

Provisions for Aerial Eradication of Coca and Poppy in Colombia Under U.S. Law:

A Report in Two Parts

PART I

A Legal Analysis of Information Necessary for Compliance with Congressional Conditions on Funding of Aerial Fumigations

PART II

Colombia's Environmental Management Plan for Eradication of Illicit Crops with Glyphosate

Astrid Puentes, LL.M.
Thomas Ruppert, J.D. Candidate

May 2003

Conservation Clinic
University of Florida College of Law
Thomas T. Ankersen, Director

With the collaboration of Anna Cederstav, PhD,
Inter-American Association for Environmental Defense

Submitted to: Eduardo Cifuentes, Defensor del Pueblo de Colombia [Colombian Ombudsman]

TABLE OF CONTENTS

EXECUTIVE SUMMARY	I
PART I – A LEGAL ANALYSIS OF INFORMATION NECESSARY FOR COMPLIANCE WITH CONGRESSIONAL CONDITIONS ON FUNDING OF AERIAL FUMIGATIONS	
I. INTRODUCTION	1
II. HISTORY	1
III. BEGINNING OF PLAN COLOMBIA--FY 2000 & 2001	3
IV. FY 2002	4
<i>A. CONGRESSIONAL CONCERNS AND RESULTING LANGUAGE</i>	4
<i>B. CERTIFICATION IN 2002</i>	5
V . FY 2003 APPROPRIATIONS LANGUAGE	6
VI. CONDITION (1): MIXTURE, LABEL REQUIREMENTS, AND ACTUAL USE	7
<i>A. ACTUAL TANK MIXTURE TO BE CONSIDERED</i>	8
<i>B. FOCUS ON HOW THE MIXTURE IS BEING USED</i>	9
<i>C. LABEL REQUIREMENTS</i>	13
1. COSMOFLUX 411F	13
2. COMMERCIAL GLYPHOSATE FORMULATION	14
<i>D. COMPARABLE USE IN THE UNITED STATES</i>	14
<i>E. ADDITIONAL CONTROLS RECOMMENDED BY THE EPA</i>	17
<i>F. THE COLOMBIAN ENVIRONMENTAL MANAGEMENT PLAN</i>	18
VII. CONDITION (2): HUMAN AND ENVIRONMENTAL EFFECTS	19
<i>A. HUMAN EFFECTS</i>	19
1. HEALTH EFFECTS: RISK ASSESSMENT	20
a. Hazard Identification	20
b. Dose-Response Analysis	20
c. Exposure Assessment	21
d. Risk Characterization	23
2. DISPLACEMENT	27

3. FUMIGATION OF ALTERNATIVE DEVELOPMENT	28
<i>B. ENVIRONMENTAL EFFECTS</i>	29
1. DEFORESTATION	29
2. CONCLUSIONS BASED ON NORTH AMERICAN PLANT AND ANIMAL STUDIES	30
VIII. CONDITION (3): COMPLAINTS OF HARM EVALUATED AND PAID	31
<i>A. LIST OF COMPLAINTS</i>	31
<i>B. DELINEATION OF PROCESS</i>	33
IX. ADDITIONAL CONDITIONS: ALTERNATIVE DEVELOPMENT	34
<i>A. IS ALTERNATIVE DEVELOPMENT EFFECTIVELY IMPLEMENTED?</i>	34
<i>B. DELINEATION OF AREAS WHERE SECURITY PERMITS ALTERNATIVE DEVELOPMENT</i>	35
<i>C. “SMALL ACREAGE” LANGUAGE AND THE COLOMBIAN EMP</i>	35
X. LIMITATION ON FUNDING FOR NONCOMPLIANCE WITH CONDITIONS	36
XI. CONCLUSION: INFORMATION AS KEY	37
PART II – COLOMBIA’S ENVIRONMENTAL MANAGEMENT PLAN FOR ERADICATION OF ILLICIT CROPS WITH GLYPHOSATE	
I. INTRODUCTION	41
II. COLOMBIAN ADMINISTRATIVE AUTHORITIES	42
<i>A. MINISTRY OF THE ENVIRONMENT, HOUSING, AND LAND DEVELOPMENT</i>	42
<i>B. MINISTRY OF SOCIAL PROTECTION</i>	43
<i>C. COLOMBIAN AGRARIAN INSTITUTE</i>	43
<i>D. NATIONAL COUNCIL ON NARCOTICS</i>	44
<i>E. NATIONAL DIRECTORATE OF NARCOTICS</i>	44
<i>F. PUBLIC MINISTRY AND THE GENERAL COMPTROLLER’S OFFICE</i>	45
III. ENVIRONMENTAL MANAGEMENT PLAN	46
<i>A. GENERAL DEFINITION</i>	46
<i>B. ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROGRAM TO ERADICATE ILLICIT CROPS WITH GLYPHOSATE</i>	47
1. ACTIVITIES TO IMPLEMENT WITHIN THE EMP	48
a. Characterization of areas affected by the PECIG	48
b. Definition of Buffer Zones	50

c. Mitigation, Compensation and Environmental Control Measures	50
i. Contingency Plan	51
ii. Inspection, Verification and Control Program	51
iii. Compensation program	53
d. Herbicide Management Program	53
e. Solid Waste Management Program	54
f. Waste Water Management Program	55
g. Social, Educational and Information Programs	55
2. TECHNICAL AUDIT	56
3. OTHER REQUIREMENTS	57
4. REPORTING REQUIREMENTS	58
IV. CONCLUSION	61
APPENDIX 1	62
APPENDIX 2	65
APPENDIX 3	66

Executive Summary

The U.S. Congress recently renewed funding for an aerial fumigation program in Colombia aimed at destroying illicit cultivation of coca and poppy. While this action comes out of concern for the drugs that flow into the United States from Colombia, Congress also place conditions on the use of Congressional funding for the fumigation program.

Procedurally, the conditions in the 2003 Consolidated Appropriations Act require that the Department of State (DoS) consult with the U.S. Environmental Protection Agency (EPA) to determine whether the conditions have been met. Substantively, the conditions require that DoS consider the actual tank mixture applied in Colombia. This contrasts with last year in which only the separate components of the tank mixture were considered. Thus, this year the EPA in its consultation with DoS must conduct analysis based on the actual tank mixture sprayed.

The current language puts more emphasis on how the mixture is actually used in the fumigation program. Last year EPA's consultation depended exclusively on their and Dos assumptions about how the fumigation program in Colombia was carried out; despite troubling indications that such assumptions might not reflect the actual situation of the fumigation program in Colombia. In this year's analysis, DoS, and EPA in its consultation, must analyze actual practices within the fumigation program rather than depending on assumptions based on written policy, which may not reflect actual practices.

The 2003 conditions, like last year, require that DoS ensure that use of the tank mixture in Colombia is in accordance with label requirements for comparable use in the

United States. The conditions also require that any additional controls recommended by EPA be included in the fumigation program. The EPA has recommended that the fumigation program switch to a less toxic glyphosate formulation and that prospective health studies take place in order to allow for better assessment of health impacts. The prospective health studies are crucial because they form a substantial part of the information needed to comply with the condition that the fumigation program not cause unreasonable and adverse effects on humans or the environment.

In addition to the direct health effects of the fumigation program, DoS must also look to other human effects such as displacement and effects on alternative development programs. The conditions specifically require DoS to certify that alternative development programs are being implemented in areas where fumigations take place.

Congress also recognized that damages to health and licit crops could occur on occasion. Thus DoS must certify that complaints of such harm are evaluated and that meritorious claims receive compensation for the harm.

Finally, Congress also clearly expressed its intent that the fumigation program complies with the Colombian Environmental Management Plan (EMP). This incorporation by reference of the EMP means that DoS must certify that the fumigation program complies with all aspects of the EMP. Should the fumigation program fail to comply with the EMP, DoS cannot certify that the fumigation program meets the Congressional conditions placed on funding for the program.

Since 1996, the Colombian Ministry of the Environment requested to the National Directorate of Narcotics (DNE) the draft and submission of the EMP. Particularly, the MMA requested the development of environmental impact assessments in the areas to be

spread to identify eventual environmental impacts and propose mitigation and compensation measures.

The MMA and the CNE declared that aerial eradication of illicit crops with glyphosate was not to be applied over sensible areas, such as natural protected areas and populated areas. In addition, small acreage areas were also excluded from the eradication programs with glyphosate. In case illicit crops were found in sensible areas, manual eradication and other alternative eradication measures will be carry out.

In order to avoid, mitigate and compensate the environmental and social impacts caused by glyphosate fumigations, the MMA requested to the DNE to characterize and geo-reference areas with illicit crops and of those that might be affected or that have to be excluded.

In addition, the DNE was complied to adopt mitigation and environmental control measures such as the draft and application of a Contingency Plan, an Inspection, Verification and Control Program, and a Compensation Program. The definition of indicators for the social, economic, ecologic and environmental impacts is required, in order to make an acute evaluation of the compliance with the EMP conditions.

Special importance is given to the establishment of an independent Technical Audit, that evaluates the observance of the EMP conditions, and of the environmental, social and human health impacts of the fumigations with glyphosate.

The MMA also incorporates the fulfillment of the conditions under which ICA approved the use of the glyphosate mixture, and the Epidemiological Program that the Ministry of Health requested, as part of the conditions that the EMP has to comply.

Taking into account the kinds of impacts that the aerial eradication of illicit crops cause, Community Education Programs, as well as Public Information Programs, are key in the EMP.

Finally, there are several authorities that are involved in the eradication of illicit crops in Colombia; thus, it's likely that their functions and activities overlap. Therefore, the DNE has the obligation to coordinate activities and programs, and assure the efficient sharing of information, in order to be effective in the eradication of illicit crops, while avoiding environmental, human health and social impacts. Whenever those impacts are caused, mitigate and compensate them according to the defined measures.

PART I

**A Legal Analysis of Information Necessary for
Compliance with Congressional Conditions on
Funding of Aerial Fumigations**

I. INTRODUCTION

The U.S. and Colombian governments are carrying out a fumigation program to eliminate cultivation of coca and poppy in Colombia. U.S. funding for fumigations in Colombia contain conditions that must be complied with before funds for the fumigation program may be released. This report seeks to provide a brief discussion of relevant history in Colombia in Section II and recent U.S. legislation in Sections III and IV. Section V presents the 2003 conditions and Sections VI through X elaborate on the language and present a framework for legal analysis of whether the conditions on funding of the fumigation program are being met. This legal analysis breaks each condition down into elements and the factual information necessary to demonstrate the elements.

II. HISTORY

During the past three decades, Colombia has been a major world drug producer. Initially drug production focused on marijuana. During the 1970s and 1980s cocaine became a fashionable drug in the United States, and Colombia's drug production shifted to supply this demand.¹ Colombia now produces most of the world's cocaine and much of the world's heroin.²

¹ MARK BOWDEN, *KILLING PABLO: THE HUNT FOR THE WORLD'S GREATEST OUTLAW* 21 (2001).

² See NINA M. SERAFINO, CONGRESSIONAL RESEARCH SERVICE, *COLOMBIA: CONDITIONS AND U.S. POLICY OPTIONS 2* (Updated Feb. 12, 2001) <http://fpc.state.gov/documents/organization/6573.pdf>. See also CONGRESSIONAL BUDGET JUSTIFICATION FOR FY 2004, 455 (2003) ("Colombia remains the world's leading producer of cocaine and is an important supplier of heroin to the U.S. market.") <http://www.state.gov/documents/organization/17790.pdf>.

According to the U.S., guerillas and anti-guerilla paramilitary groups are closely linked to illegal coca and poppy cultivation.³ The guerrillas and paramilitaries originally charged drug producers “protection” money. These groups eventually turned to direct involvement in the drug production and trade⁴ that now serve as a funding source for armed actors that undermine the stability of Colombia and surrounding countries.⁵ This is especially true in southern Colombia where coca production is intense.⁶

The United States responded to these concerns when Congress approved “Plan Colombia” during the last year of the Clinton Administration.⁷ Plan Colombia focused largely on counter-narcotics measures including an aerial fumigation program designed to

³ CONGRESSIONAL BUDGET JUSTIFICATION FOR FY 2004, 455 (2003) <http://www.state.gov/documents/organization/17790.pdf>. See also H.R. CONF. REP. NO. 108-10, at 949 (2003), reprinted in 2003 U.S.C.C.A.N. 283 [hereinafter CONF. REP.]. See also K. LARRY STORRS & NINA M. SERAFINO, CONGRESSIONAL RESEARCH SERVICE, ANDEAN REGIONAL INITIATIVE (ARI): FY2002 SUPPLEMENTAL AND FY2003 ASSISTANCE FOR COLOMBIA AND NEIGHBORS 10 (updated June 12, 2002) (“Recent administrations have had to deal with a complicated mix of leftist guerrillas, rightist paramilitary (or “self-defense”) forces, both associated with many groups of independent drug traffickers.”) available at <http://fpc.state.gov/documents/organization/11276.pdf>.

⁴ See e.g. BUREAU FOR INTERNATIONAL NARCOTICS AND LAW ENFORCEMENT, U.S. DEPT. OF STATE, INTERNATIONAL NARCOTICS CONTROL STRATEGY REPORT-2002, South America, section III (2003), <http://www.state.gov/g/inl/rls/nrcrpt/2002/html/17944.htm>. See also Department of State communication at <http://usinfo.state.gov/espanol/colombia/001129.htm>. See also, Justicia Colombiana Punta [sic] a las FARC, available at http://news.bbc.co.uk/hi/spanish/latin_america/newsid_1271000/1271118.stm (noting that the attorney general of Colombia had issued its first arrest warrant for drug trafficking for a leader of the FARC). See also Jerry Seper, Mexicans, Russian mob new partners in crime: Cocaine busts indicate an alliance, THE WASHINGTON TIMES (D.C.) May 28, 2001, at A1, 2001 WL 4154254 (noting that FARC was believed to have used cocaine to buy thousands of AK-47s from Russia). See also Press Release, Department of State, Justice Dept. Indicts Colombian AUC Leaders on Drug Charges (September 24, 2002) at <http://usinfo.state.gov/regional/ar/colombia/02092404.htm>.

⁵ STORRS & SERAFINO, *supra* note 3, at 3.

⁶ MARÍA CLEMENCIA RAMÍREZ, ENTRE EL ESTADO Y LA GUERRILLA: IDENTIDAD Y CIUDADANÍA EN EL MOVIMIENTO DE LOS CAMPESINOS COCALEROS DEL PUTUMAYO [BETWEEN THE STATE AND THE GUERRILLA: IDENTITY AND CITIZENSHIP IN THE PEASANT COCALERO MOVEMENT IN PUTUMAYO] 38-41 (2001).

⁷ Military Construction Appropriations Act, 2001, Pub. L. No. 106-246, §§3201-27, 114 Stat. 511, 572-78 (2001).

eradicate coca.⁸ These fumigations have consistently created great controversy in Colombia.⁹

III. BEGINNING OF PLAN COLOMBIA--FY 2000 & 2001

Plan Colombia funding for the fumigations contained reporting requirements and explicit conditions.¹⁰ The reporting requirements included an initial report by the Secretary of State, as head of the United States Department of State (DoS), on the planned uses for funds appropriated¹¹ as well as a regional strategy report,¹² a report on extradition of narcotics traffickers,¹³ a report on support for Plan Colombia,¹⁴ and bimonthly reports.¹⁵ The conditions required the Secretary of State to certify compliance with various conditions designed to ensure that the Colombian military does not support paramilitary forces¹⁶ and that the number of United States personnel in Colombia is limited.¹⁷ When only one of the many conditions was met, the others were waived.¹⁸

⁸ See NINA M. SERAFINO, CONGRESSIONAL RESEARCH SERVICE, COLOMBIA: PLAN COLOMBIA LEGISLATION AND ASSISTANCE (FY 2000-2001)(Updated July 5, 2001), <http://www.globalsecurity.org/military/library/report/crs/RL30541.pdf>.

⁹ STORRS & SERAFINO *supra* note 3, at 11 (“The eradication spraying by the U.S. funded counternarcotics brigade in Putumayo beginning in December 2000 caused social and political turmoil in Colombia”). See also generally RAMÍREZ, *supra* note 6. Use of fumigation as an official strategy for eradication in Colombia began in 1984. CONTRALORÍA GENERAL DE LA REPÚBLICA AUDITORÍA ESPECIAL A LA POLÍTICA DE ERRADICACIÓN DE CULTIVOS ILÍCITOS CGR-CDMA [GENERAL ACCOUNTING OFFICE SPECIAL AUDIT OF THE ILLICIT CROP ERADICATION PROGRAM] Julio de 2001, Contralor General de la República Carlos Ossa Escobar [hereinafter GENERAL ACCOUNTING OFFICE SPECIAL AUDIT] (“Officially the chemical eradication program began in 1984 as a responsibility of the Ministry of Justice.” [“Oficialmente, y a cargo del Ministerio de Justicia y el derecho, la erradicación química se inicia en 1984”]).

¹⁰ Military Construction Appropriations Act, 2001, Pub. L. No. 106-246, §§3201-27, 114 Stat. 511, 572-78 (2001). See also, SERAFINO, *supra* note 8, at 12-14 .

¹¹ Pub. L. No. 106-246, 114 Stat. 511, 572 (2001).

¹² Id. at § 3202, 114 Stat. 511, 574 (2001).

¹³ Id. at § 3203, 114 Stat. 511, 575 (2001).

¹⁴ Id. at § 3204, 114 Stat. 511, 576 (2001).

¹⁵ Id. at § 3204, 114 Stat. 511, 577 (2001).

¹⁶ Id. at § 3201, 114 Stat. 511, 573 (2001).

¹⁷ Id. at § 3204, 114 Stat. 511, 576 (2001).

¹⁸ SERAFINO, *supra* note 8, at 15.

IV. FY 2002

A. Congressional Concerns and Resulting Language

The conditions on use of U.S. funding for the purchase of chemicals for the fumigation program in Colombia for 2002 were part of Public Law 107-115, Title II under the heading “Department of State, Andean Counterdrug Initiative.”

The law stated that

the funds appropriated by this Act that are used for the procurement of chemicals for aerial coca fumigation programs may be made available for such programs only if the Secretary of State, after consultation with the Administrator of the Environmental Protection Agency, the Secretary of the Department of Agriculture, and, if appropriate, the Director of the Centers for Disease Control and Prevention, determines and reports to the Committees on Appropriations that: (1) aerial coca fumigation is being carried out in accordance with regulatory controls required by the Environmental Protection Agency as labeled for use in the United States, and after consultation with the Colombian government to ensure that the fumigation is in accordance with Colombian laws; (2) the chemicals used in the aerial fumigation of coca, in the manner in which they are applied, do not pose unreasonable risks or adverse effects to humans or the environment; and (3) procedures are available to evaluate claims of local citizens that their health was harmed or their licit agricultural crops were damaged by such aerial fumigation, and to provide fair compensation for meritorious claims; and such funds may not be made available for such purposes after six months from the date of enactment of this Act unless alternative development programs have been developed, in consultation with communities and local authorities in the departments in which such aerial fumigation is planned, and in the departments in which such aerial fumigation has been conducted such programs are being implemented.¹⁹

These conditions appeared as a result of concerns about the effects of the aerial fumigation program on the communities, the health, and the environment of fumigated areas.²⁰

¹⁹ Kenneth M. Ludden Foreign Operations, Export Financing, and Related Programs Appropriations Act, Title II, Pub. L. 107-115, 115 Stat. 2118, 2130-31(2002)[hereinafter 2002 Appropriations Act].

²⁰ Cf. H.R. CONF. REP. NO. 106-710, at 166-67, 169, 172. (2000). EU Resolution (European Parliament, DO C 267 de 21.9.2001, p. 75) See, e.g. *EUROPEAN PARLIAMENT Session document 11 January 2001 MOTION FOR A RESOLUTION further to Oral Questions O-0123/2000 and O-0124/2000 pursuant to Rule 42(5) of the Rules of Procedure by Joaquim Miranda on behalf of the Committee on Development and*

B. Certification in 2002

The Secretary of State had to consult with both the U.S. Secretary of Agriculture and the U.S. EPA before DoS could certify that the conditions placed on funding for fumigations in Colombia were met.²¹ The Secretary of State also had to consult with the Colombian government as to whether the fumigation program conformed to all Colombian laws.²²

In its consultation with DoS,²³ EPA repeatedly noted areas in which EPA lacked sufficient or relevant information. EPA also had many unanswered questions regarding practices and procedures; however, EPA had to depend on assumptions about the fumigation program that were supplied by DoS. These many weaknesses provoked great criticism of the EPA's consultation report and DoS's dependence on the EPA's report.²⁴

Cooperation on Plan Colombia and support for the peace process in Colombia B5-0000/2000 European Parliament resolution on Plan Colombia and support for the peace process in Colombia.

²¹ The Secretary of State also had the discretion to decide whether it was appropriate to consult with the Director of the Centers for Disease Control but elected not to.

²² The Colombian government simply a note to the United States Embassy in Bogotá asserting that the fumigation program complied with Colombian law. Letter from Colombian Ambassador to the U.S. Luis Alberto Moreno with Attached Diplomatic Note from the Ministry of Foreign Affairs of the Government of Colombia (March 22, 2002), <http://www.state.gov/g/inl/rls/rpt/aeicc/13247.htm>. The note contained no legal or scientific analysis.

²³ BUREAU FOR INTERNATIONAL NARCOTICS AND LAW ENFORCEMENT AFFAIRS, DEPARTMENT OF STATE, REPORT ON ISSUES RELATED TO THE AERIAL ERADICATION OF ILLICIT COCA IN COLOMBIA, RESPONSE FROM EPA ASSISTANT ADMINISTRATOR JOHNSON TO SECRETARY OF STATE (August 19, 2002) [hereinafter EPA RESPONSE] <http://www.state.gov/g/inl/rls/rpt/aeicc/13237.htm>.

²⁴ *See, e.g.* comments by Ted Schettler MD, MPH Science Director, Science and Environmental Health Network; Boston Medical Center, Boston, MA; Greater Boston Physicians for Social Responsibility; Comments by Anna Cederstav, PhD, Staff Scientist, Earthjustice and Interamerican Association for Environmental Defense; Comments by Ivette Perfecto, PhD, Associate Professor, School of Natural Resources and Environment, University of Michigan; and John Vandermeer, PhD, Margaret Davis Collegiate Professor, Department of Ecology and Evolutionary Biology, University of Michigan; Letter to The Honorable Joseph B. Biden by David B. Sandalow, Executive Vice President, World Wildlife Fund; Comments by Donald Brenneis, President, American Anthropological Association; Janet Chernela, PhD, Professor of Anthropology, Florida International University; and Jean Jackson, PhD, Professor of Anthropology and Head of Program, M.I.T.; Comments by Rachel Massey, Research Fellow; and Jim Oldham, Amazon Project Director, Institute for Science and Interdisciplinary Studies; Comments by Lisa Haugaard, Director, Latin American Working Group. Links to these sources are available at <http://www.amazonalliance.org/scientific/scientific1.htm>

The remainder of Part I of this report repeatedly refers to the EPA's 2002 consultation as a way to illustrate various shortcomings of that analysis and emphasize what information DoS must consider for its 2003 certification process.

V . FY 2003 APPROPRIATIONS LANGUAGE

The 2003 appropriations bill²⁵ again sets up conditions for release of certain money for the aerial fumigation program. The bill provides that

not more than 20 percent of the funds appropriated by this Act that are used for the procurement of chemicals for aerial coca and poppy fumigation programs by be made available for such programs unless the Secretary of State, after consultation with the Administrator of the Environmental Protection Agency (EPA), certifies to the Committees on Appropriations that: (1) the herbicide mixture is being used in accordance with EPA label requirements for comparable use in the United States and any additional controls recommended by the EPA for this program, and with the Colombia Environmental Management Plan for aerial fumigation; (2) the herbicide mixture, in the manner it is being used, does not pose unreasonable risks or adverse effects to humans or the environment; (3) complaints of harm to health or licit crops caused by such fumigation are evaluated and fair compensation is being paid for meritorious claims; and such funds may not be made available for such purposes unless programs are being implemented by the United States Agency for International Development, the Government of Colombia, or other organizations, in consultation with local communities, to provide alternative sources of income in areas where security permits for small-acreage growers whose illicit crops are targeted for fumigation.²⁶

One difference from 2002 to 2003 is that the conditions on funding expanded to include poppy eradication.²⁷ A second difference, addressed below, is a change in language requiring examination of the mixture used for fumigations rather than just the chemicals involved in the mixture; while this may seem a minor change, the larger

²⁵ Consolidated Appropriations Resolution, Pub. L. No. 108-7 (Title II, Department of State, Andean Regional Initiative), 117 Stat. 11, 172-174 (2003) [hereinafter Consolidated Appropriations Resolution].

²⁶ Id.

²⁷ Id. However, poppy eradication programs have been underway in Colombia since the proposal of the EMP. MMA Resolution No. 1065/2001 November 26, 2001.

implications of it for this year's certification appear below. A third difference is the exclusion of the consultation with the Colombian government to ensure that the fumigation is in accordance with Colombian laws. Now DoS must certify fumigations comply with the Colombian Environmental Management Plan.²⁸

This last change focuses attention on the requisites of Colombia's Environmental Management Plan for aerial eradication (EMP). The 2003 conditions incorporate by reference²⁹ the requirements in the EMP. Thus, U.S. law requires use of the herbicide mixture in accordance with the Colombian EMP. Therefore Part I of this report repeatedly references the EMP when information would be required both to prove compliance with the language of U.S. law and compliance with the EMP.

These and other changes receive further consideration below. While the aim of this report does not include an exhaustive critical analysis of last year's certification of the aerial fumigation program by DoS, consideration of last year's process and information can serve to indicate areas in which the factual record required to establish various elements of the conditions found in United States law are missing or poorly developed.

VI. CONDITION (1): MIXTURE, LABEL REQUIREMENTS, AND ACTUAL USE

(1) [T]he herbicide mixture is being used in accordance with EPA label requirements for comparable use in the United States and any additional

²⁸ "[T]he herbicide mixture is being used in accordance with . . . the Colombian Environmental Management Plan for aerial eradication." Consolidated Appropriations Resolution, *supra* note 25.

²⁹ Incorporation by reference is defined as "[t]he method of making one document of any kind become a part of another separate document by referring to the former in the latter, and declaring that the former shall be taken and considered as a part of the latter the same as if it were fully set out therein." BLACK'S LAW DICTIONARY 766-67 (6th ed. 1990).

controls recommended by the EPA for this program, and with the Colombia Environmental Management Plan for aerial fumigation.³⁰

A. Actual Tank Mixture to Be Considered

Rather than examining the use of “the chemicals used in the aerial fumigation of coca” as in the 2002 law,³¹ the 2003 bill requires that “the herbicide mixture” be considered.³² This new language referring to the tank mixture precludes an analysis like the one done by EPA in 2002 where EPA considered each chemical constituents independently rather than examining the mixture.³³ This change echoes concern expressed by the EPA in its 2002 consultation that “[t]he potentially most important uncertainty in this risk assessment concerns differences in the formulation and tank mix for use in Colombia from those used in the United States. Toxicity studies indicate that U.S. formulations of glyphosate are more toxic to non-target animals than the technical product alone.”³⁴ This is important to note since most of EPA’s analysis of glyphosate examined the technical product.³⁵ Thus, consideration of the actual tank mixture makes sense since the glyphosate formulation is more toxic than the technical product tested by EPA, additional surfactants are added, and chemicals in the presence of each other may have greater effects than expected by simple addition of the effects that each has individually.³⁶

³⁰ Consolidated Appropriations Resolution, *supra* note 25.

³¹ 2002 Appropriations Act *supra* note 19.

³² Consolidated Appropriations Resolution, *supra* note 25.

³³ EPA RESPONSE, *supra* note 23, at § 2(II) (“ In order to assess the hazard of what was sprayed in Colombia, components of the mixture were evaluated separately.”).

³⁴ *Id.* at § 4 (VI).

³⁵ *See, e.g.* *id.* at § 2 (II, VI). The only studies involving the commercial glyphosate formulation are the acute toxicity studies; however, even these failed to account for the presence of CosmoFlux-411F. *Id.* at part III.

³⁶ *Id.* at § 2 (II, V).

Therefore, the 2003 DoS consultation with EPA must involve an analysis of the actual tank mixture rather than studies about each separate constituent of the chemical mixture considered in isolation. Several portions of the Colombian EMP also require evaluation of the actual tank mixture used.³⁷

B. Focus on How the Mixture is Being Used

In effect, EPA's risk assessment for its 2002 consultation with DoS primarily represented an analysis of risk as it would occur in the scenario described by DoS.³⁸ The question then becomes how accurately the scenario described by DoS represents the actual situation in Colombia. This remains unclear. EPA did not carry out independent fact-finding nor consider information from Colombian agencies involved in investigating the fumigations.³⁹

Even accepting information supplied by DoS,⁴⁰ EPA still noted various issues with the fumigations. First, EPA observed that its review was based on U.S. conditions of glyphosate use⁴¹ that the EPA can assure through the pesticide label and a compliance

³⁷ See, e.g. *infra* Part II, Section II. B.

³⁸ See, e.g. EPA RESPONSE, *supra* note 23, at § 2(I) (“Unless otherwise specified, all information pertaining to the U.S. supported coca eradication program in Colombia was provided to the [EPA] from two sources: (1) Department of State (DoS) Presentation, DoS Coca Eradication Program, 4/18/02, (2) DoS document entitled Chemicals Used for the Aerial Eradication of Illicit Coca in Colombia and Conditions of Application.”). *Id.* at Executive Summary (“Based on a comparison of the glyphosate use pattern in Colombia, as described by the Department of State, and use in the U.S., EPA determined that the most equivalent U.S. uses of glyphosate would be forestry or rights-of-way.”) (“Department of State has assured the Agency that mixers/loaders and applicators of the glyphosate formulation receive training comparable to U.S. label requirements for glyphosate products including the use of personal protective equipment such as gloves and goggles.”) See also *id.* at § 2(I) (“To facilitate the request, the DoS met with members of OPP on April 18 and sent a written request, dated May 8, 2002, with documentation on the coca eradication program, including a description of the pesticide spray mixture components, application methods, target site identification, and potential exposures. DoS also supplied EPA with incident reports for aerial eradication of illicit poppy in Colombia.”).

³⁹ EPA did note that EPA considered information submitted by nongovernmental parties. EPA RESPONSE, *supra* note 23, at Executive Summary.

⁴⁰ EPA noted that it did not review the source of the data used in the EPA analysis. *Id.* at § 2(VIII).

⁴¹ *Id.* at Executive Summary.

infrastructure.⁴² In Colombia, EPA clearly does not and cannot accomplish this. Thus, attention should focus not on written protocols but on actual practices in Colombia. The importance of conditions of use cannot be overemphasized; one scientific review of toxicological studies of glyphosate products concludes that glyphosate does not pose a health risk to humans as long as it is used as permitted and expected to be used in the United States; the study does not address the safety of glyphosate mixtures should it be used inconsistently with expected and permitted uses in the United States.⁴³ The case of drift of the chemical applied serves as an excellent example of why actual practices and conditions need to be considered.

Drift occurs when a chemical is carried by wind to non-target areas instead of landing on target areas. This may affect food plants, animals, people, and water bodies. In its 2002 report, the EPA noted that drift is likely minimized “*if all procedures are adhered to*”⁴⁴ However, no monitoring reports support any conclusion of compliance with the procedures outlined.⁴⁵ The EPA also concluded that even with all equipment in working order, there would be “minimal collateral damage to surrounding vegetation based on information supplied by DoS.”⁴⁶

⁴² EPA RESPONSE, *supra* note 27, at Executive Summary.

⁴³ G.M Williams, R Kroes & I. C Munro, *Safety Evaluation and Risk Assessment of the Herbicide Roundup and Its Active Ingredient, Glyphosate, for Humans*, REGULATORY TOXICOLOGY AND PHARMACOLOGY 31, 117-165 (2000)

⁴⁴ EPA RESPONSE, *supra* note 23, at § 2(II).

⁴⁵ Great confusion exists about what really is happening in Colombia. Reports by both the Ombudsman (Defensoría) and Government Accounting Inspector (Contraloría) in Colombia establish that many procedures are not adhered to. Contraloría General de la Nación, Auditoría Especial a la Política de Erradicación de Cultivos Ilícitos, CGR-CDMA, July, 2001. Defensoría del Pueblo, Informe Defensorial No. 1, Febrero 9 de 2001. Informe Defensorial No. 2, April 16, 2001. Resolución Defensorial No. 4, February 12, 2001, Resolución Defensorial Nacional No. 26, October 9, 2002. *See also e.g. infra* Part II, Section IV (referring to an investigation of the Colombian agency in charge of the fumigations for lack of compliance with conditions).

⁴⁶ EPA RESPONSE, *supra* note 23, at § 2(IX).

EPA estimated drift using a model from forestry uses.⁴⁷ The EPA stated that the accuracy of the model for the program in Colombia is suspect due to differences between the use in Colombia and the uses for which the model was intended.⁴⁸ EPA noted that EPA did not receive from DoS quantitative spray drift studies conducted by DoS in conjunction with the University of Georgia.⁴⁹

EPA observed that one of the most important variables for determining drift with the model used—droplet size—varied tremendously, and EPA did not know if the droplet size had been measured under application conditions.⁵⁰ EPA wanted such information because droplet size is one of the most crucial determinants when examining drift,⁵¹ but droplet size measured without being under application conditions would likely be larger (leading to less drift) than if the droplet size were measured as it comes out of the nozzles on an airplane going over 120 miles per hour.⁵² After noting the myriad uncertainties involved, EPA finally used the assumptions given by DoS to create a chart showing that the spray drift could still affect 50% of young plants from approximately 150 to almost 600 feet from the spray path.⁵³

⁴⁷ EPA RESPONSE, *supra* note 23, at § 4(III).

⁴⁸ Id. Some of the differences included the fact that the model was designed for use on flat topography while much of the spraying takes place on irregular topography with trees and shrubs and the model is not intended to model spray drift under temperature inversion conditions. Id.

⁴⁹ Id. at § 2(VIII).

⁵⁰ Id. at § 4(III), table 1.

⁵¹ Id.

⁵² Id. at § 4(III). In the spraying program in Guatemala, it was recommended that the department of state stop using airplanes to do the spraying because of the fact that thirty percent “overspray” was common and that the government of Guatemala was becoming increasingly concerned about complaints about damage to legitimate food crops resulting from overspray. Cable from the American Embassy in Guatemala to the United States Secretary of State 3, Document No. 1991GUATEM04301 (May 1991)(on file with author). The recommendation was to switch to use of helicopters as it was estimated that helicopters would only involve approximately ten percent overspray. Id.

⁵³ Id. at § 4(III), figure 1.

EPA further noted that up to 25% of exposed crops can be damaged by exposure to as little as 0.07 lb of glyphosate active ingredient per acre.⁵⁴ Since this represents only a tiny fraction of what is currently applied,⁵⁵ the need to avoid drift is crucial. Factors necessary to consider to credibly certify the fumigation program include weather conditions at the spraying location (wind speed, humidity and air temperature); aircraft type and speed; location of licit crops, people, and water bodies; and the actual droplet size of the solution as applied.⁵⁶ Other factors to consider when examining how fumigations actually occur include scale, level of detail, and accuracy of maps being used to identify target areas; accuracy of methods used to distinguish between legal food crops and illicit crops; time elapsed between the preparation of maps and the spraying event; size of plots sprayed; and minimum distance (buffer zone) between target areas and areas excluded from spraying. Virtually all of these considerations come in the form of direct legal requirements incorporated into the United States law by virtue of their inclusion in the Colombian EMP.⁵⁷

In conclusion, the conditions in this year's conditions specifically require consideration of "the herbicide mixture, *in the manner it is being used.*"⁵⁸ Such clear language and the EMP indicate that any determination by DoS needs to be based on the *actual* situation in Colombia. Since the actual situation may differ from what policy would indicate, DoS should insure that the actual situation in the fumigation program indeed reflects policy for the fumigation program.

⁵⁴ Id. at § 4(III).

⁵⁵ At the time of the 2002 report, DoS reported to EPA that the program applied 3.34 lb active ingredient per acre. Id.

⁵⁶ These factors must be considered according to the law since they are required as part of the Colombian EMP. See, e.g., *supra* note 29 and accompanying text (referring to incorporation by reference of the Colombian EMP). See also *infra* Part II, Section II.B.

⁵⁷ See *infra* Part II, Section II.B.

⁵⁸ Consolidated Appropriations Resolution, *supra* note 25 (emphasis added).

C. Label Requirements

In order to ensure compliance with the label requirements, DoS must supply to EPA a label from the chemicals used, and the chemicals used must clearly have a label approved by the EPA and registered for use in the United States. Without such a label, one cannot determine whether the chemical's use in Colombia complies with EPA label requirements for comparable use in the United States.

1. CosmoFlux 411F

The fumigation program continues to use Cosmo-Flux 411F as a surfactant⁵⁹ in the tank mix sprayed.⁶⁰ The surfactant Cosmo-Flux is manufactured by a Colombian company⁶¹ and has not been registered for use in the United States.⁶² The conditions require that the mixture be used in accordance with EPA label requirements for comparable use in the United States. Thus, even though surfactants are usually exempt from use or sale regulation in the United States,⁶³ compliance with funding conditions is impossible if a surfactant has no U.S.-registered label for use in the United States.

⁵⁹ A surfactant is added to glyphosate in order to make glyphosate more effective. See EPA RESPONSE, *supra* note 23, at § 1.

⁶⁰ WASHINGTON BUREAU, U.S. DEPT. OF STATE, FACT SHEET: STATE DEPARTMENT QUESTIONS AND ANSWERS ON AERIAL ERADICATION PROGRAM IN COLOMBIA, <http://usinfo.state.gov/regional/ar/colombia/03032502.htm> [hereinafter DEPT. OF STATE FACT SHEET].. “Besides water, the only other product added to the commercial formulation of glyphosate is Cosmo-Flux 411f, a Colombian-manufactured surfactant.” *Id.* Similar information came from a Department of State official. Telephone interview with Nathaniel Christie, Colombia Desk, U.S. Dept. of State (April 3, 2003).

⁶¹ EPA RESPONSE, *supra* note 23, at § 2(II).

⁶² *Id.*

⁶³ *Id.* at § 2(V).

2. Commercial Glyphosate Formulation

Many people that follow the fumigation program in Colombia are confused about exactly what commercial glyphosate formulation is being used.⁶⁴ DoS must supply a label for a commercial glyphosate formulation registered and labeled for use in the United States.

D. Comparable Use in the United States

Congress added “comparable use” language in the 2003 funding for the fumigation program to ensure that use of the fumigation tank mixture is consistent with EPA regulations.⁶⁵ Characterization of comparable use as forestry/rights-of-way or agriculture carries importance because some glyphosate products are registered only for forestry uses and not agriculture.⁶⁶ Commercial glyphosate formulations also differ in the usual, recommended, and permitted concentrations and amounts applied depending on whether used in forestry or agriculture.⁶⁷

Determination of “comparable use” includes factors such as: target plants; concentrations of the mixture; application rates; proximity to water bodies, cultivated land, human settlements; re-entry times into sprayed areas; application methods; and compliance with regulatory controls, among others. A comprehensive listing of all the factors that go into determining “comparable use” goes beyond the scope of this report.

⁶⁴ E-mail from Jeremy Bigwood, private consultant and journalist, to Thomas Ruppert (March 14, 2003, 20:26 EST) (on file with author).

⁶⁵ CONF. REP., *supra* note 3, at 949.

⁶⁶ *See, e.g.* EPA RESPONSE, *supra* note 23, at § 1 (noting that the glyphosate product Accord© is intended for forestry uses).

⁶⁷ *See, e.g.* *id.*

This report merely highlights some of the difficulties EPA encountered in last year's certification when trying to characterize chemical use in the fumigations.

EPA's 2002 consultation concluded that the most comparable use in the U.S. would be forestry or rights-of-way.⁶⁸ While poppy plants resemble agricultural plants more than trees, EPA said that "[a]ccording to the DoS, Colombian coca plants (*Erythroxylum* species) are woody perennial shrubs native to the Andean region."⁶⁹ This appeared to be one of the main reasons that DoS compared glyphosate use in Colombia to forestry or rights-of-way use in the United States. The glyphosate formulation being used in Colombia was registered only for non-agricultural use in the United States.⁷⁰

EPA also said that the concentrations applied most resembled forestry and rights-of-way use in the United States.⁷¹ However, later in the report, the EPA repeatedly compares many of the practices described by DoS to EPA as resembling agricultural use in the United States.⁷² For example, forestry use implies unoccupied areas, but areas sprayed in Colombia are inhabited; in fact, many claims exist that people are being sprayed.⁷³

Use in Colombia also does not seem comparable to U.S. forestry use when one considers that in the United States the potential for exposure as "a result of entering

⁶⁸ EPA RESPONSE, *supra* note 23, at Executive Summary, § 1.

⁶⁹ *Id.* at § 2(VII).

⁷⁰ *Id.* at § 3(I).

⁷¹ *Id.* at § 1. The DoS also said that the glyphosate formulation in the coca eradication program "is registered with the U.S. Environmental Protection Agency (EPA) for sale in the United States for non-agricultural use." *Id.* at § 3.

⁷² *See, e.g.* *id.* at § 2(VII) (saying that the likelihood of spray drift is no higher in the Colombian use than in agricultural use). *See also id.* at § 2(VIII) (comparing the aircraft used to those used in U.S. agriculture, comparing the spray nozzles used to those used in U.S. agriculture, comparing the spray mixture with adjuvant to common practice in U.S. agriculture, and comparing the quality assurance procedures described by DoS to those in U.S. agriculture).

⁷³ *See also infra* note 112 (referring to Senator Wellstone getting sprayed with glyphosate in Colombia).

treated fields immediately after treatment to perform pruning or harvesting activities”⁷⁴ is extremely low. The EPA noted that in the United States, products with high ocular toxicity (such as the formulation used in Colombia) give rise to longer restricted entry intervals (REI).⁷⁵

The application method in Colombia also differs from the method for forestry in the United States. EPA notes that the application method for forestry in the United States is virtually always by helicopter⁷⁶ whereas in fumigations in Colombia are done by airplane.⁷⁷ Agricultural spraying in the United States is usually done by airplane.⁷⁸ This is very important since the higher speed of applying by airplane creates smaller spray droplets which drift farther.⁷⁹

Thus, in order for DoS to credibly certify that use of the chemical mixture for the fumigation program in Colombia is comparable to use in the United States, DoS must, at minimum, consider factors such as target plants; concentrations of the mixture; application rates; proximity to water bodies, cultivated land, and human settlements; re-entry times into sprayed areas; application methods; and compliance with regulatory controls.

⁷⁴ EPA RESPONSE, *supra* note 23, at § 2(VII).

⁷⁵ Id. at § 2(VIII).

⁷⁶ Id. at § 1 (“BEAD [the Biological and Economic Analysis Division of the Office of Pesticide Programs, EPA] was asked to report on the use of glyphosate in forestry sites since it seemed similar to the use pattern for coca eradication. However, it is not clear how closely this use approximates that for coca eradication. Glyphosate is typically applied to forestry sites using helicopters at air speeds of 50-70 knots (about 60-80 miles per hour). Application to forestry sites by fixed wing aircraft, if practiced at all, is extremely rare”)

⁷⁷ BUREAU FOR INTERNATIONAL NARCOTICS AND LAW ENFORCEMENT AFFAIRS, DEPARTMENT OF STATE, REPORT ON ISSUES RELATED TO THE AERIAL ERADICATION OF ILLICIT COCA IN COLOMBIA, CHEMICALS USED FOR THE AERIAL ERADICATION OF ILLICIT COCA IN COLOMBIA AND CONDITIONS OF APPLICATION, <http://www.state.gov/g/inl/rls/rpt/aeicc/13234.htm>.

⁷⁸ EPA RESPONSE, *supra* note 23, at § 2(VIII).

⁷⁹ See *supra* notes 50-52 and accompanying text.

E. Additional Controls Recommended by the EPA

The EPA recommended in its consultation report in 2002 that a lower-toxicity glyphosate formulation be used to create the tank mix⁸⁰ and that there be a program of prospective tracking of health effects and application times.⁸¹

The recommendation of prospective tracking of health came in response to the lack of relevant data possessed by EPA. EPA commented that “[w]ithout prospective collection of data and follow up, it is difficult to evaluate potential health effects of the glyphosate tank mixture sprayed in Colombia. Better records of the time of exposure relative to the onset of symptoms would also enhance interpretation of the incidence data.”⁸² Prospective tracking of people’s health needs to take place both immediately before and after spraying in order to have reliable data for epidemiological study.⁸³ The EMP contains similar requirements for health monitoring and the data collection required for epidemiological study.⁸⁴

EPA also recommended a switch to a less toxic commercial glyphosate formulation. EPA recommended this change because “the surfactant in the *formulated* product reportedly can cause severe skin irritation and be corrosive to the eyes....The label for the *formulated* product includes the ‘Danger’ signal word....The product has been determined to be toxicity category I for eye irritation, causing irreversible eye

⁸⁰ EPA RESPONSE, *supra* note 23, at § 2(II).

⁸¹ Id. (“Prospective tracking of reports of health complaints, documenting times of exposure and onset of symptoms, are recommended during future spray operations to evaluate any potential health effects and ameliorate or prevent their occurrence.”). *See also*, id. at § 2(IX) (“Rather than review incomplete medical records, it would be better to collect information prospectively.”).

⁸² Id. at § 2(IX).

⁸³ *See infra* notes 99-102 and accompanying text.

⁸⁴ *See infra* note 102.

damage.”⁸⁵ According to DoS information, DoS changed commercial glyphosate formulations to comply with this recommendation of the EPA.⁸⁶

Thus, in order for DoS to credibly certify that the fumigation program complies with the current conditions placed on its funding, DoS must present evidence that prospective tracking of health takes place and that the current commercial glyphosate formulation is less toxic than the formulation used last year.

F. The Colombian Environmental Management Plan

Conditions on funding for fumigations last year required DoS to consult with the Colombian government as to whether the fumigation program complied with Colombian laws.⁸⁷ Conditions this year require DoS to certify that “the herbicide mixture is being used in accordance with ...the Colombian Environmental Management Plan for aerial fumigation.” This language incorporated by reference the EMP and all its requirements.⁸⁸ From a legal standpoint this means that any documented failure to comply with the EMP represents a failure to comply with the Congressional condition of compliance with the EMP.

In addition, because this year’s conditions require *actual* compliance with the EMP instead of consultation with the Colombian government, DoS may not simply

⁸⁵ EPA RESPONSE, *supra* note 23, at § 2(II) (emphasis in original). EPA emphasized the word “formulated” to note the distinction between technical-grade glyphosate, the commercial formulation containing the technical-grade glyphosate and water and surfactants, and the actual tank mix which contains the commercial formulation mixed with water and an additional surfactant (Cosmo-Flux 411F).

⁸⁶ DEPT. OF STATE FACT SHEET, *supra* note 60.

⁸⁷ 2002 Appropriations Act, *supra* note 19. Last year the Colombian foreign minister asserted in a short note to the United States embassy in Colombia that the fumigations complied with Colombia law. Letter and attached diplomatic note from Luis Alberto Moreno, Colombian Ambassador to the U.S., Ministry of Foreign Affairs of the Government of Colombia, to Randy Beers, Assistant Secretary for International Narcotics and Law Enforcement, U. S. Department of State, March 22, 2002 at <http://www.state.gov/g/inl/rls/rpt/aeicc/13247.htm>.

⁸⁸ See *supra* note 29 and accompanying text.

accept assertions by Colombia that the fumigations comply with Colombian law. This year's language requires DoS to examine the EMP and relevant evidence to determine whether the fumigation program complies or does not comply with the EMP.⁸⁹ For an in-depth look at the requirements of the Colombian EMP, see Part II of this Report.

VII. CONDITION (2): HUMAN AND ENVIRONMENTAL EFFECTS

Adverse effects to humans and the environment encompass a broad array of considerations including risk of human health harm, harm to wildlife, erosion, and deforestation. However, the concept also extends beyond such obvious considerations to include social and economic impacts on the human community.⁹⁰

A. Human Effects

Analysis of human health effects typically takes place through the process of risk assessment. This four-part process includes: 1) hazard identification, 2) dose-response analysis, 3) exposure assessment, and 4) risk characterization.⁹¹ Data sources include epidemiological, toxicological, and exposure studies, among others.⁹² The National Research Council concluded that the quality and comprehensiveness of relevant

⁸⁹ “The conference agreement again includes conditions on the aerial spraying of herbicide, similar to the Senate amendment, *to ensure that any use of such chemicals is consistent with the Colombian Environmental Management Plan.*” CONF. REP., *supra* note 3, at 949 (emphasis added).

⁹⁰ *Cf.* National Environmental Policy Act § 102(2)(C). *See also* Hanly v. Kleindienst, 471 F. 2d 823, 827 (2d Cir. 1972) (interpreting the human environment in NEPA to include effects on the social environment).

⁹¹ OFFICE OF TECHNOLOGY ASSESSMENT, UNITED STATES CONGRESS, REDUCING HEALTH RISKS 1 (1993) [hereinafter HEALTH RISKS].

⁹² *Id.* Some of the “others” include structure-activity relationships and exposure studies. *Id.* at 49-50. Structure-activity relationships includes examining the chemical structure of substances. *Id.*

knowledge comprises the most important factor in improving risk assessment.⁹³ Thus, a credible risk assessment and certification of the fumigation program should focus on inputting quality information into all aspects of the analysis of hazards of the fumigations.

1. Health Effects: Risk Assessment

a. Hazard Identification

Because conditions this year require consideration of the tank mix as a whole,⁹⁴ the hazard identification must include toxicological studies to determine what health effects might result from the chemical mixture. This precludes an analysis like the one performed last year where EPA performed its hazard identification based on separate studies of the technical grade glyphosate and the other chemicals in the tank mix.⁹⁵

b. Dose-Response Analysis

Dose-response analysis comprises the second step in a risk assessment.⁹⁶ Clearly the dose-response analysis should include the same mixture identified as the potential hazard in step one of risk assessment.⁹⁷ In its 2002 report, EPA only considered the dose-response information for glyphosate.⁹⁸ Clearly this does not comply with the revised conditions for the fumigations contained in the 2003 appropriations bill.

⁹³ Id. at 1.

⁹⁴ See *supra* notes 31-36 and accompanying text.

⁹⁵ EPA RESPONSE, *supra* note 23, at § 2(V). See also *supra* notes 36-37 and accompanying text.

⁹⁶ Id. at 2(VI).

⁹⁷ See also *supra* notes 31-36 and accompanying text.

⁹⁸ EPA RESPONSE, *supra* note 23, at § 2(VI).

The value of dose-response analysis depends heavily on extrapolations from exposure to high concentrations to effects at low concentrations, and these extrapolations form one of the most disputed areas in risk assessment.⁹⁹ Weaknesses inherent in such extrapolations can be mitigated by adding consideration of epidemiological studies. A useful epidemiological study requires reliable information,¹⁰⁰ and epidemiological studies may provide especially valuable conclusions when good information exists about exposure, the affected population is well-defined, and the adverse effects associated with the substance in question are known.¹⁰¹ These facts led EPA to recommend prospective health studies to establish a reliable baseline for health information as well as retrospective studies soon after spraying to assess effects both immediately and shortly after spraying.

Unfortunately, relevant epidemiological studies have not been done for the conditions experienced by those living in the fumigated areas of Colombia. Creation of the informational requisites for such epidemiological studies must form a priority in order to create a reasonable and credible risk assessment. The EMP also requires exactly this type of health baseline and retrospective study as well.¹⁰²

c. Exposure Assessment

Exposure assessment comprises the third step of risk assessment. Exposure assessment calculates the amount of a substance to which defined populations are

⁹⁹ HEALTH RISKS, *supra* note 91, at 1.

¹⁰⁰ *Cf.* *supra* note 93 and accompanying text.

¹⁰¹ HEALTH RISKS, *supra* note 91 at 48-49

¹⁰² *See infra* Part II, Section III.B.1.c.iii.

exposed.¹⁰³ This entails examination of the “source, type, frequency, magnitude, and duration of actual or hypothetical contact.”¹⁰⁴ This information allows determination of a population’s dose for the substance or substances in question.¹⁰⁵

The exposure assessment presented a very weak link in the 2002 DoS certification. Typically, exposure assessment should use actual field measurements in addition to anticipated exposures under different conditions.¹⁰⁶ Here, the language of the current appropriations bill clearly requires consideration of “the herbicide mixture, in the manner it is being used.”¹⁰⁷ Thus, hypothetical information about possible exposure routes must come from information about actual use of the chemical mixture.

While EPA noted that its exposure assessment was based on information received from DoS,¹⁰⁸ it appears that such information sometimes fails to represent actual use of the tank mixture in Colombia. One example of the potential disconnect between the information EPA considered in its risk assessment versus the reality of the fumigation program comes in the form of direct exposure of humans by getting sprayed. Although EPA noted that they did not consider this exposure route because of assurances given by DoS,¹⁰⁹ the Ombudsman’s Office in Colombia has information that contradicts this.¹¹⁰

¹⁰³ HEALTH RISKS, *supra* note 91, at 52-53.

¹⁰⁴ EPA RESPONSE, *supra* note 23, at § 2(VII).

¹⁰⁵ *Id.*

¹⁰⁶ HEALTH RISKS, *supra* note 91, at 51, figure 2-1. The exposure assessment in the 2002 Report on Issues Related to the Aerial Eradication of Illicit Crops in Colombia only took into account exposure rates in scenarios portrayed by the DoS rather than considering actual exposure through examination of actual spraying practices and/or field measurements. EPA RESPONSE, *supra* note 27, at § 2(VII).

¹⁰⁷ Consolidated Appropriations Resolution, *supra* note 25.

¹⁰⁸ EPA RESPONSE, *supra* note 23, at § 2(VII).

¹⁰⁹ *See, e.g. id.* at § 2(II) (“DoS states that pilots are instructed not to spray fields where people are present. Therefore, incidental oral exposure (hand-to-mouth) resulting from individuals being directly sprayed by glyphosate was not assessed.”). *See also id.* at § 2(VII) (“Since DoS states that pilots are instructed not to spray fields where people are present, incidental oral exposure (hand-to-mouth) resulting from being directly sprayed by glyphosate was not assessed. Non-dietary incidental oral exposure was not quantitatively assessed for the use of glyphosate in Colombia.”).

Furthermore, in addition to thousands of reports by people in Colombia that have been sprayed by the fumigation planes,¹¹¹ one very high profile case involved former senator Paul Wellstone who was sprayed while observing a fumigation operation.¹¹² Thus, in this year's certification DoS either should present evidence that actual practices in the fumigation program are preventing direct spraying of people, or EPA should consider exposure routes that appear likely according to information about actual use of the herbicide mixture.

DoS's analysis for this year's certification should also account for the fact that peasants in areas subject to spraying in Colombia spend much of their time outdoors. This could have a large impact on the amount of exposure they receive to the tank mixture. Such calculations are required by standard exposure assessment procedures which require accounting for the movement and activity of people.¹¹³

d. Risk Characterization

EPA struggled in 2002 to do a credible risk assessment with very little information. EPA noted several times in their report that they were dependent on making assumptions about critical facts based on what DoS instructed EPA to consider.¹¹⁴

¹¹⁰ DEFENSORIA DEL PUEBLO, Resolución Defensorial Nacional No. 26, October 9, 2002. *See also* DEFENSORIA DEL PUEBLO, Resolución Defensorial No. 4, February 12, 2001.

¹¹¹ DEFENSORIA DEL PUEBLO, Resolución Defensorial No. 26, October 9, 2002.

¹¹² Rob Hotakainen, *Wellstone gets sprayed with herbicide*, STAR-TRIBUNE (Minneapolis—St. Paul) Dec. 1, 2000, at 25A, 2000 WL 6999853. The greatest irony in Wellstone and his party getting sprayed is that they were there to observe the precision of the spraying operations. *Id.*

¹¹³ HEALTH RISKS, *supra* note 91, at 52-53.

¹¹⁴ *See, e.g.* EPA RESPONSE, *supra* note 23, at § 1 (“Unless otherwise specified, all information pertaining to the U.S. supported coca eradication program in Colombia was supplied to the [Environmental Protection] Agency from two sources: (1) Department of State (DoS) presentation, DoS Coca Eradication Program, 4/18/02, (2) DoS document entitled Chemicals Used for the Aerial Eradication of Illicit Coca in Colombia and Conditions of Application.”). *See also id.* at § 2(II) (Since DoS states that pilots are instructed not to spray fields where people are present, incidental oral exposure . . . was not assessed.”). *See also id.* at § 4(I) (This [ecological] risk assessment is based on the information provided in that [April

EPA cautioned against drawing many conclusions from the incident data from Colombia.¹¹⁵ The incident data pertained to poppy, not coca, eradication programs.¹¹⁶ DoS informed EPA that application rates for poppy were lower than for coca and that the pattern of use differs.¹¹⁷ However, EPA received no further information about these differences.¹¹⁸ DoS did not inform EPA as to whether the tank mixture for the poppy program was the same or different for the coca program.¹¹⁹ The EPA also noted in last year's consultation report that there may be a risk to the eyes of those entering the fields immediately after spraying.¹²⁰ However, EPA was unable to assess this risk as the EPA did not have any methodology for doing so.

Even with the lack of information for the poppy incident data, the EPA concluded that the poppy program may “have resulted in minor skin, eye, or respiratory irritation, and perhaps headache or other minor symptoms.”¹²¹ But EPA could not say definitively whether any particular case was due to the spraying program or not.¹²² In part, EPA

18, 2002] meeting [with Department of State].”). *See also* id. at § 4(III) table 1 (“in the presentation at [the Office of Pesticide Programs] offered by the DoS the VMD during application was said to be 200-300 microns.”)

¹¹⁵ Id. at § 2(II) (“[G]eneralized conclusions drawn from human incident data as a result of application to opium poppy, in comparison to conditions of use for the coca eradication program should be made with caution.”).

¹¹⁶ Id.

¹¹⁷ Id.

¹¹⁸ Id. at § 2(II).

¹¹⁹ Id. at § 2(IX). This information is very important since, as noted in the EPA's report, the surfactants used and the percentage can have tremendous effects on the toxicity of the tank mixture. Aerial application of glyphosate in poppy applied 50.25 liters per hectare of a 5% glyphosate mixture while the coca program used 10.4 liters per hectare of a 44% glyphosate mixture. Letter from Anna Cederstav, Staff Scientist, Earthjustice, to Lisa Haugaard at http://www.usfumigation.org/Literature/PressReleases/MEMO-STATE_DEPARTMENT_EVIDENCE-EJ-.htm. This indicates that nine times as much glyphosate is applied in coca eradication as in poppy eradication. Id.

¹²⁰ EPA RESPONSE, *supra* note 23, at § 2(VII).

¹²¹ Id. at § 2(X).

¹²² Id. at § 2(IX). It amounts to a logical fallacy to think that if DoS is required to demonstrate compliance with the conditions, the inability to definitively determine that a specific health problem originated from the spraying program does not mean that the problem did not since that could also not be stated with certainty due to the inadequacy of the data. *Cf. id.* Thus, the inability to either definitively say whether health cases are due to the fumigation program or not indicts the lack of information available for the analysis and

noted, the poppy incident information was limited by the fact that detailed information on the use, timing of application, history of exposure, and medical documentation of symptoms related to glyphosate were not available¹²³ and the fact that the poppy and coca fumigation programs differed in several respects regarding concentrations, amount applied, and other factors.¹²⁴

A credible risk assessment must also take into account situation-specific factors affecting the validity of extrapolations. In some areas subject to fumigations in Colombia this includes extensive exposure by the population to many other herbicides.¹²⁵ However, health risk assessment also fails to take into account the cumulative effect of exposure to other substances.¹²⁶ Rather than leading to the conclusion that existing health problems and other chemical exposures means another one will not matter much, the converse may be the case.¹²⁷

should preclude a finding that no adverse or unreasonable human or environmental effects result from the fumigation program.

¹²³ Id. at § 2(X). *See also* id. at § 2(IX).

The absence of any reports of pesticide poisoning combined with the information from the ten municipalities is difficult to interpret. The glyphosate formulated product is known to cause irritation to the skin, eyes, mucous membranes which may account for some of the reports of sore throat, conjunctivitis, dermatitis and other conditions described above. However, it is not possible to evaluate these reports in any detail due to the lack of any information on how many of these cases experienced exposure immediately prior to their illness and lack of information on investigation of potential alternative causes. This anecdotal information does not provide any substantial evidence of health effects due to the spraying of the glyphosate tank mixture in Colombia. Many of the reports are consistent with exposure to glyphosate products by the dermal route, as reported in California and the literature. So, it is possible that some cases could be related to the aerial eradication program.

Id. *See also* id. at § 3(IV)(1.3) (noting that anecdotal evidence from one of the poppy incident reports did not “provide and substantial evidence of health effects due to glyphosate” although the information indicated that “some number of cases . . . could be related to the aerial eradication program”).

¹²⁴ Id. at § 2(IX).

¹²⁵ Id. at § 2(IX)(1.2).

¹²⁶ Id.

¹²⁷ HEALTH RISKS, *supra* note 91, at 55.

Situation-specific factors also entail consideration of “special populations” that are more susceptible to risks¹²⁸ and other chronic and endemic health problems plaguing the area.¹²⁹ Areas of Colombia subject to fumigation include a large number of children that may be malnourished and lacking health care.¹³⁰ Both of these increase susceptibility to health risks even beyond the special status of childhood.

In concluding the section on risk characterization, the EPA noted that

not a single case of the reported symptoms can be confirmed as caused by the spray applications. The information so far collected gives the impression that any increase in health problems is likely to be relatively small at most and the severity of those symptoms is likely to be minor to moderate at most. Given the limited amount of documentation, none of the data in the report from Colombia provide a compelling case that glyphosate spraying has been a significant cause of illness in the region studied. Some of the reports in Colombia, potentially related to glyphosate, are similar to those reported in the literature and by California.¹³¹

The consultation report with repeatedly emphasized an inability to conclusively link specific cases of health problems to the fumigations.¹³² However, this fails to

¹²⁸ Those with low body weight as well as children are typically considered especially vulnerable. *See, e.g.* Food Quality Protection Act 1996, 21 U.S.C. § 408(b)(2)(C) (requiring EPA to take into account children’s special susceptibility when determining pesticide tolerances).

¹²⁹ EPA RESPONSE, *supra* note 23, at § 2(IX)(1.2), (2.5).

¹³⁰ Part of lacking healthcare may include distances from health care facilities that preclude ready physical access to hospitals or clinics.

¹³¹ EPA RESPONSE, *supra* note 23, at § 3(V).

¹³² *See, e.g.* *id.* at § 2(IX)(1.2) (“[T]his [information in the tables] suggests that the overwhelming majority (95%) of illnesses reported would be background incidence unrelated to the spraying of herbicide. The remaining 5% increase could be due to a variety of causes and do not support a conclusion that the glyphosate tank mixture was responsible for these complaints.”). *See also id.* at § 3(IX)(1.3).

The glyphosate formulated product is known to cause irritation to the skin, eyes, mucous membranes which may account for some of the reports of sore throat, conjunctivitis, dermatitis and other conditions described above. However, it is not possible to evaluate these reports in any detail due to the lack of any information on how many of these cases experienced exposure immediately prior to their illness and lack of information on investigation of potential alternative causes. This anecdotal information does not provide any substantial evidence of health effects due to the spraying of the glyphosate tank mixture in Colombia. Many of the reports are consistent with exposure to glyphosate products by the dermal route, as reported in California and the literature. So, it is possible that some cases could be related to the aerial eradication program.

Id. *See also id.*

account for both the general lack of information in the poppy incident data and the differences between the poppy and coca fumigations.¹³³ Thus, use of the poppy incident data does not serve to determine risks for the coca fumigation program.

2. Displacement

Displacement qualifies as an “adverse impact” to humans.¹³⁴ The fumigation program has allegedly caused significant displacement of people in Colombia, especially in the southern Department of Putumayo.¹³⁵ While the majority of displacement occurs due to armed conflict and violence in the area,¹³⁶ growing numbers are displaced by the fumigations.¹³⁷

Out of a total of 125 reported pesticide poisonings in 61 weeks, 15 occurred during 5 weeks when spraying eradication occurred. Given the variation in the data, this could easily be due to chance and be unrelated to exposure from the spraying of the glyphosate tank mixture. More work is required to determine whether locations of the 15 suspect poisoning matched the location and timing of spraying.

Id. *See also* id at § 2(IX)(2.2) (“[T]he commission concluded ‘that the information available permitted the commission to consider only the possibility of an association between exposure to pesticides and the effects’.”). *See also* id. at § 2(IX)(2.3) (“[The nurse’s aid] could not say whether the symptoms were related to exposure to the spraying of glyphosate tank mixture.” “These interviews [with health providers] do not add significant evidence about the health risks from the use of glyphosate tank mixture in Colombia.”).

¹³³ EPA RESPONSE, *supra* note 23, at § 2(IX).

¹³⁴ *See supra* note 90 and accompanying text.

¹³⁵ *See, e.g.* ALLISON WERNER & AMANDA CASSEL, REGIONAL FOUNDATION FOR HUMAN RIGHTS ADVISING, BETWEEN THE LAW AND REALITY: THE CURRENT SITUATION OF COLOMBIAN REFUGEES IN ECUADOR 19 (2002). “Although it is not yet reflected in the statistics, a growing number of Colombians have fled the effects of the fumigation of coca plantations in the department of Putumayo in southern Colombia in recent months.” Id.

¹³⁶ Id. In addition to being one of the causes of displacement, the armed conflict apparently receives reinforcement from the displacement. INFORME DEFENSORIAL NO. 1. FUMIGACIONES Y PROYECTOS DE DESARROLLO ALTERNATIVO EN EL PUTUMAYO [OMBUDSMAN REPORT NO. 1, FUMIGATIONS AND ALTERNATIVE DEVELOPMENT PROJECTS IN PUTUMAYO] 9, Defensoría Delegada para los Derechos Colectivos y el Ambiente, page 9., Feb. 9, 2001 [hereinafter FUMIGATIONS AND ALTERNATIVE DEVELOPMENT]. “Many people insist that the lack of options for subsistence in the area leads many young people into getting recruited into armed groups.” [“Varias personas manifiestan que la falta de opciones de subsistencia conducirá a que muchos jóvenes sean reclutados por los grupos armados al margen de la ley.”] Id.

¹³⁷ *See, e.g.* WERNER & CASSEL, *supra* note 135.

Displacement destroys the communities displaced, impacts the communities the displaced flee to,¹³⁸ and often throws the displaced into extreme poverty.¹³⁹ Despite this, some officials in DoS seem to view displacing people as a desired effect of the fumigation program.¹⁴⁰ The belief that displacement indicates a successful fumigation program contradicts Congress' and the EMP's intentions to prevent and mitigate adverse human effects due to the fumigation.

3. Fumigation of Alternative Development

The Colombian government has received complaints indicating that alternative development projects have been sprayed.¹⁴¹ An inter-institutional commission that traveled to the area confirmed complaints by indigenous peoples, mayors, regional attorneys (procuradores), and citizens of the affected areas that fumigations had caused

¹³⁸ WERNER & AMANDA CASSEL, *supra* note 135, at 45-50.

¹³⁹ *See id.* at 23-33, 39-44.

¹⁴⁰ UNITED STATES DEPT. OF STATE, UNITED STATES POLICY TOWARDS COLOMBIA AND OTHER RELATED ISSUES, Feb. 03, 2003, at <http://www.state.gov/p/wha/rls/rpt/17140.htm>.

Recent reports from Putumayo Department indicates that the region's coca dependent economy has suffered a significant downturn. Business owners (a good general barometer) in four towns in the heart of the coca cultivation district complained that commerce was dying, and pointed to a major decrease in bus traffic, low occupancy rates in hotels, supermarkets moving less goods, fewer diners in restaurants, reductions in money transfers, and increases in loan defaults. There is also a reported upswing in the number of coca worker families leaving the area. While anecdotal, this information indicates that the spray program does appear to be disrupting the coca industry.

Id.

¹⁴¹ FUMIGATIONS AND ALTERNATIVE DEVELOPMENT, *supra* note 136 at 1. *See also* DEFENSORÍA DEL PUEBLO. INFORME DEFENSORIAL NO. 2, SEGUIMIENTO A LA RESOLUCIÓN DEFENSORIAL NO. 4 DEL 12 DE FEBRERO DE 2001 [OMBUDSMAN REPORT NO.2, CONTINUATION OF OMBUDSMAN RESOLUTION NO. 4 OF FEBRUARY 12, 2001], Delegada para los Derechos Colectivos y del Ambiente, April 16, 2001 [hereinafter OMBUDSMAN REPORT NO.2].

The completed investigation verified that indiscriminate fumigations in Putumayo resulted in environmental, social, economic, and cultural impacts as well as damaged eleven alternative development projects with both nacional and internacional funding sources such as The National Plan for Alternative Development, Plante, Corpoamazonia, The Social Solidarity Network, ECOPETROL, UMATAS, and United Nations agencies.

Id. at 1. *See also* RESOLUCIÓN NO. 26, 2002, at 30, Defensoría del Pueblo.

damage.¹⁴² A similar commission on a later visit to communities in southern Colombia also verified that the fumigations had affected the Palm Heart Producers Association, an alternative development project funded by PLANTE, the Social Solidarity Network, Agro Amazonia, and agencies of the United Nations.¹⁴³

In this year’s examination of the fumigation program for certification, DoS must address evidence that alternative development projects are being fumigated. Fumigation of alternative development programs clearly constitutes an adverse effect to humans¹⁴⁴ and thus contravenes conditions placed on funding by Congress and also violates the EMP.¹⁴⁵

B. Environmental Effects

1. Deforestation

Deforestation has been a major concern for many when evaluating the results of the fumigation program.¹⁴⁶ While movement of people into the area and planting of coca

¹⁴² OMBUDSMAN REPORT NO.2, *supra* note 141. This commission was comprised of representatives of the National Plan for Development, the Corporation for Sustainable Development in the Southern Amazon, and the Ombudsman’s office. *Id.* (Comisión Interinstitucional integrada por funcionarios del Plan Nacional de Desarrollo Alternativo - Plante, la Corporación para el Desarrollo Sostenible del Sur de la Amazonía – Corpoamazonia y la Defensoría.)

¹⁴³ OMBUDSMAN REPORT NO.2, *supra* note 141 at 9. (“Aerial fumigations took place over alternative development projects financed by national and international entities. The fumigations of January 4 and 5, in the area of the town of San Marcelino in the Quechua community affected a Project of the Association of Palm Heart Producers; the Project was supported by Plante, the Social Solidarity Network, Agro Amazonia, and agencies of the United Nations.” [“Aspersiones realizadas sobre proyectos financiados por entidades nacionales e internacionales o con Pactos. Las fumigaciones del 4 y 5 de enero, en áreas del cabildo de San Marcelino, parte del resguardo de Yarinal comunidad Quechua, afectaron, además, un proyecto de la Asociación de Productores de Palmito, apoyado con recursos del Plante, la Red de Solidaridad Social, Agro Amazonia y agencias de Naciones Unidas.”]) Another subsequent commission that visited sprayed regions also concluded that an alternative development program focused on rubber and sponsored by United Nations agencies had been affected by the spraying. *Id.* at 11.

¹⁴⁴ *See supra* Part I, Section VII.A.2.

¹⁴⁵ *See infra* Part II, Section II.B.1.g.

¹⁴⁶ *See, e.g.* GENERAL ACCOUNTING OFFICE SPECIAL AUDIT, *supra* note 9 (“The principal impact of the increase in area of illicit crops has been deforestation and accompanying effects of deforestation on water systems and biodiversity due to the crops’ location in areas that are at once strategic and very fragile from an environmental standpoint.” [“La consecuencia directa del incremento en al área cultivada han sido los

undoubtedly contributes to deforestation in southern Colombia and the Amazon,¹⁴⁷ studies should be performed to determine the additional effect on deforestation rates resulting from the fumigation program. For instance, since glyphosate acts as a broad-spectrum herbicide, which can be expected to kill or damage most plants,¹⁴⁸ how much additional rainforest destruction occurs due to drift from the fumigations?¹⁴⁹ To these direct effects of fumigations on deforestation one must add the adverse effects of deforestation that are exacerbated by those displaced from already deforested areas and subsequently expand the agricultural frontier, causing still more deforestation.

2. Conclusions Based on North American Plant and Animal Studies

Colombia, and particularly the Amazon basin where the majority of the fumigations take place, contains more than 50,000 plant species (at least 2,000 of which

grandes efectos ambientales dada su ubicación en zonas estratégicas y a la vez frágiles desde el punto de vista ambiental, siendo el principal impacto la deforestación y sus implicaciones sobre el régimen de aguas y la biodiversidad.”)].

¹⁴⁷ Amat, G. Germán, Andrade Gonzalo, Rangel J. Orlando, *Plan Colombia, Golpe bajo a la biodiversidad?*, newspaper of the Universidad Nacional de Colombia, number 13, August 13, 2000, page 6. Studies from the National University in Colombia indicate that deforestation due to coca planting presents a severe problem.

The annual loss of 200,000 hectares of native forest as a result of illicit planting of marihuana, coca, and poppy is well documented. The Andean Region, for example, where deforestation has been underway since the 1940s, presents more rapid deforestation since illicit plantings began in the 1980s; in 1992 there were 20,000 hectares of poppy for the production of opium, morphine and heroin. The total area deforested in Colombia as a result of poppy cultivation is estimated at 50,000 hectares . . . The most worrying part of the statistics of deforestation due to illicit crops is that such deforestation represents about 60-70% of total deforestation.

August, 2000. It has also been noted that “the establishment of illicit crops has, among other causes, increased the generalized destruction and degradation of ecosystems.” CONSEJO NACIONAL AMBIENTAL, POLÍTICA DE BOSQUES [NATIONAL ENVIRONMENTAL ADVISOR, POLITICS OF THE FOREST] 10 (1995).

¹⁴⁸ EPA RESPONSE, *supra* note 23, at § 1.

¹⁴⁹ See also *supra* notes 54-55 and accompanying text (noting that up to 25% of plants can be damaged by a tiny fraction of what is being applied in the fumigation program). Note also that this must be determined by careful study in order to comply with the EMP. See *infra* Part II, Section III.B.1.a.

have not yet been identified), 358 mammals, and eighteen percent of the world's birds species, the biggest percentage of any country.¹⁵⁰ EPA noted in its consultation with DoS last year that the studies used to evaluate the effects of glyphosate on plants and animals used North American species rather than ones native to South America.¹⁵¹ Credible certification by DoS this year must include data about glyphosate effects relative to the flora and fauna of the regions fumigated. This represents good scientific practice and is legally required by the EMP.¹⁵²

VIII. CONDITION (3): COMPLAINTS OF HARM EVALUATED AND PAID

A. *List of Complaints*

The 2002 conditions required that “procedures [be] available to evaluate claims of local citizens that their health was harmed or their licit agricultural crops were damaged by aerial coca fumigation, and to provide fair compensation for meritorious claims.”¹⁵³ DoS found in 2002 that “procedures are available to evaluate claims of local citizens that their health was harmed or their licit agricultural crops were damaged” by the aerial applications. This finding came in spite of the fact that 1,000 claims had been filed and only two had been found meritorious and neither of these had yet been paid.¹⁵⁴ But DoS

¹⁵⁰ Trade and Environment Database at www.american.edu/projects/mandala/TED.

¹⁵¹ See, e.g. EPA RESPONSE, *supra* note 23, at § 4(III) (using studies based on bobwhite quail and mallard ducks for determination of dietary toxicity for birds and mammals and using bluegill sunfish for studies determining toxicity for aquatic life).

¹⁵² See *infra* Part II, Section III.B.1.c.ii.

¹⁵³ 2002 Appropriations Act, *supra* note 19.

¹⁵⁴ BUREAU FOR INTERNATIONAL NARCOTICS AND LAW ENFORCEMENT AFFAIRS, DEPARTMENT OF STATE, REPORT ON ISSUES RELATED TO THE AERIAL ERADICATION OF ILLICIT COCA IN COLOMBIA, THE GOVERNMENT OF COLOMBIA'S PROCEDURES FOR HANDLING CLAIMS OF COLOMBIAN CITIZENS THAT THEIR HEALTH WAS HARMED OR THEIR LICIT AGRICULTURAL CROPS WERE DAMAGED BY AERIAL ERADICATION, <http://www.state.gov/g/inl/rls/rpt/aeicc/13242.htm>. “As of the end of August 2002, the DNE has received over 1,000 complaints through the streamlined complaint resolution procedure. Of these, close to 800 have been closed on paper after further investigation that showed that spraying did not take place in

statements about drift in aerial fumigation programs would lead one to expect more meritorious complaints of licit crops harmed by overspray.¹⁵⁵ Reports indicate that local prosecutors became so accustomed failure of the compensation process that they began advising peasants not waste time filling out the paperwork.¹⁵⁶

The 2003 conditions echo this requirement that claims of damage receive evaluation and meritorious ones receive payment.¹⁵⁷ To determine compliance with this condition, DoS should undertake a comprehensive review of all complaints and the evaluation of merit of the complaints. The records from the planes flying the spraying missions are an invaluable resource in evaluating complaints.¹⁵⁸ Review of a comprehensive database of this information should form the first step in evaluating a claim.¹⁵⁹ Open and transparent review of such information would work to allay

the complainant's vicinity during the date of the complaint. Some 220 complaints require field verification and are in the pipeline for in situ verification. Fourteen sites have been physically verified (11 in Putumayo, 2 in Nariño and one in Cesar) and in one of these cases, the DNE has agreed to pay damages that are currently being estimated. Although security and safety factors sometimes delay verification missions, the Embassy, the DNE, and the DIRAN are committed to this process." *See infra* notes 166-68.

¹⁵⁵ DoS has stated that "fixed wing aircraft cannot 'surgically' spray the small poppy field(s)" and that thirty percent overspray is typical. Cable from the American Embassy in Guatemala to the United States Secretary of State, Document No. 1991GUATEM04301 (May 1991)(on file with author). While these statements were made in reference to a fumigation program in Guatemala, the airplanes being used were the same as one of the three currently used in Colombia's fumigation program. *Id.*

¹⁵⁶ *See supra* note 155.

¹⁵⁷ Consolidated Appropriations Resolution, *supra* note 25.

¹⁵⁸ DEPT. OF STATE FACT SHEET, *supra* note 60.

[F]lights target the areas identified by the Colombian National Police in their estimates of illicit crops. An aircraft-mounted global positioning computer system identifies the precise geographical coordinates where those crops are being grown. A computer program then sets up precise flight lines (the width of a spray swath) within that area.

Id. *See also* EPA RESPONSE, *supra* note 23, at § 2(VIII).

Reconnaissance of spray sites is intended to define the treatment zones through the use of sophisticated GPS mapping which is then overlaid with GPS spray records from missions to evaluate performance. GPS technology is used for planning, assessments of mission performance, and for archival purposes to evaluate potential claims against the program.

Id.

¹⁵⁹ This same information is required by the EMP. *See infra* Part II, Section III.B.1.c.ii.

suspicions of an unfair process.¹⁶⁰ Results of these reviews should then be made public and available for independent study, to facilitate determination of the fairness of the review and the quality of information considered in the review. Finally, DoS must investigate whether meritorious claims have indeed received payment. Colombia's EMP also requires that compensation be paid for destruction of licit crops.¹⁶¹

B. Delineation of Process

Flight logs alone, however, do not suffice to assess whether or not a claim of harm to health or licit crops has merit. Actual verification of field situations serves as the only reliable way to accomplish this; officials need to see the places sprayed to fully assess claims. Such visits also need to be timely so as not to come so soon after spraying that possible effects may not yet have fully materialized or so late that effects can no longer be credibly associated with the spraying. Such a procedure not only makes intuitive sense as a way to ensure compliance with the plain language of the United States law limiting funding for the fumigation program¹⁶²—it is also explicitly required by the EMP.¹⁶³

Concern has arisen that the security situation, particularly in southern Colombia, is so difficult that ground verification is not feasible. However, the United States law

¹⁶⁰ Suspicions about the efficacy of the program arise because, according to the Colombian Ombudsman Office, the DNE received 210 complaints in December 2001, and January and February of 2002 from the Putumayo region (207), Caquetá (1), Cesar (1) and Nariño (1). Eighty-eight of the complaints were rejected and 122 (58%) were still under investigation. However, the scheduled visit in order to verify the effects did not take place. Seventy-four of the complainants declared that they had signed alternative substitution pacts with the government. Resolution No. 26/2002 at 27.

¹⁶¹ See *infra* Part II, Section III.B.1.c.iii.

¹⁶² Consolidated Appropriations Resolution, *supra* note 25.

¹⁶³ See *infra* Part II, Section III.B.1.c.ii.

requiring evaluation and compensation of claims of harm contains no exemption from its requirements due to security concerns. This stands in stark contrast to the explicit security exemption in the United States law for implementation of alternative development projects if security does not permit.¹⁶⁴ Moreover, even had the United States law contained a security exemption due to security issues, the need for ground verification explicitly appears as a requisite of the Colombian EMP¹⁶⁵ and does not permit security issues as a reason for noncompliance.¹⁶⁶

IX. ADDITIONAL CONDITIONS: ALTERNATIVE DEVELOPMENT

The requirement of instituting alternative development acknowledges that forced eradication creates tremendous resentment and protest by peasants and farmers when done with few realistic economic alternatives for subsistence.¹⁶⁷

A. Is Alternative Development Effectively Implemented?

DoS concluded in last year's certification that alternative development programs had been developed for all departments where spraying was planned and that alternative development plans were being implemented in departments where spraying had been

¹⁶⁴ Consolidated Appropriations Resolution, *supra* note 25. “[S]uch funds may not be made available for such purposes unless programs are being implemented by the United States Agency for International Development, the Government of Colombia, or other organizations, in consultation with local communities, to provide alternative sources of income *in areas where security permits* for small-acreage growers.” *Id.* (emphasis added).

¹⁶⁵ *See infra* Part II, Section III.B.1.c.ii.

¹⁶⁶ *See infra* Part II, Section IV.

¹⁶⁷ *See generally* RAMÍREZ, *supra* note 7. *See also* MARTIN JELSMA, TRANSNATIONAL INSTITUTE, ALTERNATIVE DEVELOPMENT AND DRUG CONTROL: A CRITICAL ASSESSMENT 15 (2002) http://www.alternative-development.net/downloads/documents/jelsma_martin.html.

conducted.¹⁶⁸ This section of the report included little analysis of the efficacy of such programs and the conditions did not clearly require that programs be effective.

This year's conditions require that programs "are being implemented...to provide alternative sources of income...for small-acreage growers."¹⁶⁹ This implies not only that the programs exist, but also that such programs also actually create a revenue stream for the peasants at which the programs are aimed. However, the Colombian Ombudsman's Office has reported several flaws with these programs, especially the lack of compliance by various government agencies and the time that these programs are taking to realize alternative development.¹⁷⁰

B. Delineation of Areas Where Security Permits Alternative Development

To comply with the language in the 2003 appropriations bill noting that alternative development programs should take place in areas where security permits, the United States must undertake an effort to delineate areas where alternative development programs need not be implemented because security does not permit it. Such findings should be based on consistent criteria used to determine the security situation of an area.

C. "Small Acreage" Language and the Colombian EMP

The U.S. requirement for alternative development programs specifically mentions "small-acreage" growers.¹⁷¹ While the U.S. law does not define what constitutes a small-

¹⁶⁸ BUREAU FOR INTERNATIONAL NARCOTICS AND LAW ENFORCEMENT, U.S. DEPT. OF STATE, AERIAL ERADICATION AND ALTERNATIVE DEVELOPMENT, September 2002, <http://www.state.gov/g/inl/rls/rpt/aeicc/13245.htm>

¹⁶⁹ Consolidated Appropriations Resolution, *supra* note 25 (emphasis added).

¹⁷⁰ Colombian Ombudsman Office, Res. No. 26/2002. The lack of compliance also includes the spraying of alternative development projects. *See supra* Part I, Section VII.A.3.

¹⁷¹ Consolidated Appropriations Resolution, *supra* note 25.

acreage grower, the EMP incorporates a definition of “small-acreage” grower.¹⁷² The Colombian EMP explicitly excludes all small-acreage growers from the fumigation program.¹⁷³ Yet U.S. law apparently allows targeting of small-acreage growers in direct contravention of the Colombian EMP.¹⁷⁴ Because U.S. law implies and past reports¹⁷⁵ in Colombia indicate that that small-acreage growers have been targeted in the past, DoS must ensure that such small-acreage producers are no longer being targeted.

X. LIMITATION ON FUNDING FOR NONCOMPLIANCE WITH CONDITIONS

It appears difficult to understand the limitation to not release more than twenty percent of the funds appropriated that are used for the procurement of chemicals until the Secretary of State certifies to the Appropriations Committees that the relevant conditions have been met.¹⁷⁶ Because this section does not contain any set figure for the amount of money appropriated for the fumigation program, the limitation of only releasing twenty percent of the funds until certification to the Appropriations Committees appears impossible to calculate until after the money has been spent.¹⁷⁷ Even if one can calculate the twenty percent of the funds that “are used for the procurement of chemicals,” this

¹⁷² CONSEJO NACIONAL DE ESTUPEFACIENTES [NATIONAL NARCOTICS ADVISORY BOARD], RESOLUCIÓN 005, (art. 2, paragraph 2) 2000 (defining small-acreage growers as those that have less than 2 hectares of illicit crops).

¹⁷³ *Id.*

¹⁷⁴ Consolidated Appropriations Resolution, *supra* note 25. “[S]uch funds may not be made available for such purposes unless programs are being implemented . . . to provide alternative sources of income . . . for *small-acreage growers whose illicit crops are targeted for fumigation.*” *Id.* (emphasis added).

¹⁷⁵ CONTRALORIA GENERAL DE LA REPUBLICA, DEFENSORIAL DEL PUEBLO, *Supra Note* 45.

¹⁷⁶ Consolidated Appropriations Resolution, *supra* note 25. “[N]ot more than 20 percent of the funds appropriated by this Act that are used for the procurement of chemicals for aerial coca and poppy fumigation programs may be made available for such programs unless the Secretary of State . . . certifies to the Appropriations Committees that: . . .” *Id.*

¹⁷⁷ Every other limitation or specification in the section on the Andean Regional Initiative contains either a specific dollar amount or a complete prohibition of any funding; the conditions on the fumigation funding are the only conditions subject to a percentage calculation.

limitation still means that twenty percent of the funds will be available for the fumigation programs regardless of any environmental or human damages due to the fumigations which fail to comply with the limitations placed on fumigations by United States law.

XI. CONCLUSION: INFORMATION AS KEY

A lack of clear, relevant, and reliable information and procedures to ensure the quality of information seems the dominant theme which emerges from an examination of last year's inquiry into whether the Plan Colombia fumigations to eradicate coca and poppy complies with the conditions requested for the US Congress to fund the fumigations. The conditions placed on funding of the fumigation program in Colombia indicate that Congress seeks to avoid unreasonable harm to people and the environment, requires compliance with the Colombian EMP, and address the socio-economic factors causing otherwise law abiding. The only way to assure that Congress does not fund the fumigation program if the program does not meet the standards Congress set out is to have reliable and verifiable information that addresses set of elements of the conditionality. Virtually all of the information necessary for a credible, effective certification by DoS to the Appropriations Committees that the fumigation program complies with Congressional conditions placed on funding is also required in the Colombian EMP. For 2003 DoS should not depend on the logical fallacy that failure to conclusively prove that harm effectively establishes that the fumigation program complies with the law.

The lack of information and uncertainty about the validity of information which was used in DoS's report to the Appropriations Committees in 2002 indicates that DoS

should strive to develop more credible data and make it easily available to third parties. What comprises credible data itself seems to comprise part of the debate. Many opposed to the fumigations have an inherent mistrust of any information generated by the Colombian National Police, DoS, or any group working with them. Similarly, DoS and the Colombian National Police exhibit a mistrust of those opposed to the fumigations and any of their factual claims.¹⁷⁸ Such *ad hominem* attacks by those on either side of the issue do little to further an objective analysis; these attacks do, however, cloud the issue of what information really is credible. The obvious way to deal with such problems is to make collection and interpretation of data a more public and transparent process. This includes giving the public, including those directly affected by the fumigation program and their representatives, access to the information and analysis on which DoS bases its conclusions regarding certification.

¹⁷⁸ A DoS website about the fumigation program in Colombia ascribes the complaints about harm from glyphosate to the self-interest of coca growers and guerillas and paramilitaries.

Question: If glyphosate is so benign, why are there complaints of damage from its use in Colombia? Answer: Many of these reports are based on unverified accounts by growers whose illicit crops have been sprayed. Because their illegal livelihoods have been affected by the spraying, these persons do not offer objective information about the program. Illegal armed groups are the source of other complaints, since they derive much of their incomes from illicit crops and have a significant interest in fomenting opposition to the spray program.

DEPT. OF STATE FACT SHEET, *supra* note 60. A Colombian National Police website explaining the aerial eradication spraying program appears to be a direct translation of the DoS version in English.

Si el glifosato es tan benigno, ¿por qué existen reclamos de daños relacionadas con su aplicación en Colombia? La mayoría de los informes negativos en Colombia relacionados con el uso del glifosato se han basado en versiones no comprobadas de campesinos a quienes se les han fumigado cultivos ilícitos. Además, creemos que los grupos armados por fuera de la ley son la fuente de muchas de esas quejas. Estos grupos reciben grandes cantidades de dinero por parte de los narcotraficantes para proteger los cultivos ilícitos y, por lo tanto, tienen un gran interés en mantener la oposición al programa de fumigación.

POLICIA NACIONAL, MINISTERIO DE DEFENSA, ¿QUÉ ES EL PROGRAMA DE ERRADICACIÓN AÉREA? [NATIONAL POLICE, MINISTRY OF DEFENSE, WHAT IS THE AERIAL ERADICATION PROGRAM?], at <http://www.policia.gov.co/inicio/portal/portal.nsf/TitularesWeb/444F913EAF76604986256B5900076FB3?openDocument>

Only by open and public creation of valid, verifiable information can DoS credibly certify that the fumigation program in Colombia complies with the requisites of Congressional limitations on funding for the fumigation program.

PART II

Colombia's Environmental Management Plan for Eradication of Illicit Crops with Glyphosate

I. INTRODUCTION

This report aims to clarify and elucidate aspects of Colombian law that are relevant to an analysis of the Program for the Eradication of Illicit Crops with Glyphosate [Programa de Erradicación de Cultivos Ilícitos con Glifosato (PECIG)]. Such an analysis is required of the U.S. Department of State by Congress, in the 2003 Consolidated Appropriations Resolution.¹⁷⁹

Section I of this Part explains generally how Colombian executive authorities are organized, and their functions and responsibilities in PECIG. Section I also introduces the authorities that have been involved in the evaluation of the program.

Section II defines what the Environmental Management Plan is under Colombian law, and describes the most important requirements upon which the Colombian Ministry of the Environment [Ministerio del Medio Ambiente, (MMA)] conditioned approval of the Environmental Management Plan (EMP). To facilitate the analysis of the complex EMP, Section II begins with a description and brief explanation of the activities that the DNE must carry out under the EMP. Thereafter, it addresses the main elements required of the Technical Audit, a key mechanism for verifying the prevention and mitigation of, and compensation for, environmental, social and economic impacts potentially caused by the fumigations. The section also presents obligations included in the EMP although established by authorities other than the MMA. Lastly, this Section identifies reporting and other notification requirements that are obligatory for the agencies implementing the aerial eradication program.

Explanatory tables with detailed information are provided as appendices, to facilitate the understanding of the administrative EMP process. It is important to take into account that this

¹⁷⁹ Consolidated Appropriations Resolution, *supra* note 25.

report does not include all the requirements or obligations established in the EMP, and is not an exhaustive analysis of all conditions. Rather, this Part focuses on the conditions most important for the protection of the environment and human health in Colombia.

II. COLOMBIAN ADMINISTRATIVE AUTHORITIES

The State of Colombia is a decentralized Republic where the President is the Head of the National Government. The Ministers of each area of the Executive Branch, the Executive Directors of National Agencies, and the President, compose the National Government.¹⁸⁰ The Ministries involved in the design, implementation, and evaluation of the PECIG are the Ministry of the Environment, Housing, and Land Development, Ministry of Labor and Social Security, and Ministry of Defense. The National Agencies and offices involved are the National Council on Narcotics, the National Directorate of Narcotics, and the Colombian Agrarian Institute. Other authorities such as the General Comptroller Office and the Ombudsman Office have also participated in the evaluation of the PECIG.

A. Ministry of the Environment, Housing, and Land Development

The Colombian Congress created the Ministry of the Environment [Ministerio del Medio Ambiente (MMA)] in 1993 as the highest environmental authority in Colombia.¹⁸¹ The MMA has national jurisdiction. Among its most important functions, the MMA has the authority to

¹⁸⁰ Constitución Política de Colombia, art. 115.

¹⁸¹ Ley 99 de 1993, Diario Oficial, Año CXXIX. N. 41146. 22, Diciembre, 1993. Pg. 1, art. 4.

request environmental impact assessments and other environmental permits for projects that might have a significant impact on the Colombian environment.¹⁸²

Upon creation, the MMA assumed the powers of the National Institute of Natural Resources [Instituto Nacional de los Recursos Naturales y del Ambiente (INDERENA)], the authority in charge of the protection of the environment before 1993. Congress also conferred new responsibilities on and provided expanded powers to the MMA. Though in February 2003¹⁸³ the MMA was combined with the Ministry of Development and is now called the Ministry of the Environment, Housing, and Land Development, the authority over environmental permits did not change.¹⁸⁴ Thus, the merger of the Colombian Ministries in no way affected the EMP for the PECIG.

B. Ministry of Social Protection

The former Ministry of Health, now known as the Ministry of Social Protection, is the national authority in charge of developing laws and regulations related to public health. Among its functions, this Ministry classifies pesticides in Colombia based on toxicological data and the potential hazard to human health.¹⁸⁵

C. Colombian Agrarian Institute

The Colombian Agrarian Institute [Instituto Colombiano Agropecuario (ICA)] is a national agency created in 1962. The agency has the authority to carry out the scientific control

¹⁸² *Id.*, art. 52.

¹⁸³ Ley 790 de 2002, Diario Oficial. Año CXXXVIII, No. 45046, Diciembre 27 de 2002, pg. 45, art. 4.

¹⁸⁴ Decreto 216 de 2003, Diario Oficial. Año CXXXVIII. No. 45086, Febrero 3 de 2003, pg. 49, art. 2.

¹⁸⁵ Decreto 1843 de 1991, Diario Oficial. Año CXXVII. N. 39991, Agosto 26 de 1991, pg. 2, art. 13.

of the production and trade of agrarian products that can pose a risk for farming production and sanitary health.¹⁸⁶

Specifically, ICA is the administrative agency that registers pesticides used in Colombia.¹⁸⁷ ICA also defines the technical conditions under which pesticides should be used, and approve the purpose and concentrations of use.¹⁸⁸

D. National Council on Narcotics

The National Council on Narcotics [Consejo Nacional de Estupefacientes (CNE)] was created by the National Anti-Narcotics Act¹⁸⁹ as part of the Ministry of Justice (currently the Ministry of Interior and Justice). CNE formulates the nationwide policies and programs for the control of illicit use of addictive drugs.¹⁹⁰

E. National Directorate of Narcotics

The National Directorate of Narcotics [Dirección Nacional de Estupefacientes (DNE)] is a special office of the Colombian Ministry of Interior and Justice that is the executive secretariat of the National Council on Narcotics.¹⁹¹ The main functions of DNE are to enforce the decisions made by the CNE, and to coordinate the implementation of the national government policies for the control, of illegal drugs.¹⁹² The DNE is the agency in charge of the aerial eradication program

¹⁸⁶ Decreto 2141 de 1992, Diario Oficial, Año CXXVIII, No. 40703, Diciembre 31, 1992, pg. 84, art. 3°, numeral 11°.

¹⁸⁷ Decreto 1843 de 1991, *supra* note 183, at art. 141.

¹⁸⁸ *Id.* 185, art. 195.

¹⁸⁹ Ley 30, 1986. Diario Oficial, Año CXXXVI. N. 44169. 21, Septiembre, 1986. pg 29.

¹⁹⁰ *Id.*, art. 91.

¹⁹¹ Decreto No. 0494 de 1990, Diario Oficial. Año CXXXVI No. 39205. 27 Febrero, 1990. pg. 2

¹⁹² *Id.* art. 3.

of illicit crops in Colombia. Therefore, though other agencies and authorities are also involved, the DNE is responsible for the coordination and implementation of the program.¹⁹³

F. Public Ministry and the General Comptroller's Office

The Public Ministry and the General Comptroller's Office are independent control bodies of the Colombian State that are separate from other government branches.¹⁹⁴ The General Comptroller Office is in charge of the State financial management, controlling its outcomes.¹⁹⁵ The Public Ministry is composed of the Attorney General's Office [Procuraduría General de la Nación], and the Ombudsman's Office [Defensoría del Pueblo].¹⁹⁶ The Attorney General oversees compliance with the Colombian Constitution, laws and administrative acts. In particular, the Attorney General oversees the activities carried out by the governmental agencies and officers. It also oversees protection of human rights in collaboration of the Ombudsman Office.¹⁹⁷ The Ombudsman Office is in charge of the promotion and protection of human rights in Colombia.¹⁹⁸ The Public Ministry can demand any information needed to carry out its functions from other government branches.¹⁹⁹

¹⁹³ MMA, Res. 341, 2001, Art. 4, and art. 5 e). *See also*, Res. 1065/2001, Considerations, pg. 5.

¹⁹⁴ Constitución, *supra* note 180, at art. 117.

¹⁹⁵ *Id.* art. 119.

¹⁹⁶ *Id.* art. 118.

¹⁹⁷ *Id.* art. 277.

¹⁹⁸ *Id.* art. 282.

¹⁹⁹ *Id.* art. 284.

III. ENVIRONMENTAL MANAGEMENT PLAN

A. General Definition

In the early 90's Colombia revised and modernized the environmental laws, issued a new Constitution, and created the National Environmental System.²⁰⁰ The new law established requirements for environmental impact assessments (EIA), environmental impact statements (EIS), and environmental permits for projects that may cause negative and significant impacts to the environment.

Activities begun under the new environmental structure (after 1993) require a permit from MMA if the activities have the potential to cause a significant impact on the environment. Prior to the creation of the Ministry of Environment (MMA), projects did not need environmental permits, but simply consultation and approval by INDERENA subsequent to consultation. Therefore, projects begun before 1993 are grand-fathered in the sense of not needing permits. That is not to say that no conditions ever apply. Grand-fathered activities must – if required by the MMA – operate under an Environmental Management Plan (EMP) with defined measures to prevent harm to the environment. In these cases, the activity may continue as long as it complies with the MMA-approved EMP.²⁰¹

Colombian Law defines the Environmental Management Plan as “the document that as a result of an environmental assessment specifies in detail, the actions to carry out to prevent, mitigate, correct, or compensate impacts or negative environmental effects that the development of a project, or activity cause. The document includes implementation, monitoring, contingency, and closure plans, depending on the nature of the activity.”²⁰²

²⁰⁰ Ley 99 de 1993, *supra* note 181.

²⁰¹ Decreto 1753 de 1994, Diario Oficial Año CXXX, No. 41477, Agosto 5, 1994, pg. 24, art. 38.

²⁰² Decreto 1728 de 2002. Diario Oficial No. 44893, Agosto 6, 2002. Art. 1.

B. Environmental Management Plan for the Program to Eradicate Illicit Crops with Glyphosate

As per Colombian Environmental Laws, the Ministry of the Environment in 1996 required the National Narcotics Division [Dirección Nacional de Estupefacientes (DNE)] to draft and submit an EMP for the Program to Eradicate Illicit Crops with Glyphosate [Programa de Erradicación de Cultivos Ilícitos con Glifosato (PECIG)]. Almost six years later, in January 2002, the MMA finally approved the EMP for the program contingent on certain conditions and clarifications.

The EMP process in Colombia was very complicated for this Program. As explained above, the MMA has the authority to require the EMP and approve it with imposed conditions.²⁰³ In the process of evaluating and approving the EMP for the PECIG, the MMA issued several resolutions and administrative acts, the most important of which are Administrative Act No. 558A/1996 (framework for the EMP), Resolution No. 341/2001 (rejection of the original EMP submitted and imposition of conditions), Resolution No. 1065/2001 (decision of a request for review with clarifications), and Resolution No. 0108/2002 (final decision).²⁰⁴

The EMP presented by the DNE to the MMA is a complex document organized into thirteen cards, corresponding to the requirements and activities that the DNE has to carry out for the PECIG. The thirteen cards describe the following programs and activities:

- Management Program for Spraying Operations
- Management of Herbicides and Additives at Operations Bases
- Management of Fuels, Vehicles, Equipment, and Transport
- Solid Waste Management Program

²⁰³ Ley 99 de 1993, *supra* note 181, at art. 52.

²⁰⁴ See Appendix 1 for a list of the administrative decisions regarding the PECIG.

- Water Waste Management Program
- Inspection, Verification and Control of Spraying Operations
- Scientific Study of potential impacts of the Glyphosate Herbicide on Representative Tropical Ecosystems
- Environmental Monitoring Program
- Social Management Program
- Education Program
- Occupational Safety and Health Program
- Program for Inter-institutional Coordination
- Contingency Plan

In approving the EMP, the MMA modified a number of the proposed management programs, and imposed additional conditions that DNE must comply with in implementing the Fumigations Program. To present a clear perspective of the critical applicable conditions, this report focuses on the most significant programs in the EMP, as defined by the MMA in relevant Resolutions.

1. Activities to implement within the EMP

a. Characterization of areas affected by the PECIG

The DNE is required to assess environmental impacts in fumigated areas, and specifically to determine the nature and characteristics of the environmental impacts caused by fumigations between January and May of 2001. The DNE must propose adequate measures to mitigate such

environmental impacts.²⁰⁵ In addition, the DNE has to immediately characterize and map the areas with illicit crops and affected by the eradication program, to a scale of 1:100,000. This includes areas to be excluded from the fumigation (sensitive areas).²⁰⁶ The MMA stated that these obligations should be carried out immediately after issuance of the Resolution No. 341 – in May 2001 – and should be completed within the following six months. Moreover, to characterize the affected and excluded areas the DNE was required to use all available information, including analog and digital cartographic information, and its associated databases, satellite information, radar images, aerial photos, and geographic information system data.²⁰⁷

The MMA also ordered that for populated or environmentally sensitive areas, the DNE identify and implement methods of crop eradication that guarantee social and environmental protection.²⁰⁸ Specifically the MMA provided that “aerial spraying is not to take place in sensitive environments, such as populated areas, parks, natural reserves, aqueducts and bodies of water.”²⁰⁹ Because aerial spraying is not permitted in protected areas such as national parks, the DNE must manually eradicate illicit crops in these areas.²¹⁰ The eradication of illicit crops in these areas was also required to comply with the guidelines established by the Office of National Parks [Unidad Administrativa del Sistema de Parques Nacionales Naturales].²¹¹ Finally, the MMA stated that the DNE must comply with the requirements defined by the CNE specifically regarding the exclusion of small crops from the PECIG.²¹²

²⁰⁵ MMA Res. 341, 2001, art. 2, Res. 1065, 2001

²⁰⁶ Deadline due in November 2001. MMA Res. 341, 2001, art. 5. This obligation was reinforced in MMA Res. 1065, 2001, when the MMA redefined the scale at which the characterization should be done.

²⁰⁷ MMA. Res. 1065, 2001, considerations to art. Fifth, a) and b) of MMA Res. 341/2001.

²⁰⁸ MMA Res. 341/2001, art. 4.

²⁰⁹ MMA Res. 341/2001.

²¹⁰ Bearing what the CNE decided on Resolution 0005/2000, the MMA include it in MMA Res. 341, 2001, art. 3 and confirmed it in MMA Res. 1065/2001, considerations.

²¹¹ Id.

²¹² CNE, Res. 0005/2000, MMA Res. 341/2001.

b. Definition of Buffer Zones

The MMA required the creation of buffer zones to effectively protect areas that are culturally, socially, economically or ecologically fragile.²¹³ The DNE was to immediately adopt and enforce these buffer zones.²¹⁴ The buffer zones established by the MMA are greater than the default zones established under Colombian law, and also more extensive than those initially proposed by the DNE.²¹⁵ The MMA insisted on these greater buffer zones because the usage of pesticides on illicit crops in the PECIG differs greatly from the way these pesticides are used on legal crops, thus necessitating more stringent protective measures.²¹⁶

c. Mitigation, Compensation and Environmental Control Measures

The DNE was required to immediately and effectively propose and carry out measures to mitigate, control, and compensate for the environmental damages that PECIG causes.²¹⁷ To do so, the DNE must develop a Contingency Plan; an Inspection, Verification and Control Program; and, a Compensation Program.²¹⁸ For each of these programs, the DNE must monitor the different activities of the PECIG to determine the real environmental impact of the program on water bodies, soils, vegetation, uses of soil and health of the people in the fumigated areas, as per the following requirements and indicators:

²¹³ See Appendix 2 for a detailed description of the buffer zones.

²¹⁴ MMA Res. 1065/2001, considerations on Art. 5, d) of Res. 341/2001, pg. 8.

²¹⁵ MMA Resolution 1065/2001 and Resolution 0108/2002.

²¹⁶ MMA, Res. 1065/2001. For the detailed buffer zones, see Appendix 2.

²¹⁷ MMA Res. 341/2001, art. 6. *See also* MMA Res. 1065/2001, and MMA Res. 0108/2002.

²¹⁸ *Id.*

i. Contingency Plan

The purpose of the Contingency Plan is to control and prevent potential undesired accidents of the PECIG, particularly those that might occur during the transport, storage, and operational activities in the Anti-narcotics Fumigation Bases.²¹⁹ The MMA approved the Contingency Plan that the DNE presented in compliance with the EMP requirements, and that was drafted according to the framework on the National Policy on the Prevention and Attention of Disasters. Therefore, the MMA clearly established that the DNE must immediately start the implementation of the Contingency Plan.²²⁰

ii. Inspection, Verification and Control Program

The objectives of the Inspection, Verification and Control Program are to 1) verify the effective application of environmental management measures; 2) determine effectiveness of the PECIG in reducing illicit crop cultivation, and; 3) assess the efficiency of the compensation and mitigation measures in cases of damages.²²¹

This program will determine the regeneration rates and ecological dynamics of the sprayed areas, including zones affected by the drift (especially water bodies, forest, biomass, legal crops and pasturelands).²²² Considering the environmental, social and economic damages that the PECIG might be causing, the MMA required immediate implementation of this monitoring program.²²³ The DNE has to draft and submit a schedule of activities, and push forth

²¹⁹ MMA. Res. 1065/2001, pg. 6.

²²⁰ MMA Res. 341/2001, art. 6. *See also* MMA Res. 1065/2001.

²²¹ MMA Res. 341/2001, art. 6, *See also* MMA Res. 1065/2001, and MMA Res. 0108/2002.

²²² According to Card 6 Inspection, Verification and Control of Spraying Operations.

²²³ MMA Res. 341/2001, art. 6. *See also* MMA Res. 1065/2001, and MMA Res. 0108/2002.

with a collaborative research proposal/program with the District University [Universidad Distrital].²²⁴

The indicators to be used for monitoring were only generally discussed by the DNE, but the MMA required concrete, specific soil,²²⁵ water,²²⁶ and sediment²²⁷ measurements. These would provide information on any physical or chemical effects on natural resources. Biological indicators such as bees and soil worms were also included.²²⁸ As well as levels of residues of pesticides in vegetables, to verify continued compliance with FAO standards,

The EMP required monitoring at the following sites to represent all the ecosystems affected by the PECIG, including high Andean ecosystems and sub-paramos. The specific plots used for monitoring studies were to be geo-referenced and located in.²²⁹

- The Amazon Region: Caquetá (area of Lomería), Guaviare (Amazon sabana), Putumayo (piedemonte);
- Catatumbo: Tibu and North of Santander;
- Magdalena and Middle Cauca: south of Bolivar;
- Macizo Colombiano: High Andean forest in Tolima.

Sampling must be done immediately post fumigation, and also 15 and 60 days after spraying. If persistent contamination is found, further sampling is required four and six months

²²⁴ MMA Res. 0108/2002, art. 1.

²²⁵ The indicators to be measured in soil are: Residual glyphosate and AMPA (Aminomethyl-Phosphonic Acid) levels at different post-application times; biomass of microorganisms and worms; pH, “CIC”, “Relacion de bases intercambiables,” contaminants, nitrification (nitrates, nitrites, ammonia), Nitrogen fixers, texture, percent organic matter, total and available phosphorus, phosphate solubilizers, percent clay, and toxicity; vegetative succession and recovery patterns in sprayed areas. MMA Res. 1065/2001. *See also* MMA Res. 0108/2002, art. 1.

²²⁶ Indicators to be measure in groundwater are: pH, DO, “DQO”, turbidity, color, temperature, electric conductivity, nitrates, nitrites, ammonia, dissolved phosphate, magnesium, calcium, glyphosate, and AMPA concentrations. MMA Res. 0108/2001, art. 1.

²²⁷ Indicators to be measure in sediments are: Glyphosate and AMPA concentrations, Organic Matter and “granulometria”. MMA Res. 0108/2001, art. 1.

²²⁸ MMA Res. 0108/2002, art. 1.

²²⁹ MMA Res. 1065/2001, considerations. *See also* MMA Res. 0108/2002, article 1.

later, to help determine preventive and corrective measures.²³⁰ In soils and sediments, the samples will be at least five, to insure a fair representation of samples, and provide a standard deviation curve.²³¹

iii. Compensation program

In the event that the monitoring activities evidence the existence of residual glyphosate or glyphosate metabolite in soils, water or sediments, the EMP defined several mitigation actions.²³² Because of the particular concern about PECIG impacts on public health, the MMA required that where complains from the people exist; the DNE must develop an Epidemiological Vigilance Program.²³³ In fact, the Ministry of Health has demanded the implementation of epidemiological monitoring since 1984. Nevertheless, no such studies have been done to date.

d. Herbicide Management Program

The EMP also sets out conditions for the management of the herbicides and additives at the operations bases. These include specifications for appropriate herbicide storage, preparation, and loading, as well as equipment calibration, among others. These measures are intended to insure that the herbicides are handled and applied without unacceptable risk to environmental and human health.

The Herbicide Management Program emphasizes the importance of complying with conditions for flight operation to insure spraying is not done at greater wind speeds, altitudes, or

²³⁰ MMA Res. 1065/2001, considerations to art. 7. *See also* MMA Res. 0108/2002.

²³¹ MMA Res. 0108/2002, art. 1.

²³² Among the most important measures, the DNE shall apply neutralizers, fertilizers, and erosion control in affected soils. In addition, apply clay and monitor the quality of the water for the control of impacted water bodies. As defined in the EMP and in detail in MMA Res. 1065/2001.

²³³ MMA Res. 1065/2001.

temperatures than permitted. If these conditions are not met, environmental and social impacts are likely to occur. The EMP also requires the DNE to ensure that all pilots receive at least 60 hours per year of theoretical and practical training on aerial spraying for crop eradication. In addition, before each spray cycle, program personnel must verify the calibration of spray equipment, and when necessary, recalibrate according to prescribed procedures.

Procedures for the management of fuels, vehicles, equipment, and transport were also defined in the EMP to prevent and mitigate impacts associated with fuel storage, operation of heavy machinery, and transport of glyphosate herbicides.²³⁴

e. Solid Waste Management Program

The Solid Waste Management programs is intended to reduce the quantity of solid wastes generated at the anti-narcotics bases, and mitigate impacts of wastes generated. The DNE presented a series of waste management and disposal options and was additionally required to present solid waste management alternatives for wastes associated with the herbicide and additives.²³⁵ The DNE had 30 days, as of February 2002, to submit a plan for the management of solid wastes, related with glyphosate and its adjuvant.²³⁶ Measures for the management, separation and disposition of hazardous wastes such as used oil, lubricants, and batteries were also required to be immediately adopted.²³⁷

²³⁴ The DNE had to present measures on the management of fuels, equipment and vehicles since the beginning of the EPM, obligation that was reaffirmed on MMA Res. 341/2001, and again on MMA Res. 1065/2001. On MMA Resolution 1065/2001 the MMA gave 15 days to the DNE to comply with this.

²³⁵ Obligation established in MMA Res. 1065/2001 where the MMA gave 15 days for its compliance. This deadline was increased to 30 days in MMA Res. 0108/2002.

²³⁶ MMA Res. 1065/2001. *See also* MMA Res. 0108/2002.

²³⁷ MMA Res. 1065/2001. *See also* MMA Res. 0108/2002.

f. Waste Water Management Program

The EMP contained a wastewater management program intended to maintain the natural quality of local and regional water sources. Among the most important measures, the DNE was required to collect wash waters from the glyphosate spray tanks in ditches and route these waters through two sequential stabilization ponds prior to discharge. Discharge must occur only to special land areas designated for herbicide degradation.²³⁸ In addition, DNE was required to treat all waters collected from the herbicide mixing area to ensure degradation of glyphosate.

The DNE must conduct quarterly sampling on wastewaters to monitor pH, DQO and glyphosate concentrations. These monitoring samples shall be done both in raining and treated water systems.²³⁹

g. Social, Educational and Information Programs

The DNE is responsible for the coordination of the social and environmental programs that form part of the PECIG. In so doing, the DNE is required to collaborate with other government agencies that, for example, carry out alternative development plans for the affected region.²⁴⁰ Particularly important is the identification of the areas under alternative development plans, in order to exclude them from the fumigations.²⁴¹ In addition, these programs constitute an essential part in the eradication of illicit crops strategy. The MMA requested an immediate report on how the coordination with other institutions will work and is currently happening.

²³⁸ MMA Res. 1065/2001. *See also* MMA Res. 0108/2002.

²³⁹ MMA Res. 1065/2001.

²⁴⁰ MMA Res. 1065/2001.

²⁴¹ CNE, Res. 0005/2000, art. 3.

The Educational Program is intended to inform the national, regional and local communities about the PECIG, and to increase capacity among the operations personnel to reduce the risk of health and environmental harm.²⁴² The Education Program also includes a reporting requirement on the results of educational activities, specifically on the information given to the communities regarding the problems that fumigations might have.

According to the EMP, the DNE must inform all segments of the population and particularly the local communities about the objectives, importance, and methods of spraying, environmental and social mitigation measures taken, the results of the monitoring/auditing program, and the process for addressing complaints and compensating for harms. This is required to be done via various methods such as the Internet, a monthly publication, press releases and other media work.²⁴³

In addition, the DNE has to hold weekend workshops in each of the municipalities subject to spraying to inform the communities about the environmental measures included in the spraying plan (with a detailed explanation of the EMP), opportunities for community participation in the program, avoiding herbicide exposure; and environmental issues in the region.

2. Technical Audit

The MMA required the establishment of a Technical Audit,²⁴⁴ in charge of verifying how PECIG is carried out and of the evaluation of environmental, human health and agricultural impacts caused by it.²⁴⁵

²⁴² MMA Res. 341, 2001, art. 5, lit c. *See also* the confirmation on MMA Res. 1065/2001, pg. 7, in Considerations

²⁴³ MMA Res. 341/2001. *See also* Res. 1065/2001.

²⁴⁴ MMA Res. 341/2001, art. 8.

²⁴⁵ CNE Res. No. 0005/2000.

recuperation of coca plants fumigated with glyphosate, and report the results to the ICA for the needed approval, according to registration of pesticides regulations.²⁵¹

In the event that higher concentrations of glyphosate, or a different mixture should be used in the PECIG, the DNE shall, after complying with required studies, protocols and procedures of those agencies, secure prior approval from ICA and the Ministry of Health. Furthermore, the DNE shall adopt the measures of toxicological classification and evaluation defined by the Ministry of Health, for the mixture related with the toxicological risk of the herbicide and of the approved formulation.²⁵²

4. Reporting requirements

The DNE has to send quarterly reports to the MMA on the following activities:²⁵³

- Characterization, environmental assessment and maps of the areas to be fumigated, as well as the sensitive areas to be excluded.
- Definition and observance of the buffer zones to prevent adverse fumigation impacts in sensitive areas.
- Implementation of the Community Educational Program, with the consent of agencies and authorities involved.
- Coordination of social and environmental programs of the PECIG with the social and environmental programs from other authorities involved in the National Plan to Fight Drugs.


²⁵¹ MMA Res. 1065/2001, pg. 12, considerations to art. 10

²⁵² MMA Res. 1065, 2001.

²⁵³ MMA Res. 341/2001, art. 5, paragraph, art. 7, and paragraph art. 9.

- The results of the regeneration rate and ecological dynamics studies in areas sprayed.
- Residual soil levels of glyphosate and associated environmental impacts, on defined plots.

The DNE also has to annually report to the MMA on:

- The results from the monitoring to assess the effectiveness of the program;
- The monitoring of environmental impacts;
- Complaints from individuals or environmental authorities;
- A description of how damages have been settled in accordance with CNE Resolution 017 of 2001.
- Long-term monitoring for each municipality, department, and region of:
 - Spatial and temporal trends in illicit crop production (based on Satellite images per the SIMCI  procedure);
 - Spatial and temporal environmental and social changes in areas subjected to crop eradication (based on information from the DIRAN);
 - Impact of the crop eradication program on the expansion of the area subject to illicit crop production;
 - Adverse environmental impacts the program generates on legal crops and fields, forests and other natural ecosystems, and rural populations including indigenous populations.

A copy of this report must be sent to the local environmental authorities in the nine key regions being sprayed. In addition, the DNE must draft and implement a system to inform the

public about the development of PECIG, the activities and reports of the Technical Audit, and the compliance with the MMA Resolutions.²⁵⁴

The MMA's approval of the EMP gives clear authority only for the specific activities described in the EMP, and subject to the conditions listed. Therefore, any modification of the practices, conditions, or obligations shall be submitted immediately to the MMA for evaluation and approval.²⁵⁵ The MMA pointed that if any natural resource will be use or impacted in a different way than the conditions approved in the EMP, the DNE must also count with the MMA authorization,²⁵⁶ Furthermore, the DNE must provide written and prior notification to the MMA of any change that can alter the assessment or approval of the eradication activity.²⁵⁷ The DNE also has to provide written notification to the contractors and all personnel involved in the eradication program, of the obligations, control measures and prohibitions of the MMA Resolutions and the EMP, and ensure compliance with these measures.²⁵⁸ Finally the MMA determined that security problems in the eradication program could not be used as an excuse for the lack of compliance with the requirements and conditions. In fact, the DNE must notify the MMA in case that security concerns or public disorder make compliance with the EMP impossible.

²⁵⁴ MMA. Res. 341/2001, art. 9.

²⁵⁵ MMA Res. 1065/2001, art. 2.

²⁵⁶ MMA Res. 1065/2001, art. 2.

²⁵⁷ MMA Res. 1065/2001, art. 3.

²⁵⁸ MMA Res. 1065/2001, art. 4.

IV. CONCLUSION

The DNE is the authority in Colombia that is responsible for implementing the PECIG. Therefore, the DNE is the agency in Colombia that has to draft and submit to the environmental authorities the EMP identifying the environmental and other impacts that the PECIG causes along with appropriate measures to prevent, mitigate or compensate for such impacts. The MMA is the environmental agency with the authority to request the submission of the EMP and to evaluate the program and review compliance with EMP conditions.

The characterization, environmental assessment and monitoring activities are essential to prevent environmental, social, and economic impacts and guarantee that whenever such impacts are produced, the DNE is able to mitigate and compensate for them. Additional verification is also vital in the implementation of the EMP and should be done as part of the Technical Audit. The Technical Audit should be carried out according to the environmental and other parameters outlined in the EMP.

Finally, Educational, Information, and Alternative Programs for the substitution of illicit crops, have also occupied an important place in the development of the EMP, bearing in mind the potential and actual effects of the PECIG.

It is important to note that due to lack of compliance with several of the conditions in the EMP, the Ombudsman Office and the General Comptroller Office have reported on the aerial eradication program.²⁵⁹ Furthermore, the MMA opened an administrative investigation against the DNE to determine the sanctions that should be imposed because of the lack of compliance.²⁶⁰

²⁵⁹ Defensoría del Pueblo, *supra* note 110. See also Contraloría General de la República, Julio 2001, *supra* note 9.

²⁶⁰ MMA Res. 0108/2002, pg. 4.

**Legal and Procedural History of the
Colombian Environmental Management Plan**

Date	Kind of event	Decision
August 13, 1996	MMA Auto No. 558 ^a .	Required the EMP and establish guidelines.
July 30, 1998	DNE Oficio No. 1140.	DNE submitted the EMP to the MMA, without Chapter VII, regarding the “Identification and Assessment of Environmental Impacts”
October 2, 1998	MMA Oficio No. 22111-2-315.	Required the identification and assessment of the environmental impacts (Chapter VII), omitted in the EMP presented three months before.
November 18, 1998	DNE Oficio No. 3110-1-25417.	Submitted copies of Chapter VII of the EMP “Identification and Assessment of Environmental Impacts”
December 23, 1999	MMA Auto No. 599, 1999.	Required DNE to amend the EMP.
February 1, 2000	DNE Recurso de Reposición (Review request)* against Auto 599/1999	Disagreed with the guidelines and timeline established by the MMA for the EMP.
March 13, 2000	MMA Auto No. 143/2000.	MMA decided the review and gave three months to the DNE to present the additional information.
May 10, 2000	DNE Recurso de reposición	DNE requested a review, on the grounds that in order to comply with the MMA conditions, the participation of

* The Recurso de Reposición is a request that the petitioner presents before the judge or administrative authority making the decision, in order to reconsider, correct or give further explanations or information regarding the decision taken.

		other authorities and agencies was needed.
June 6, 2000	MMA Auto No. 275, 2000.	Decided the review against Auto No. 143/2000 denying all DNE arguments and confirming the deadlines and compromises.
September 13, and October 17, 2000	Communication from DNE to MMA	DNE submitted the “Additional information to the EMP for the application of Glyphosate in the eradication of illicit crops”, amended the following month.
December 20, 2000	Meeting between the MMA and the DNE, based on the Technical Memo No. 589, December 20, 2000	MMA communicated to the DNE that the EMP did not comply with the guidelines. Thus, required only the environmental risk assessment for the Putumayo region. Considering that the measures established in such assessment, could be applied to other regions. DNE committed to it.
January 30, 2001	DNE Communication No. 3111-1-1627.	DNE submitted to the MMA the EMP for the eradication of illicit crops, based on the Putumayo assessment
May 2001	Resolution 341/2001, MMA	MMA denied approval of the EMP. Determined measures and guideline to prevent environmental impacts and to be able to approve the plan.
July 16, 2001	MMA Auto No. 516/2001.	MMA required the DNE to report on the compliance of MMA Res. No. 341/2001
August 8, 2001	DNE Communication No. 3110-1-1069.	The DNE submitted the first advance report on the obligations stated in MMA Res. 341/2001.
August 24, 2001, and September 6, 2001	MMA Communication No. 2211-2-126, and MMA Communication No. 3111-2-11558.	MMA required clarification regarding communications with the Ministry of Health and ICA. They also made comments on the “quick ex-post environmental assessment, and the establishment of the effect of fumigations with

		glyphosate”.
November 7, 2001	DNE Communication No. 3113-1-14331.	DNE submitted the EMP for the Aerial Eradication Program of illicit crops with Glyphosate, as well as the advance document on the compliance of MMA Res. 341/2001.
November 26, 2001 (23 days after the past submission)	MMA Resolution 1065/2001.	MMA approved the EMP, stipulating additional requirements.
December 10, 2001	DNE Recurso de reposición	DNE requested the revision of the approval, the plan was suspended a few days.
December, 2001	Citizens review request.	Citizens appeals: Claudia Sanpedro and Héctor Suárez
January 31, 2002	MMA Res. 0108/2002.	Final decision of the revision and imposition of EMP.

Buffer Zones for Environmental Resources

Environmental Resource	Buffer Zone
<ul style="list-style-type: none"> • Static water bodies: lakes, lagoons, aquaculture ponds, and wetlands • Running water: streams and rivers 	Minimum of 200 meters as per criteria established in the Ministry of Health Decree 1843/1991. This may be augmented depending on the technical specifications of the aerial operations.
<ul style="list-style-type: none"> • Sub-paramos, water springs, aquifer recharge areas. 	No spraying of the interior of these is permitted. External buffer zone is a minimum of 2000 m.
<ul style="list-style-type: none"> • Natural Protected Areas 	No spraying in natural protected areas is permitted. Minimum buffer zone is 2000 meters.
<ul style="list-style-type: none"> • Human Settlements: (Hamlets, farmhouses, overseers, indigenous reserves, town centers) 	No spraying of these is permitted. Minimum buffer zone is 2000 meters.
<ul style="list-style-type: none"> • Areas of socio-economic interest: legal crop producing areas, zones of eradication agreements. 	No spraying in these is permitted. Minimum buffer zone is 1600 meters.

Acronyms

CNE	National Council on Narcotics [Consejo Nacional de Estupefacientes]
DoS	Department of State
DNE	National Directorate of Narcotics [Dirección Nacional de Estupefacientes]
EMP	Environmental Management Plan
EPA	United States Environmental Agency
ICA	Instituto Colombiano Agropecuario (Colombian Agriculture Institute)
INDERENA	National Institution of the Natural Resources and the Environment [Instituto de Nacional de los Recursos Naturales y del Ambiente]
MMA	Ministry of the Environment [Ministerio del Medio Ambiente]
PECIG	Program for the Eradication of Illicit Crops with Glyphosate [Programa de Erradicación de Cultivos Ilícitos con Glifosato]