington had 96. At a modest pay rate of $50,000 per professional, including fringes, this would translate into an approximate cost of $5,000,000 per state per year. The western SFPAs are rigorous, but the amount of timber harvested is less than the large southern pine states (Smith et al. 2004), and the number of harvest operations is probably fewer than in the South.

If administered and funded at the same levels as in the West, large southern states would need new forest regulatory agency staff of about 100 persons and budgets amounting to $5 million per year, and small state perhaps $1 million per year to match the level of the western states. It is unlikely that southern states could receive that much additional staff and funds, especially in these difficult budget times. So a requirement to issue and monitor individual stormwater permits for all harvest operations or stream crossings would present intractable administrative and budgetary problems for southern state agencies, as well as for forest landowners. The lack of state funding suggests that they would need to charge significant application or annual fees for the NPDES permits.

Timber Investment Effects

The permit cost also would be a large share of the net sales, and reduce landowner profits greatly as it reduced net income from timber sales. Table 7 illustrates the effect on timber sale profits on average at current timber removal rates and timber prices, assuming a combined softwood and hardwood harvest at the proportions cut in the South, for small harvest tracts typical of small landowners and large tracts typical of large landowners. We assumed the costs would be applied to the same volume per acre for both small and large landowners. For small landowners, we assumed they harvested the southern average tact size of 32 acres; for large landowners, we assumed they would harvest 80 acres.

Table 7. Effect of NPDES permit costs on net landowner revenue for South-wide averages, 2011

Timber / Sale Characteristic		
Volume harvested in South, 2002 (thousand cubic feet)[1]	10,070,134	
Timberland area in the South (thousand acres)[2]	204,376	
Timberland area harvested in South, 2011 (thous. ac)[2]	5,861	
Volume harvested per acre in South (ft^3)	1,718	
Volume harvested per acre in South (tons)	63	
Harvest value per acre in the South[3]	$1,049	
Returns and Costs per Harvest	**Small Landowners NIPFs**	**Large Landowners Corporate**
Harvest Tract Size (acres)	32	80
Gross Sale Price	$33,568	$83,920
NPDES Permit Cost	$24,000	$16,000
Net Revenue with Permit Costs	$9,568	$67,920
NPDES Permit Cost as Share of Gross Sale Price	71.5%	19.1%
NPDES Permit Cost per Acre Harvested	$750	$200

[1]Smith et al. 2004; removals for all species, hardwood and softwood
[2]Sheffield 2011, harvests for all types—final harvests, thinning, partial cuts
[3]Based on 2011 weighted average of 50% pulpwood at $8/ton and 50% sawtimber at $25/ton

As Table 7 indicates, the potential effects of an expensive NPDES permit requirement for each timber harvest, mile of road, or stream crossing on landowner gross returns would be very harmful for forest owners. The NPDES permit costs per acre would be $750 for small nonindustrial private forest tracts and $200 per acre for large landowners. Typical nonindustrial forest landowners with small tracts of 32 acres would lose 71% of their gross revenues, and large landowners 19%. The 19% alone is a loss greater than the normal average returns of stock price appreciation and dividends for REITs, so would essentially cause them to lose shareholder value, at best. At a minimum, this would prompt an intense reconsideration of investment in the corporate U.S. forest sector, for REITs and TIMOs. Worse, it could result in capital flight, land value decreases, and massive disinvestments by corporate and family owners if buyers could be found.

The effect on most nonindustrial and family private forest owners would be disastrous, wiping out all profits and destroying the value of their capital that had been invested for decades in most cases. And

these losses do not even account for the long wait and discounted value of returns for forest investments; or the income, capital gains, severance, and property taxes that forest landowners would pay on the land and gross timber sales prices. And while the net timber removals from Smith et al. (2004) was the handiest measure to use, it probably overstates harvest volumes, which inflates our timber sale revenue values slightly. Smith et al. report total removals, and some of this volume is not for timber harvests, but rather land clearing for development. In addition, our timber removal volume of 1,700 cubic feet per acre could even be high if one considers thinnings and partial harvests, which usually remove less timber per acre. These comprise a large share of timber harvests in the South, as summarized in Table 1.

Discussion

This analysis summarizes the possible effects of a requirement to obtain a multi-sector NPDES permits for forest roads in the South based on the best available information and data about such a program. The methods for the analysis were to (1) estimate the possible actions and costs that would be required to obtain a general NPDES permit; (2) estimate the number of timber harvest operations, road construction activities, or stream crossings per year that might require a permit; (3) estimate the costs for individuals or organizations that would prepare permit requests per state and for the South as a whole for obtaining permits based on parts 1 and 2; and (4) estimate other forest owner and state agency costs that may be incurred to develop NPDES road permits. Overall, the effects of a requirement for a permit requirement for forest roads, for landowners, loggers, forest products firms, and state agencies were substantial, and the costs incurred by all sectors in implementing such a program would be quite large. The net effects of a NPDES road permit per landowner would be extremely harmful to timber investments, adversely affecting the entire forest land owning and manufacturing sector.

Permit Requirements and Costs

Plans for industrial stormwater or for general construction permits generally require detailed descriptions and maps of facilities or construction activities; identification and description of potential pollutant sources; description and implementation of stormwater control measure; schedules and procedures for monitoring; inspection; documentation regarding other federal laws; and certification/application costs. The preparation of NPDES permits was estimated to be about $16,000 per permit for large firms that already had staff and experience with industrial NPDES permits, and about $24,000 for nonindustrial or small owners that lacked staff or experience, and would probably have to employ consultants to prepare plans.

Three methods were used to estimate the number of permits that might be required per state: (1) the number of timber harvests of average size ownerships needed to match the state total area harvested per year; (2) the number of stream crossings that would occur per year on the harvested area; and (3) the number of miles of forest roads that would occur per year on the harvested area. These metrics

indicated that the number of permits could range between 33,000 and 183,000 “permittable” operations per year in the South, with a median of at least 100,000 per year being reasonable.

Based on the cost per permit and the number of permits that could be required, the costs for landowners, procurement dealers, loggers, and forest products firms could range from a minimum of $420 million per year in the South to a maximum of $4.4 billion per year, with a median of about $2 billion per year being reasonable if every timber harvest operation needed to obtain a NPDES permit. The total aggregate costs per state for landowners were also large, at $9 million per year for the least cost option in the smallest states, and exceeded $200 million per year in the larger states and with the larger number of permits required scenarios. The administrative costs for state agencies to run the regulatory programs would also cost millions of dollars per year in large states such as Georgia, Alabama, Florida, North Carolina, and Texas, with more than 400,000 acres of timber harvests per year. The administrative costs could cost as much as $1 million per year in small states, such as Oklahoma, Kentucky, Tennessee, and Virginia, which harvest 250,000 acres or less per year.

Forestry Sector Implications

If applied to every qualifying timber harvest operation, forest road, and stream crossing in the South, the detailed, required NPDES permit would essentially negate the South’s voluntary best management practices (BMP) approach, and convert the Clean Water Act implementation to a de facto state forest practice act approach. The costs of this approach would be extremely large, and further reduce or eliminate the profitability of the southern forestry sector by reducing returns to forest landowners, adding administrative burdens and time delays, and harming large TIMOs and REITs significantly and small family forest owners much more.

On a per harvest basis, the costs of preparing, implementing, and monitoring NPDES forest roads permit would decrease net timber sales returns 19% for large harvest tracts of 80 acres, and reduce them 71% for small forest tracts of 32 acres typical of nonindustrial private forest owners. This would eliminate any profits at best, or even cause massive losses and disinvestment in the forest land.

We found relatively poor competitiveness of U.S. timber investments in global context in other research (Cubbage et al. 2010), and instituting required NPDES permits for forest roads would exacerbate the problem substantially. The added costs would reduce returns and profits from timber growing. Timber markets have been depressed for a decade, and adding such large costs would hurt investors, nonindustrial owners, family forest owners, and forest products processing and employment. Furthermore, capital flight would cause ecological and environmental problems as rural economies rushed to seek financially better land uses than forestry.

Caveats

In order estimate the potential impacts of requiring NPDES permits for forest roads in the South, we had to make various assumptions about how many permits would be required and estimate the costs of those permits. It is possible of course that a NPDES permit program could be instituted in such a fashion that fewer permits would be required, or much simpler actions and permit applications were developed.

EPA may not want to require something as complex as the SWPPP approach modeled here, since they have eschewed this approach to date with their Silvicultural Rule. However, even if they preferred simpler approaches, the courts and environmental interest groups might force strict regulation without some amendment of the law. We estimated our impacts based on the current multi-sector industrial stormwater permits, which is the principal model being discussed at this time. Lower costs might be incurred with a simpler or more streamlined regulatory instrument, but there is no basis other than complete conjecture to model such an approach, so we did not do so. Conversely, we did not estimate any added costs for BMPs, but detailed multi-sector general permits could require additional BMPs, record keeping, and costs not required by existing forestry BMPs.

Our estimates of the number of permits required ranged from a low of 33,000 per year based on typical TIMO and REIT management of roads and stream crossings, to a high of 183,000 per year based the approximate number of timber harvests made each year in the South on average sized ownerships and harvest sizes. It is not clear what level of action may require a permit—each harvest, each stream crossing, each mile of road, or some other criterion. But our range of possible permits and concomitant costs seems reasonable based on what we know now.

It may be that multiple harvests on the same tract would need only one permit for many years. However, with the annual area harvested being about 2% per year, there is not apt to be as much overlap in a 50 year time period. And the owners may change hands in that time as well—both corporations and nonindustrial private owners turn over in less than every ten years by most accounts. And SWPPP permits must be renewed periodically as well, usually in less time than in another timber harvest for small forest owners.

Multi-year permits for the same owners or management methods that minimize stream crossings could reduce the number of permits required, but still there would be significant time and delay costs for some forest owners, loggers, procurement dealers, or manufacturing firms. The assumptions we made about number of permits based on average harvest size, miles of road, or number of stream crossings should be moderate. Fewer permits might be required if large land owners could submit a consolidated application; however we assumed that each potential discharge point will have to be assessed and documented. It is not clear how this could work for small nonindustrial owners, or how the permit could be sure to target the specific harvest tracts that actually needed a road/stream crossing permit.

Furthermore, it is at least as likely that one might require more than one permit per mile of road or stream crossing, so our estimate of the number of permits and their costs could be too small. In addition, we did not consider secondary economic effects of permit costs, such as producer and consumer surplus (welfare analysis), or multipliers (input-output analysis). These would have led to much greater costs.

It also is possible that our estimates of the number of roads or costs of each permit could be too small. As noted, other environmental consultants said permits could cost up to $20,000 apiece, so we have probably been accurate with that estimate. As one more benchmark on roads, we checked on the NC State University Hofmann Forest, which has 80,000 acres and 400 miles of road. This amounts to 200

acres per mile of road, which is slightly higher than the NAFO South-wide average, but the Hofmann has about 30,000 acres of deep swamp that are not managed at all, so the average seems close. The coastal plain forests also have extensive ditch and drainage operations, which could easily have more than one stream crossing or "permittable" required actions than the averages used here. Conversely, small private forest land owners in the Piedmont of the South may require fewer roads and stream crossings than the amount we used based on data from NAFO members, and the mountains may require more.

Sensitivity Analysis

We believe the basic assumptions we used bracket the reasonable number of forest harvests in the South, as well as the amount of primary forest roads, and potential forest stream crossings. The caveats listed in the preceding section suggest some sensitivity analyses that could be performed. In general, all of the assumptions and multiplications for the aggregate state-wide and southern costs of a detailed NPDES requirement were linear—a constant change in one would have the same effect on the total estimated. Thus if one desired to examine the effects of a road density that was only half as extensive, the estimated aggregate costs for each state and the South would be only half as much. The reverse is true as well; more intensive road, stream crossing, or permit requirement assumptions would increase the aggregate costs linearly.

The same logic holds for the case of the permit costs on aggregate costs—doubling costs would double impacts; cutting permit costs in half would halve aggregate impacts. However, there would be basic permit costs for all owners, and their effects on individual landowner net returns would be quite large unless they were reduced to only extremely small levels. This seems unlikely if any mandatory permit, plan, monitoring, and inspection actions are required.

Conclusion

This report presents many results by state based on the best data available on southern timber harvest levels, permit actions and costs, number or harvests, miles of roads, and stream crossings. The details enumerated above are summarized briefly for reference for key scenarios in Table 8 for the South as a whole. Note that we also calculated the costs per acre owned in Table 8, which provides some reference for comparison among different regions in the country.

On a basis of the forest land area owned (not harvested), and the smaller estimate of permits required based on roads or stream crossings, the minimum number of permits cost for larger forest owners, would cost $2.08 an acre per year (Table 8). For small forest owners, the minimum annual cost would average $3.13 per acre owned per year. For the higher estimate of permits required based on the number of harvest operations, large landowners would average $14.36 per acre owned each year, and small forest owners would average $21.54 per acre owned. These costs, coupled with already significant property taxes, would be punitive—sometimes even greater than the value of the timber growth each year.

Table 8. Summary of estimated annual South-wide impacts of NPDES permit requirements for forest roads, 2011

Analysis Component	Amount	
Data Inputs		
Total Timberland Area in the South (acres)	204,376,000	
Timber Harvests (acres)	5,860,540	
Maximum Amount of Timber Harvests (number)	183,142	
Forest Roads on Timber Harvest Area (miles)	33,489	
Stream Crossings on Timber Harvest Area (number)	40,141	
Hours to prepare NPDES Permit (large-small owners)	260-440	
Costs to Prepare and Apply for NPDES Permit (large-small owners)	$16,000-$24,000	
Results	**Cost per Year**	**Cost Per Acre Owned Per Year[5]**
Minimum Aggregate Costs at Corporate Owner Costs, Fewest Permits[1]	$426 million	$2.08
Minimum Aggregate Costs at NIPF Owner Costs, Fewest Permits[2]	$640 million	$3.13
Maximum Aggregate Costs at Corporate Owner Costs, Most Permits[3]	$2,930 million	$14.36
Maximum Aggregate Costs at NIPF Owner Costs, Most Permits[4]	$4,395 million	$21.54
Weighted Minimum Aggregate Costs, Corporate and NIPF (25%/75%)	$586 million	$2.87
Weighted Maximum Aggregate Costs, Corporate and NIPF (25%/75%)	$4,029 million	$19.75
Reduction in Timber Harvest Sale Returns per Tract, Large/Corporate Owners	19%	-
Reduction in Timber Harvest Sale Returns per Tract, Small/NIPF Owners	71%	-

[1] Cost per year based on fewest miles of roads or number of stream crossings by state times $16,000 per permit
[2] Cost per year based on fewest miles of roads or number of stream crossings by state times $24,000 per permit
[3] Cost per year based on average tract size by state times $16,000 per permit
[4] Cost per year based on average tract size by state times $24,000 per permit
[5] Cost per year divided by total number of timberland acres in the South

The approaches and data we used here represent reasonable and transparent methods to estimate the possible economic impacts of requiring NPDES permits for forest roads in the South. The estimated effort required and associated costs are very large, and would reduce forest investments and substantially harm nonindustrial and family forest landowners. In total these costs for landowners, loggers, procurement organizations, forest products firms, and states would drastically decrease net returns or even eliminate profits for forest investors, causing capital flight, as well as decrease U.S. competitiveness, manufacturing, and employment in the forestry sector.

The current mostly voluntary BMP approach has been effective. The added costs of converting to a regulatory framework with extensive application procedures and ongoing monitoring, on thousands of small tracts and for millions of small owners, do not seem to have much merit given the poor health of

the forestry sector already, and the modest incremental benefits to be gained given that the South has a long standing, well implemented, and effective voluntary forestry best management practice (BMP) program in each state. In addition, a mandatory forest road permit may lead landowners to avoid building primary roads whenever possible, and just skid trees father or use secondary roads, which would actually cause more pollution.

Last, we might note that we started this analysis without substantial knowledge of its details, and have tried to minimize our bias in calculating the results. We have used the best data and assumptions we think reasonable given the generally uncertain knowledge about a possible NPDES permit program in the South. Based on the analysis, we think we are safe in concluding that a rigorous, strict, mandatory multi-sector NPDES forest road permit implemented for every timber harvest would be calamitous for the forestry sector and for forests in the South. We hope this analysis clearly conveys the reasons for that concern, and will facilitate the search for alternative policies to ensure that the nation meets its water quality objectives and that forest landowners, who already suffer from poor timber markets and high property taxes in many cases, can continue to own, receive reasonable returns from, and manage their forests wisely.

Economic returns are one of the three pillars of sustainable forest management, along with environmental and social benefits. The evidence summarized here indicates that mandatory NPDES permits for forest roads in the South would substantially reduce returns to forest investments and diminish the incentive for wise land stewardship and sustainability. Decreased stewardship would also lead to more environmental problems as owners avoided forest management, or accelerated "cut-out and get-out" forestry. These practices would adversely affect ecological values of forests, as well as social systems in local economies and employment. All stakeholders and regulators need to seek alternative policies to mandatory, detailed NPDES road permits, including perhaps a reaffirmation of the Silvicultural Rule, in order to ensure sustainable forest management.

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File: Road Permit Costs in the South V29

Industrial SWPPP Template

Introduction

To help you develop a SWPPP that is consistent with the 2008 MSGP, the U.S Environmental Protection Agency (EPA) has created this Industrial SWPPP Template (or, "the Template"). Use of the Template will help ensure that your SWPPP addresses all the necessary elements required in Part 5 of the 2008 MSGP.

Before completing the Template, make sure you read and understand the requirements in the 2008 MSGP. A copy of the MSGP is available at www.epa.gov/npdes/stormwater/msgp.

Using the Industrial SWPPP Template

Tips for completing the Template:

- **This Template is designed for use by all facilities eligible for coverage under the 2008 MSGP. The Template is NOT tailored to your individual industrial sector. Depending on which industrial sector you fall under (see Appendix D of the 2008 MSGP) and on where your facility is located (see Appendix C of the 2008 MSGP), you will need to address additional SWPPP requirements outlined in Part 8 and/or Part 9 of the permit, respectively.**
- **Complete a SWPPP *before* submitting your Notice of Intent (NOI) for permit coverage.**
- **Each section includes "instructions" and space for your facility's specific information. You should read the instructions for each section before you complete that section.**
- **The Template was developed in *Microsoft Word* so that you can easily add tables and additional text. Some sections may require only a brief description while others may require several pages of explanation.**
- **To make it easier to complete, the Template generally uses blue text where the operator is expected to enter information.**

EPA notes that while EPA has made every effort to ensure the accuracy of all instructions and guidance contained in the Template, the actual obligations of regulated industrial facilities are determined by the relevant provisions of the permit, not by the Template. In the event of a conflict between the Template and any corresponding provision of the MSGP, the permit controls. EPA welcomes comments on the Template at any time and will consider those comments in any future revision of this document.

Stormwater Pollution Prevention Plan

for:

Insert Facility Name
Insert Facility Address
Insert City, State, Zip Code
Insert Facility Telephone Number (if applicable)

SWPPP Contact(s):

Insert Facility Operator
Insert Name
Insert Address
Insert City, State, Zip Code
Insert Telephone Number
Insert Fax/Email

SWPPP Preparation Date:

__ __/ __ __/ __ __ __ __

Contents

SECTION 1: FACILITY DESCRIPTION AND CONTACT INFORMATION

1.1 Facility Information

Instructions:

- You will need the information from this section to complete your NOI.
- For further instruction, refer to the 2008 MSGP NOI form and instructions – specifically sections C and D of the NOI. A copy of the 2008 MSGP NOI is available at www.epa.gov/npdes/stormwater/msgp (Appendix G of the permit)
- Detailed information on determining your site's latitude and longitude can be found at www.epa.gov/npdes/stormwater/latlong.
- You must include a copy of the 2008 MSGP, or a reference or link to where a copy can be found, in Attachment C of your SWPPP.

Facility Information

Name of Facility: _____

Street: _____

City: _____ State: _____ ZIP Code: _____

County or Similar Subdivision: _____

Permit Tracking Number: _____ (if covered under a previous permit)

Latitude/Longitude (Use **one** of three possible formats, and specify method)

Latitude:	Longitude:
1. _ _ º _ _ ' _ _" N (degrees, minutes, seconds)	1. _ _ º _ _ ' _ _" W (degrees, minutes, seconds)
2. _ _ º _ _ . _ _' N (degrees, minutes, decimal)	2. _ _ º _ _ . _ _' W (degrees, minutes, decimal)
3. _ _ . _ _ _ _ º N (decimal)	3. _ _ . _ _ _ _ º W (decimal)

Method for determining latitude/longitude (check one):

☐ USGS topographic map (specify scale:_____) ☐ EPA Web site ☐ GPS

☐ Other (please specify): _____

Is the facility located in Indian Country? ☐ Yes ☐ No

If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."_____

_____

Is this facility considered a Federal Facility? ☐ Yes ☐ No

Estimated area of industrial activity at site exposed to stormwater:_____ (acres)

Discharge Information

Does this facility discharge stormwater into an MS4? ☐ Yes ☐ No

If yes, name of MS4 operator: __

Name(s) of water(s) that receive stormwater from your facility _____

Are any of your discharges directly into any segment of an "impaired" water? ☐ Yes ☐ No

If Yes, identify name of the impaired water (and segment, if applicable):_____

Identify the pollutant(s) causing the impairment:_____

For pollutants identified, which do you have reason to believe will be present in your discharge? _____

_____

For pollutants identified, which have a completed TMDL? _____

Do you discharge into a receiving water designated as a Tier 2 (or Tier 2.5) water? ☐ Yes ☐ No

Are any of your stormwater discharges subject to effluent guidelines? ☐ Yes ☐ No

If Yes, which guidelines apply? _____

Primary SIC Code or 2-letter Activity Code:_____
(refer to Appendix D of the 2008 MSGP)

Identify your applicable sector and subsector:_____

1.2 Contact Information/Responsible Parties

Instructions:

- List the facility operator(s), facility owner, and 24 hour emergency contact. Indicate respective responsibilities, where appropriate.
- You will need the information from this section of the SWPPP Template for your NOI.
- Refer to Section B of the NOI instructions (available in Appendix G of the 2008 MSGP).

Facility Operator (s):

Name: Insert Name
Address: Insert Address
City, State, Zip Code: Insert City, State, Zip Code
Telephone Number: Insert Telephone Number
Email address: Insert email address
Fax number: Insert fax number (optional)

Facility Owner (s):

Name: Insert Name
Address: Insert Address
City, State, Zip Code: Insert City, State, Zip Code
Telephone Number: Insert Telephone Number

Email address: Insert email address
Fax number: Insert fax number (optional)

SWPPP Contact:

Name: Insert SWPPP Contact Name
Telephone number: Insert Telephone Number
Email address: Insert email address
Fax number: Insert fax number (optional)

1.3 Stormwater Pollution Prevention Team

Instructions (see 2008 MSGP Part 5.1.1):

- Identify the staff members (by name or title) that comprise the facility's stormwater pollution prevention team as well as their individual responsibilities.
- Your stormwater pollution prevention team is responsible for assisting the facility manager in developing and revising the facility's SWPPP, implementing and maintaining control measures/BMPs, and taking corrective actions where required. Each member of the stormwater pollution prevention team must have ready access to either an electronic or paper copy of applicable portions of the MSGP and your SWPPP.

Staff Names	Individual Responsibilities
Insert name of SWPPP team member	Insert explanation of that staff person's responsibilities relating to compliance with the permit
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]

1.4 Activities at the Facility

Instructions (see 2008 MSGP Part 5.1.2):

- Provide a general description of the nature of the industrial activities at your facility

Insert text here

1.5 General Location Map

Instructions (see 2008 MSGP Part 5.1.2):

- Provide a general location map (e.g., U.S. Geological Survey (USGS) quadrangle map) with enough detail to identify the location of your facility and all receiving waters for your stormwater discharges (include as Attachment A of this SWPPP Template).

Include a copy of the general location map for this facility in Attachment A.

1.6 Site Map

Instructions (see 2008 MSGP Part 5.1.2):

- Include a map showing the following information. The site map should be included as Attachment B of this SWPPP Template.
  - the size of the property in acres;
  - the location and extent of significant structures and impervious surfaces;
  - directions of stormwater flow (use arrows);
  - locations of all existing structural control measures;
  - locations of all receiving waters in the immediate vicinity of your facility, indicating if any of the waters are impaired and, if so, whether the waters have TMDLs established for them;
  - locations of all stormwater conveyances including ditches, pipes, and swales;
  - locations of potential pollutant sources identified under MSGP, Part 5.1.3.2;
  - locations where significant spills or leaks identified under MSGP, Part 5.1.3.3 have occurred;
  - locations of all stormwater monitoring points;
  - locations of stormwater inlets and outfalls, with a unique identification code for each outfall (e.g., Outfall No. 1, No. 2, etc), indicating if you are treating one or more outfalls as "substantially identical" under MSGP, Parts 4.2.3, 5.1.5.2, and 6.1.1, and an approximate outline of the areas draining to each outfall;
  - municipal separate storm sewer systems, where your stormwater discharges to them;
  - locations and descriptions of all non-stormwater discharges identified under MSGP, Part 2.1.2.10;
  - locations of the following activities where such activities are exposed to precipitation:
    - fueling stations;
    - vehicle and equipment maintenance and/or cleaning areas;
    - loading/unloading areas;
    - locations used for the treatment, storage, or disposal of wastes;
    - liquid storage tanks;
    - processing and storage areas;
    - immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility;
    - transfer areas for substances in bulk;
    - machinery; and
  - locations and sources of run-on to your site from adjacent property that contains significant quantities of pollutants.

Include a copy of the site map for this facility in Attachment B.

SECTION 2: POTENTIAL POLLUTANT SOURCES

Instructions (see 2008 MSGP Part 5.1.3):

- In this section, you are required to describe areas at your facility where industrial materials or activities are exposed to stormwater or from which allowable non-stormwater discharges are released.

2.1 Industrial Activity and Associated Pollutants

Instructions (see 2008 MSGP Parts 5.1.3.1 and 5.1.3.2):

- Include a list of industrial activities exposed to stormwater (e.g., material storage; equipment/vehicle fueling, maintenance, and cleaning; cutting steel beams) and the pollutants or pollutant constituents (e.g., motor oil, fuel, battery acid, and cleaning solvents) associated with these activities.
- In your list of pollutants associated with your industrial activities, include all significant materials that have been handled, treated, stored, or disposed, and that have been exposed to stormwater in the 3 years prior to the date you prepare your SWPPP.

Industrial Activity	Associated Pollutants
Insert specific industrial activity	Insert names of pollutants or pollutant constituents that could be associated with this activity and released in stormwater
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]

2.2 Spills and Leaks

Instructions (See 2008 MSGP Part 5.1.3.3):

- Include the following in this section:
  - **Potential spills and leaks:** A description of where potential spills and leaks could occur at your site that could contribute pollutants to your stormwater discharge, and specify which outfall(s) are likely to be affected by such spills and leaks.
  - **Past spills and leaks:** A description of significant spills and leaks in the past 3 years of oil or toxic or hazardous pollutants that actually occurred at exposed areas, or that drained to a stormwater conveyance.
- *Note: Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 USC §9602.*

Areas of Site Where Potential Spills/Leaks Could Occur

Location	Outfalls
Insert description of area where spill/leak could occur	Specify which outfall(s) would be affected
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]

Description of Past Spills/Leaks

Date	Description	Outfalls
Insert date of spill/leak	Insert description of spill/leak (where it occurred, what happened, types of pollutants, extent of damage)	Specify which outfall(s) were affected
[Repeat as necessary]	[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]	[Repeat as necessary]
[Repeat as necessary]	[Repeat as necessary]	[Repeat as necessary]

2.3 Non-Stormwater Discharges Documentation

Instructions (see 2008 MSGP Part 5.1.3.4):

- The questions below require you to provide documentation of the following:
  - Your evaluation for the presence of non-stormwater discharges at your site; and
  - Your elimination of any unauthorized non-stormwater discharges.

- Date of evaluation: Insert the date(s) of your evaluation.
- Description of the evaluation criteria used: Describe the method you used to conduct your evaluation and to determine for each non-stormwater sources whether it is prohibited or allowed under the permit.
- List of the outfalls or onsite drainage points that were directly observed during the evaluation: Insert outfalls/drainage points observed.
- Different types of non-stormwater discharge(s) and source locations: Describe types of non-stormwater discharges observed and the corresponding outfall or drainage point.
- Action(s) taken, such as a list of control measures used to eliminate unauthorized discharge(s), if any were identified. For example, a floor drain was sealed, a sink drain was re-routed to sanitary, or an NPDES permit application was submitted for an unauthorized cooling water discharge: Describe actions taken to eliminate unauthorized non-stormwater discharges and the corresponding outfall/drainage point affected.

2.4 Salt Storage

Instructions (see 2008 MSGP Part 5.1.3.5):

- Document the location of any storage piles containing salt used for deicing or other commercial or industrial purposes.
- Note: You will be asked additional questions concerning salt storage in Section 3.7 of this SWPPP template, below.

Insert description of the location of any storage piles containing salt.

2.5 Sampling Data Summary

Instructions (See 2008 MSGP Part 5.1.3.6):

- Summarize all stormwater sampling data collected from your permitted outfalls during the previous permit term.

Insert summary of stormwater sampling data collected for the past permit, and/or attach discharge monitoring reports or laboratory results.

SECTION 3: STORMWATER CONTROL MEASURES

Instructions (See 2008 MSGP Parts 5.1.4.1 and 2.1.2):

– In Sections 3.1 - 3.12 of this SWPPP template, you are asked to describe the stormwater control measures that you have installed at your site to meet each of the permit's "non-numeric effluent limits" in Part 2.1.2 of the 2008 MSGP.

3.1 Minimize Exposure

Instructions (see 2008 MSGP Part 2.1.2.1):

– Describe any structural controls or practices used to minimize the exposure of industrial activities to rain, snow, snowmelt, and runoff. Describe where the controls or practices are being implemented at your site.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.2 Good Housekeeping

Instructions (see 2008 MSGP Parts 2.1.2.2 and 5.1.5.1):

Describe any practices you are implementing to keep exposed areas of your site clean. Describe where each practice is being implemented at your site. Include here your schedule for: (1) regular pickup and disposal of waste materials, and (2) routine inspections for leaks and of the condition of drums, tanks, and containers.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.3 Maintenance

Instructions (see 2008 MSGP Parts 2.1.2.3 and 5.1.5.1):

– Describe procedures (1) to maintain industrial equipment so that spills/leaks are avoided, and (2) to maintain any of your site's control measures in effective operating condition. Include the schedule you will follow for such maintenance activities. Describe where each applicable procedure is being implemented at the site.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.4 Spill Prevention and Response

Instructions (see 2008 MSGP Parts 2.1.2.4 and 5.1.5.1):

– Describe any structural controls or procedures used to minimize the potential for leaks, spills, and other releases. You must implement the following at a minimum:

  - Procedures for plainly labeling containers (e.g., "Used Oil," "Spent Solvents," "Fertilizers and Pesticides," etc.) that could be susceptible to spillage or leakage to encourage proper handling and facilitate rapid response if spills or leaks occur;
  - Preventative measures such as barriers between material storage and traffic areas, secondary containment provisions, and procedures for material storage and handling;
  - Procedures for expeditiously stopping, containing, and cleaning up leaks, spills, and other releases; and
  - Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies.

  Describe where each control is to be located or where applicable procedures will be implemented.

– Note: Some facilities may be required to develop a Spill Prevention Control and Countermeasure (SPCC) plan under a separate regulatory program (40 CFR 112). If you are required to develop an SPCC plan, or you already have one, you should include references to the relevant requirements from your plan.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.5 Erosion and Sediment Controls

Instructions (see 2008 MSGP Part 2.1.2.5):

Describe structural or non-structural controls used at your site to stabilize exposed areas and contain runoff to minimize onsite erosion and potential offsite discharges of sediment. Note: You must at a minimum implement flow velocity dissipation devices at outfalls and discharge channels. Describe the location at your site where each control will be implemented.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.6 Management of Runoff

Instructions (See 2008 MSGP Part 2.1.2.6):

Describe controls used at your site to divert, infiltrate, reuse, contain, or otherwise reduce stormwater runoff. Describe the location at your site where each control will be implemented.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.7 Salt Storage Piles or Piles Containing Salt

Instructions (see 2008 MSGP Part 2.1.2.7):

If applicable, describe structures at your site that either cover or enclose salt storage piles or piles containing salt, or that prevent the discharge of stormwater from such piles. Also, describe any controls or procedures used to minimize exposure resulting from adding to or removing materials from the pile. Describe the location at your site where each control and/or procedure will be implemented.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.8 MSGP Sector-Specific Non-Numeric Effluent Limits

Instructions (see 2008 MSGP Part 2.1.2.8):

- Describe any controls or procedures that will be used at your site to comply with any sector-specific requirements that apply to you in Part 8 of the 2008 MSGP. Describe the location at your site where each control and/or procedure will be implemented.
- Note: Sector-specific effluent limits apply to Sectors A, E, F, G, H, I, L, M, N, O, P, Q, R, S, T, U, V, X, Y, Z, and AA.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.9 Employee Training

Instructions (see 2008 MSGP Parts 2.1.2.9 and 5.1.5.1):

Describe your plan for training the employees who work in areas where industrial materials or activities are exposed to stormwater, or who are responsible for implementing activities necessary to meet the conditions of the 2008 MSGP, including all members of your Pollution Prevention Team. Included in your description must be the frequency of training (note: recommended at least one time per year), and the schedule you will follow.

INSERT DESCRIPTION OF PLAN FOR TRAINING APPLICABLE STAFF HERE.

3.10 Non-Stormwater Discharges

Instructions (see 2008 MSGP 2.1.2.10):

Describe how you eliminated any unauthorized non-stormwater discharges at your site. The unauthorized non-stormwater discharges include any non-stormwater discharges that are not specifically identified in Part 1.1.3 of the 2008 MSGP. Note: If this section is already addressed by your documentation for Section 2.3 of the SWPPP template, you can simply include a cross-reference to that section of your SWPPP.

INSERT DESCRIPTION OF YOUR APPROACH TO ELIMINATING UNAUTHORIZED NON-STORMWATER DISCHARGES HERE.

3.11 Waste, Garbage and Floatable Debris

Instructions (see 2008 MSGP Part 2.1.2.11):

Describe controls and procedures that will be used at your site to minimize discharges of waste, garbage, and floatable debris. Describe the location at your site where each control and/or procedure will be implemented.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

3.12 Dust Generation and Vehicle Tracking of Industrial Materials

Instructions (see 2008 MSGP Part 2.1.2.12):

Describe controls and procedures you will use at your site to minimize the generation of dust and off-site tracking of raw, final, or waste materials. Describe the location at your site where each control and/or procedures will be implemented.

INSERT DESCRIPTION OF CONTROL MEASURES HERE.

SECTION 4: SCHEDULES AND PROCEDURES FOR MONITORING

Instructions (see 2008 MSGP Part 5.1.5.2):

- Describe your procedures for conducting the five types of analytical monitoring specified by the MSGP, where applicable to your facility, including:

  - Benchmark monitoring (2008 MSGP, Part 6.2.1 and relevant requirements in Part 8 and/or Part 9);
  - Effluent limitations guidelines monitoring (2008 MSGP, Part 6.2.2 and relevant requirements in Part 8);
  - State- or Tribal-specific monitoring (2008 MSGP, Part 6.2.3 and relevant requirements in Part 9);
  - Impaired waters monitoring (2008 MSGP, Part 6.2.4); and
  - Other monitoring as required by EPA (2008 MSGP, Part 6.2.5).

- Depending on the type of facility you operate, and the monitoring requirements to which you are subject, you must collect and analyze stormwater samples and document monitoring activities consistent with the procedures described in 2008 MSGP, Part 6 and Appendix B, Subsections 10 – 12, and any additional sector-specific or State/Tribal-specific requirements in 2008 MSGP, Parts 8 and 9, respectively. Refer to 2008 MSGP, Part 7 for reporting and recordkeeping requirements. Note: All monitoring must be conducted in accordance with the relevant sampling and analysis requirements at 40 CFR Part 136. Include in your description procedures for ensuring compliance with these requirements.

- If you are invoking the exception for inactive and unstaffed sites for benchmark monitoring, you must include in your SWPPP the information to support this claim as required by 2008 MSGP, Part 6.2.1.3.

- If you plan to use the substantially identical outfall exception for your benchmark monitoring requirements in 2008 MSGP, Part 6.2.1 and/or your quarterly visual assessment requirements in 2008 MSGP, Part 4.2.3, you must include the following documentation:

  - Location of each of the substantially identical outfalls;
  - Description of the general industrial activities conducted in the drainage area of each outfall;
  - Description of the control measures implemented in the drainage area of each outfall;
  - Description of the exposed materials located in the drainage area of each outfall that are likely to be significant contributors of pollutants to stormwater discharges;

For each type of monitoring, your SWPPP must include a description of:

1. **Sample Location(s).** Describe where samples will be collected, including any determination that two or more outfalls are substantially identical. INSERT TEXT HERE

2. **Pollutant Parameters to be Sampled**. Include a list of the pollutant parameters that will be sampled and the frequency of sampling for each parameter. INSERT TEXT HERE

3. **Monitoring Schedules.** Include the schedule you will follow for monitoring your stormwater discharge, including where applicable any alternate monitoring periods to be used for facilities in climates with irregular stormwater runoff (2008 MSGP, Part 6.1.6). INSERT TEXT HERE

4. **Numeric Limitations**. List here any pollutant parameters subject to numeric limits (effluent limitations guidelines), and which outfalls are subject to such limits. Note that numeric limits are only included for Sectors A, C, D, E, J, K, L, and O. INSERT TEXT HERE

5. **Procedures**. Describe procedures you will follow for collecting samples, including responsible staff who will be involved, logistics for taking and handling samples, laboratory to be used, etc. INSERT TEXT HERE

Note: It may be helpful to create a table with columns corresponding to # 1 - 5 above for each type of monitoring you are required to conduct.

Inactive and Unstaffed sites exception (if applicable)

If you are invoking the exception for inactive and unstaffed sites for benchmark monitoring, include information to support this claim.

INSERT TEXT HERE

Substantially identical outfall exception (if applicable)

If you plan to use the substantially identical outfall exception for your benchmark monitoring and/or quarterly visual assessment requirements, include the following information here to substantiate your claim that these outfalls are substantially identical:

- Location of each of the substantially identical outfalls: INSERT TEXT HERE
- Description of the general industrial activities conducted in the drainage area of each outfall: INSERT TEXT HERE
- Description of the control measures implemented in the drainage area of each outfall: INSERT TEXT HERE
- Description of the exposed materials located in the drainage area of each outfall that are likely to be significant contributors of pollutants to stormwater discharges: INSERT TEXT HERE
- An estimate of the runoff coefficient of the drainage areas (low=under 40%; medium=40 to 65%; high =above 65%): INSERT TEXT HERE
- Why the outfalls are expected to discharge substantially identical effluents: INSERT TEXT HERE

SECTION 5: INSPECTIONS

Instructions:

- Describe your procedures for performing the three types of inspections required by the 2008 MSGP, including:

  - Routine facility inspections (2008 MSGP, Part 4.1);
  - Quarterly visual assessment of stormwater discharges (2008 MSGP, Part 4.2); and
  - Comprehensive site inspections (2008 MSGP, Part 4.3).

- If you are invoking the exception for inactive and unstaffed sites relating to routine facility inspections and quarterly visual assessments, you must include in your SWPPP the information to support this claim as required by 2008 MSGP, Parts 4.1.3 and 4.2.3.

- A sample routine facility inspection and quarterly visual assessment form is available on EPA's

For the routine facility inspections and the comprehensive site inspections to be performed at your site, include a description of the following:

- The names of the person(s), or the positions of the person(s), responsible for inspection: INSERT TEXT HERE
- The schedules to be used for conducting inspections. Include here any tentative schedule that will be used for facilities in climates with irregular stormwater runoff discharges (2008 MSGP, Part 4.2.3): INSERT TEXT HERE and
- Specific areas of the facility to be inspected, including schedules for specific outfalls: INSERT TEXT HERE

For the quarterly visual assessments to be performed at your site, include a description of the following:

- The names of the person(s), or the positions of the person(s), responsible for inspection: INSERT TEXT HERE
- The schedules to be used for conducting inspections. Include here any tentative schedule that will be used for facilities in climates with irregular stormwater runoff discharges (2008 MSGP, Part 4.2.3): INSERT TEXT HERE and
- Specific areas of the facility to be inspected, including schedules for specific outfalls: INSERT TEXT HERE

Inactive and Unstaffed sites exception (if applicable)

If you are invoking the exception for inactive and unstaffed sites for your routine facility inspections and quarterly visual assessments, include information to support this claim.

INSERT TEXT HERE

SECTION 6: DOCUMENTATION TO SUPPORT ELIGIBILITY CONSIDERATIONS UNDER OTHER FEDERAL LAWS

6.1 Documentation Regarding Endangered Species.

Instructions (see 2008 MSGP Part 5.1.6.1):

Include any documentation you have that supports your determination of eligibility consistent with 2008 MSGP, Part 1.1.4.5 (Endangered and Threatened Species and Critical Habitat Protection). Refer to Appendix E of the 2008 MSGP for specific instructions for establishing eligibility.

INSERT TEXT HERE OR KEEP DOCUMENTATION WITH SWPPP.

6.2 Documentation Regarding Historic Properties

Instructions (see 2008 MSGP Part 5.1.6.2):

Include any documentation you have that supports your determination of eligibility consistent with 2008 MSGP, Part 1.1.4.6 (Historic Properties Preservation). Refer to Appendix F of the 2008 MSGP for specific instructions for establishing eligibility.

INSERT TEXT HERE OR KEEP DOCUMENTATION WITH SWPPP.

6.3 Documentation Regarding NEPA Review (if applicable)

Instructions (see 2008 MSGP Part 5.1.6.3):

Include any documentation you have that supports your determination of eligibility consistent with MSGP 2008 Part 1.1.2.5 (Discharges Subject to Any New Source Performance Standards).

INSERT TEXT HERE OR KEEP DOCUMENTATION WITH SWPPP.

SECTION 7: SWPPP CERTIFICATION

Instructions (see 2008 MSGP Part 5.1.7):

The following certification statement must be signed and dated by a person who meets the requirements of Appendix B, Subsection 11.A or 11.B, of the 2008 MSGP. Note: This certification must be re-signed in the event of a SWPPP modification in response to a Part 3.1 trigger for corrective action.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

SECTION 8: SWPPP MODIFICATIONS

Instructions (see 2008 MSGP Part 5.2):

- Your SWPPP is a "living" document and is required to be modified and updated, as necessary, in response to corrective actions. See Part 3.4 of the 2008 MSGP.
  - If you need to modify the SWPPP in response to a corrective action required by Part 3.1 of the 2008 MSGP, then the certification statement in section 7 of this SWPPP template must be re-signed in accordance with 2008 MSGP Appendix B, Subsection 11.A or 11.B.
  - For any other SWPPP modification, you should keep a log with a description of the modification, the name of the person making it, and the date and signature of that person. See 2008 MSGP Appendix B, Subsection 11.C.

INSERT LOG HERE or REFERENCE ATTACHMENT

SWPPP ATTACHMENTS

Attach the following documentation to the SWPPP:

Attachment A – General Location Map

Include a copy of your general location map in Attachment A.

Attachment B – Site Map

Include a copy of your site map(s) in Attachment B.

Attachment C – 2008 MSGP

Note: It is helpful to keep a printed-out copy of the 2008 MSGP so that it is accessible to you for easy reference. However, you do not need to formally incorporate the entire 2008 MSGP into your SWPPP. As an alternative, you can include a reference to the permit and where it is kept at the site.