CENTER FOR FOOD SAFETY

660 PENNSYLVANIA AVE., SE, SUITE 302, WASHINGTON, DC 20003
(202) 547-9359 FAX (202) 547-9429
303 SACRAMENTO ST., 2ND FLOOR, SAN FRANCISCO, CA 94111
(415) 826-2770 FAX (415) 826-0570
WWW.CENTERFORFOODSAFETY.ORG

Docket No. APHIS-2010-0047
Regulatory Analysis and Development
PPD, APHIS
Station 3A-03.8
4700 River Road Unit 118
Riverdale, MD 20737-1238

Comments to USDA APHIS on the Draft Environmental Impact Statement for Glyphosate Tolerant Event H7-1 Sugar Beets

December 13, 2011

Docket No. APHIS-2010-0047.

CFS is a non-profit, membership organization that works to protect human health and the environment by curbing the proliferation of harmful food production technologies and by promoting organic and other forms of sustainable agriculture.[1] CFS represents approximately 190,000 members throughout the country that support organic agriculture and regularly purchase organic products. CFS members support the public's right to choose GE-free food and crops. These comments incorporate by reference other CFS organizational comments submitted to the docket concurrently. Also, concurrently with these comments, CFS is submitting 9,186 individual comments from CFS True Food Network members opposing the proposed full deregulation of RR sugar beets (Docket No. APHIS-2010-0047).[2]

In 2008, the Center for Food Safety (CFS) sued the Department of Agriculture (USDA) and its agency, the Animal and Plant Health Inspection Service (APHIS), arguing that APHIS's deregulation of Monsanto's genetically engineered (GE) Roundup Ready sugar beets (RRSB) violated the National Environmental Policy Act (NEPA), and that an environmental impact statement (EIS) was necessary. (*Sugar Beets I*). CFS was joined by co-plaintiffs Organic Seed Alliance, High Mowing Seeds, and the Sierra Club. On September 21, 2009, the federal court

[1] *See generally* www.centerforfoodsafety.org.
[2] Submission numbers 80f81cba, 80f81ccb, 80f81cd0, 80f81cd8, 80f81cdd

sided with CFS, vacating APHIS's deregulation of RRSB and ordering the agency complete an EIS analyzing the impacts of the crop on the environment, farmers, and the public.[3]

CFS again sued USDA and APHIS after APHIS issued permits allowing continued planting of the crop, absent any NEPA compliance, in September 2011. (*Sugar Beets II*). On September 28, 2010, the court ruled CFS was likely to succeed on its claim that APHIS violated NEPA and improperly segmented the crop cycle. On November 30, 2010, the court granted CFS's motion for preliminary injunction and ordered the stecklings destroyed. This injunction was subsequently overturned by the U.S. Court of Appeals for the Ninth Circuit on the narrow ground that CFS had not shown likelihood of irreparable harm. The Ninth Circuit did not disturb the lower court's other findings.

On November 4, 2010, APHIS released a Draft Environmental Assessment (EA) proposing new interim measures that would further allow the continued commercialization of RRSB beginning in the spring of 2011. On February 4th, 2011, APHIS announced its decision to partially deregulate GE sugar beets based on its Final EA and finding of no significant impact (FONSI). This partial deregulation is currently the subject of pending litigation in the U.S. District Court for the District of Columbia (*Sugar Beets III*).

SUMMARY

The Draft EIS (DEIS) is arbitrarily and capriciously flawed in structure, process, and substance.

The DEIS is flawed in structure because it is overly narrow in scope. It fails to give meaningful consideration to any alternative besides full deregulation based on an arbitrary and capricious interpretation of APHIS's authority under the Plant Protection Act (PPA).

The DEIS is arbitrarily and capriciously flawed in process because the DEIS's analysis is predicated on the pre-determined and separate conclusion in APHIS's Plant Pest Risk Assessment that APHIS can only deregulate RRSB.

The DEIS is arbitrarily and capriciously flawed in substance because its analysis on numerous impacts is inadequate and does not comply with NEPA: It fails to address several significant issues, and its conclusion that RRSB is not likely to cause significant impacts is contrary to record evidence known to APHIS.

The DEIS's discussion of cumulative impacts is legally deficient, in particular for its failure to consider several important factors relevant to the emergence of glyphosate-tolerant weeds.

APHIS failed to comply with the mandates of the Endangered Species Act (ESA) because it failed to ensure that the impacts of its proposed action do not affect protected species or their habitat.

[3] *Ctr. for Food Safety v. Vilsack*, 2009 WL 3047227, at *9 (N.D. Cal. Sept. 21, 2009).

APHIS's decision to deregulate RRSB is arbitrary, capricious, and contrary to the mandates of the PPA. The decision is not based on sound science, and the Roundup Ready sugar beet crop system violates the PPA in that it gives rise to impacts that will harm the agricultural economy and the environment.

COMMENTS

I. STATUTORY & REGULATORY BACKGROUND

The National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) requires a federal agency such as APHIS to prepare a detailed EIS for all "major Federal actions significantly affecting the quality of the human environment."[4] Here, the district court established that deregulation of RRSB will have a significant effect on the quality of the human environment and required APHIS to prepare this DEIS. NEPA "ensures that the agency . . . will have available, and will carefully consider, detailed information concerning significant environmental impacts; it also guarantees that the relevant information will be made available to the larger [public] audience."[5] "Preparation of an EIS thus ensures that decision-makers know that there is a risk of significant environmental impact and take that impact into consideration."[6] APHIS' decisions must be "complete, reasoned, and adequately explained."[7]

Council on Environmental Quality (CEQ)

NEPA also established the Council on Environmental Quality and charged CEQ with the duty of overseeing the implementation of NEPA.[8] The regulations subsequently promulgated by CEQ, 40 C.F.R. §§ 1500-08, implement the directives and purpose of NEPA, and "[t]he provisions of [NEPA] and [CEQ] regulations must be read together as a whole in order to comply with the spirit and letter of the law."[9] CEQ's regulations are applicable to and binding on all federal agencies.[10] Among other requirements, CEQ's regulations mandate that federal agencies address all "reasonably foreseeable" environmental impacts of their proposed programs, projects, and regulations.[11]

CEQ's regulations lay out the purpose of an EIS. "The primary purpose of an environmental impact statement is to serve as action-forcing devices to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government."[12] An

[4] 42 U.S.C. § 4332(2)(C).
[5] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).
[6] *Anderson v. Evans*, 314 F.3d at 1022.
[7] *Northwest Coalition for Alternatives to Pesticides v. U.S. E.P.A.*, 544 F.3d 1043, 1052 n.7 (9th Cir. 2008).
[8] *See* 42 U.S.C. §§ 4321, 4344.
[9] 40 C.F.R. § 1500.3.
[10] 40 C.F.R. §§ 1500.3, 1507.1; see, e.g., Hodges v. Abraham, 300 F.3d 432, 438 (4th Cir. 2002).
[11] See 40 C.F.R. §§ 1502.4, 1508.8, 1508.18, & 1508.25.
[12] 40 C.F.R. § 1502.1.

EIS shall provide "full and fair discussion of significant environmental impacts and shall inform decisionmakers of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[13] Agencies are to focus on "significant environmental issues and alternatives."[14]

Plant Protection Act (PPA)

On June 22, 2000, Congress repealed the former Plant Quarantine Act, the Federal Plant Pest Act, and the Federal Noxious Weed Act and replaced them with the Plant Protection Act (PPA), 7 U.S.C. § 7701-7772, as part of the Agricultural Risk Protection Act. APHIS regulates transgenic crops pursuant to the PPA, which consolidated these previous statutes. The PPA's overarching purpose is *broad*: to ensure "the protection of the agriculture, environment, and economy of the United States."[15] The PPA requires that all of APHIS's decisions "shall be based on sound science."[16] Developers who want to commercialize a transgenic plant based on field trial data must petition USDA for deregulation,[17] which APHIS can grant "in whole or in part."[18]

Endangered Species Act (ESA)

As recognized by the Supreme Court, the ESA is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[19] The ESA's statutory scheme "reveals a conscious decision by Congress to give endangered species priority over the 'primary missions' of federal agencies."[20] Federal agencies are obliged "to afford first priority to the declared national policy of saving endangered species."[21]

Section 7(a)(2) of the ESA requires every federal agency to consult the appropriate federal fish and wildlife agency—FWS, in the case of land and freshwater species—to "insure" that the agency's actions are not likely "to jeopardize the continued existence" of any listed species or "result in the destruction or adverse modification" of critical habitat.[22] If FWS concludes that the proposed action will jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat, the agency must outline "reasonable and prudent alternatives" to the proposed action that would avoid violating ESA section 7(a)(2).[23]

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[13] *Id.*
[14] *Id.*
[15] 7 U.S.C. § 7701(1).
[16] *Id.* §§ 7701(4), 7711(b), 7712(b).
[17] 7 U.S.C. § 7711(c)(2), 7 C.F.R. § 340.6.
[18] 7 C.F.R. § 340.6(d)(3)(i).
[19] *Tenn. Valley Authority v. Hill*, 437 U.S. 153, 180 (1978).
[20] *Id.* at 185.
[21] *Id.*
[22] 16 U.S.C. § 1536(a)(2); *see also* 50 C.F.R. § 402.01(b).
[23] 16 U.S.C. § 1536(b)(3)(A).

II. THE DEIS RELIES ON UNRELIABLE STUDIES AND KNOWINGLY IGNORES RELEVANT CONTRARY SOURCES THAT INDICATE SIGNIFICANT IMPACTS WILL RESULT FROM FULL DEREGULATION

Under NEPA, agencies must ensure the professional integrity, including the scientific integrity, of the discussions and analyses in their environmental impact statements.[24] In doing so, they must "discuss at appropriate points in the final statement any responsible opposing view which was not adequately discussed in the draft statement and shall indicate the agency's response to the issues raised."[25] As noted above, the PPA also requires that APHIS decisions be based on "sound science."

APHIS's analysis of several critical issues avoids serious consideration of evidence that is contrary to its preferred outcome. The DEIS is arbitrary, capricious, and violates NEPA and the PPA because it relies on scientific and economic analyses that APHIS knows to have been discredited—judicially, by prior inconsistent statements, or by overwhelming scientific consensus. For instance, CFS submitted comments on the draft environmental assessment for partial deregulation of RRSB (hereinafter referred to as CFS Science Comments 2010, included in supporting materials) that provide evidence refuting and discrediting APHIS's unsound science with respect to glyphosate-resistant weeds, yet APHIS continues to rely on discredited views in the draft EIS.[26]

Dr. Richard Sexton

In assessing the socioeconomic impacts of the three Alternatives on the sugar beet industry, the DEIS relies heavily on opinions by Dr. Sexton, an expert witness on behalf of industry Intervenor-Defendants in prior litigation regarding RRSB.[27] In that litigation, Dr. Sexton provided opinions on the same topics as those discussed in the DEIS: the economic impacts of halting full scale production of RRSB. However, the district court in *Sugar Beets II* found Dr. Sexton's opinions to be unreliable.[28] Dr. Sexton's estimates regarding the net economic benefit of adopting H7-1 are based on hearsay: self-reported data from industry groups either involved in pending RRSB litigation or with economic interests in its outcome. Dr. Sexton also did not consider the impacts of fluctuating commodity prices on profitability or on a farmer's choice of crops, or the cost of Monsanto's technology fee for its patented seed in the costs of producing RRSB. Dr. Sexton's methodologies are unreliable and cannot be used to support the DEIS's conclusions about economic impacts.

[24] 40 C.F.R. § 1502.24.
[25] 40 C.F.R. § 1502.9(b).
[26] Further comments by CFS on the inadequacy of APHIS's scientific analysis will be submitted separately and are incorporated by reference here.
[27] DEIS at 569, 571-72.
[28] *Ctr. for Food Safety v. Vilsack*, Case No. 3:10-cv-04038 (N.D. Cal. Nov. 30, 2010) (Dkt. No. 221), at 10 (*Sugar Beets II*).

Andrew Kniss

In its analysis of the likelihood that RRSB will hasten the emergence of glyphosate-resistant weeds, the DEIS also relies on opinions by Andrew Kniss. These opinions are contrary to evidence before the agency. Specifically, the DEIS relies on weed control practices contradicted by record evidence and Mr. Kniss's own prior inconsistent statements.[29] The DEIS also fails to acknowledge contradictory and inconsistent evidence. It does not meet NEPA's requirements regarding professional and scientific integrity in the decision making process.

Pollen Flow Methodology

Although APHIS makes repeated claims that pollen flow from RRSB is "not likely to occur," APHIS has not measured the likelihood or possibility of pollen flow from RRSB to sexually compatible *Beta* crops at the 4-mile isolation distances the industry is meant to observe. APHIS instead relies on analysis and studies with, at best, a tenuous connection to observational data. APHIS's reliance on overly derivative and unreliable scientific analysis here is therefore arbitrary, capricious, and contrary to NEPA and the PPA.

Contamination Evidence from the Sugar Beets Litigation

The DEIS states that "[d]espite testing over 3 years, no evidence of H7-1 gene flow has been detected."[30] APHIS supports this statement with a reference to a declaration in prior *Sugar Beets* litigation, without providing further context. Critically, the DEIS fails to disclose the existence of confidential evidence before the agency, introduced during *Sugar Beets I, II* and *III*, revealing that H7-1 gene flow has occurred, and continues to occur.[31] APHIS's conclusion to the contrary disregards facts before the agency. Failure to address this contrary evidence is arbitrary, capricious, and violates NEPA and PPA's mandates concerning professional and scientific integrity.

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[29] *See* Kniss, A. R. Mesbah, A. O. Nissen, S. J.; A Novel Application of the Herbicide Ethofumesate to Increase and Prlyphosate Resistant Technology in Sugarbeet. University of Wyoming (2010). *Available at* http://www.reeis.usda.gov/web/crisprojectpages/213038.html.

[30] DEIS at 218.

[31] On February 15, 2011, APHIS advised that "[i]f [] CFS [] wanted to ensure that APHIS considered the disputed confidential litigation documents in the agency decision-making process, [] CFS [] should have more specifically identified such documents during the administrative process." *See* Federal Defendants' Opposition to CFS Motion to Supplement the Administrative Record, at 14, *Sugar Beets III* (Dkt. No. 78); *id*. at n.8 (noting, with approval, method of "provid[ing] APHIS with specific page numbers"). Accordingly, CFS respectfully draws the agency's attention to the following documents, containing confidential evidence of contamination and analysis thereof: *See generally*, Plaintiffs' Closing Brief, *Sugar Beets II*, 3:10-cv-04038 (N.D. Cal. filed 11/9/2010) (Dkt. No. 210-1) (under seal); Plaintiffs' Closing Reply Brief, *Sugar Beets II*, 3:10-cv-04038 (N.D. Cal. filed 11/16/2010) (under seal); Exhs. N through T to Tomaselli Decl. in Supp. of Pls.' Mot. for Permanent Relief, *Sugar Beets I*, No. 3:08-cv-00484 (N.D. Cal. filed 6/4/2010) (Dkt. Nos. 461-467); *and Sugar Beets I* Transcript of Sealed Proceedings – Deposition Testimony of Mark Anfinrud (N.D. Cal. 11/2/2010) (under seal);\see also *CFS* Plaintiffs' Motion for Summary Judgment, *Grant v. Vilsack*, No. 1:11-cv-00308 (D.D.C. filed Sept. 23, 2011) (Dkt. No. 86-1); *CFS* Plaintiffs' Combined Response and Reply, *Grant v. Vilsack*, Case No. 1:11-cv-00308 (D.D.C. Dec. 2, 2011) (Dkt. No. 141), at 11, 13, 14, 16, 17–18; *id.* Exhibit A (Dkt. No. 141-1).

Evidence Regarding Glyphosate-Resistant Weeds

The DEIS claims that, should growers rely on a single herbicide (glyphosate) to control weeds, glyphosate-resistant weeds would nevertheless take five or more years to develop.[32] CFS rebutted this erroneous prediction, including discussion of the sources APHIS cited, in comments on the draft environmental assessment for partial deregulation (CFS Science Comments 2010). APHIS also fails to acknowledge contrary evidence introduced at all stages of the *Sugar Beets* litigation that glyphosate-resistant weeds are currently infesting fields where RRSB is grown.[33] Failure to address this contrary evidence known to APHIS is arbitrary, capricious, and violates NEPA and PPA's mandates concerning professional and scientific integrity.

Materials from Sugar Beet Litigation Generally

The DEIS fails to acknowledge or address several other documents within APHIS's knowledge that bear on crucial issues, including isolation distances, likelihood of transgenic contamination with voluntary industry stewardship in place, likelihood of harm from glyphosate-resistant weeds, and the general insufficiency of the mitigation measures that APHIS continues to claim will prevent environmental harms and the socioeconomic impacts of full deregulation. These documents—some of which are confidential discovery evidence—were introduced in the course of the *Sugar Beets* litigation, and APHIS may locate them by referring to several pleadings filed under seal in *Sugar Beets I* and *II*, as well as in *Grant v. Vilsack.*[34] As a party to this litigation at all stages, APHIS was aware of these documents at the time it prepared the DEIS. This documentary evidence flatly contradicts many of the claims in the DEIS regarding the likelihood of environmental harm from transgenic contamination or glyphosate-resistant weeds. APHIS's failure to acknowledge this evidence and adequately explain why it does not change the agency's conclusions is arbitrary, capricious, and violates NEPA and the PPA.

III. THE SCOPE OF APHIS' DEIS IS IMPROPERLY NARROW AND THE RESULT PRE-DETERMINED.

Impermissibly Narrow Scope

APHIS's NEPA analysis is improperly narrow in scope. Agencies cannot define the project so narrowly that it forecloses a reasonable consideration of alternatives, nor can they "define [their] purpose and need so as to winnow down the alternatives until only the desired one survives."[35] Under "Purpose and Need," APHIS states that its regulatory options are limited by the findings in the agency's 10-page Plant Pest Risk Assessment.[36] However, APHIS's authority and mandate are quite broad: as the DEIS itself notes, they include "protecting American agriculture," and "ensuring plant and animal health." The structure and scope of the DEIS is

[32] DEIS at 240.
[33] See *supra*, n. 31, and *infra*, discussion regarding cumulative impacts.
[34] See n. 31.
[35] *Klamath-Siskiyou Wildlands Center v. U.S. Forest Service*, 373 F. Supp. 2d 1069 (E.D. Cal. 2004).
[36] DEIS at 8–9.

flawed to the extent it does not undertake an analysis of the full range of potentially significant impacts from this starting point.

APHIS also ignores the agency's noxious weed mandate under the PPA. APHIS must undertake its statutorily mandated obligation to investigate whether RRSB poses noxious weed risks, and consider whether or how to address noxious weed harms resulting from the agency's approval action. The PPA imposes on APHIS the duty to consider whether plants under its authority create "noxious weed" or "plant pest" harms, and grants it the authority to address these harms. The agency has broad statutory power to prohibit or regulate plant pest harms, as well as noxious weed harms.[37] The statutory definition of "noxious weed" is very broad,[38] and include many of the types of harms noted in these comments including transgenic contamination to other crops from RRSB and the resulting public health risks, damage to crops, the environment, and the interests of agriculture, for example.

Exercising APHIS's noxious weed authority is particularly important here because the approval of RRSB and the glyphosate use associated with the Roundup Ready crop system will promote the rapid evolution and spread of noxious weeds tolerant of or resistant to glyphosate herbicide, in violation of the PPA's noxious weed provisions.[39] Glyphosate-resistant weeds are noxious because of their manifold negative impacts on the interests of agriculture, human health, the environment, and farmers' welfare. Because RRSB will directly and indirectly foster and cause these significant negative noxious weed impacts, APHIS must apply its noxious weed authority to RRSB.

APHIS's overly narrow application of its statutory authority here violates the PPA, and is an arbitrary and capricious abdication of authority.[40] APHIS should at a minimum delay any decision on RRSB and any other GE crop until it revises its admittedly outdated regulations to make clear that its noxious weed mandate applies to GE crops.[41]

Predetermined Result

Although NEPA does not mandate any particular results, its main purpose is to foster informed decision-making by agencies. *See* 42 USC 4321; 40 CFR 1501.1(c). Here, the decision to deregulate RRSB has already been determined. APHIS has concluded, based on its 10-page PPRA, that it must deregulate RRSB.[42] APHIS has the process backwards: the NEPA process is meant to inform agency action, not create paperwork after a decision is made. APHIS cannot use the already finished PPRA to short-circuit and prejudge the NEPA analysis.

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[37] 7 U.S.C. § 7712(a) (emphasis added).
[38] 7 U.S.C. § 7702(10) (emphasis added).
[39] *See, infra*, discussion regarding super weeds
[40] *American Paper Institute, Inc. v. American Electric Power Service Corp. et al*., 461 U.S. 402, 413 (1983) (failure to consider relevant factors in its decision making violates the PPA); 5 U.S.C. § 706.
[41] APHIS Docket 2008-0023.
[42] *See, e.g.*, DEIS at 8; USDA APHIS, Plant Pest Risk Assessment for Event H7-1 Sugar Beet, p. 10, *available at* www.aphis.usda.gov/brs/aphisdocs/03_32301p_deis_ppra.pdf.

IV. THE DEIS'S ALTERNATIVES ANALYSIS IS INADEQUATE.

Federal courts have consistently held that "[i]n addition to the proposed agency action, every EIS must '[r]igorously explore and objectively evaluate all reasonable alternatives' to that action,"[43] including the "no action" alternative.[44] The analysis of alternatives to the proposed action is "the heart of the environmental impact statement."[45] "An agency's consideration of alternatives 'must be more than a pro forma [ ] ritual. Considering environmental costs means seriously considering alternative actions to avoid them.'"[46] "The existence of reasonable but unexamined alternatives renders an EIS inadequate."[47] The consideration of alternatives furthers NEPA's goal by guaranteeing that agency decisionmakers "[have] before [them] and take [ ] into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance."[48] An alternatives analysis must foster both informed decisionmaking and informed public participation.[49]

NEPA's requirement that alternatives be studied, developed, and described both guides the substance of environmental decisionmaking and provides evidence that the mandated decisionmaking process has actually taken place.[50] Informed and meaningful consideration of alternatives is thus an integral part of the statutory scheme.[51]

As explained above, the DEIS fails to meaningfully consider any alternative other than the Preferred Alternative because the decision is predetermined: in the agency's (erroneous) view, the plant pest assessment for RRSB precludes any action other than full deregulation; thus any other alternative is illusory rather than meaningful. However, APHIS must meaningfully consider the "no action" alternative, as well as all reasonable alternatives.

Further, the DEIS fails to even consider *inter alia* the following reasonable alternatives, each discussed more fully below:

- A partial deregulation alternative with geographical restrictions
- A partial deregulation alternative requiring all H7-1 seed production to use male sterile plants
- A partial deregulation alternative imposing mandatory isolation distances greater than 4 miles

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[43] *Center for Biological Diversity v. U.S. Dept. of Interior*, 1071 (9th Cir. 2009) (citing 40 C.F.R. § 1502.14(a)).
[44] 42 U.S.C. § 4332(C)(iii).
[45] *Or. Natural Desert Ass'n v. Bureau of Land Mgmt.*, 531 F.3d 1114, 1121 (9th Cir.2008) (quoting 40 C.F.R. § 1502.14).
[46] *The Humane Soc. of U.S. v. Department of Commerce*, 432 F. Supp. 2d 4, 23 n.13 (D.D.C. 2006) (quoting *Southern Utah Wilderness Alliance v. Norton*, 237 F. Supp. 2d 48, 52 (D.D.C. 2002)).
[47] *Friends of Southeast's Future v. Morrison,* 153 F.3d 1059, 1065 (9th Cir.1998).
[48] *Calvert Cliffs' Coordinating Committee, Inc. v. United States Atomic Energy Commission*, 449 F.2d 1109, 1114 (D.C. Cir.1971).
[49] *Westlands Water District v. U.S. Dept. of Interior*, 376 F.3d 853, 872 (9th Cir. 2004).
[50] *Id.*
[51] *See Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228 (9th Cir. 1988).

- Any alternative with mandatory measures to prevent the emergence of glyphosate-resistant weeds
- A deregulation alternative that imposed monitoring requirements on commercial RRSB production

The DEIS acknowledges in several places that the environmental risks of RRSB are more acute in certain regions than in others. For example, risks stemming from the presence of feral beet populations—including, but not limited to, transmission of the H7-1 trait to wild beets from RRSB bolter pollen—are higher in California's Imperial Valley than elsewhere.[52] Also, in light of the known contamination incidents in the Willamette Valley—where most sugar beet seed production occurs and where RRSB and other *Beta* crop growers are in close proximity—it would be reasonable to consider a deregulation alternative that placed geographical restrictions on RRSB planting. Such an alternative could otherwise resemble APHIS's Preferred Alternative (i.e., complete deregulation). However, such an alternative is not mentioned anywhere in the DEIS, much less rigorously analyzed.

There are other alternatives the agency should consider to limit the likelihood of contamination. For instance, the DEIS fails to consider, much less rigorously analyze, any alternative that would require use of RRSB seed crop pollinators not carrying the H7-1 transgene (i.e., "male sterile" technology). Consideration of this alternative is reasonable in light of APHIS's previous admission that it would reduce the risk of contamination.[53] Nor does the DEIS consider a partial deregulation alternative with any isolation distances other than the 4-miles already in use by industry. Although the effectiveness of a 4-mile isolation distance is at best controversial (and contradicted by the evidence discussed *infra*), the DEIS fails to consider requiring any other isolation distance.

The DEIS also fails to consider, much less rigorously analyze, an alternative that imposed any measures to delay development of glyphosate-resistant weeds (such as prohibiting rotating RRSB with other Roundup Ready crops). Instead, APHIS relied on the industry's voluntary efforts to address this problem, arbitrarily assuming that RRSB farmers would act differently from the many thousands of farmers of Roundup Ready crops that have already created glyphosate resistant weeds on millions of acres of U.S. farmlands.[54]

Nor does the DEIS consider an alternative that would require monitoring of commercial RRSB production, but otherwise resembled the Preferred Alternative. Such an alternative would be reasonable given the paucity of data regarding transgenic contamination incidents and the myriad

[52] DEIS at 211.
[53] *See, e.g.*, USDA APHIS, Final Environmental Assessment, Monsanto Company and KWS SAAT AG Supplemental Request for Partial Deregulation of Sugar Beet Genetically Engineered to be Tolerant to the Herbicide Glyphosate (February 2011), at 75.
[54] *See, infra,* discussion regarding cumulative impacts and evidence of existing glyphosate tolerant weeds.

disincentives to reporting contamination incidents (including, but not limited to, retaliation by state/local authorities and harassment of the type documented in *Monsanto vs. U.S. Farmers*[55]).

Finally, as noted above, the DEIS fails to consider any alternatives that regulated RRSB pursuant to the agency's broader statutory authority under the PPA.

The unconditional deregulation of RRSB poses significant risks to the quality of the human environment. For example, the significant likelihood of gene flow from RRSB to non-RR sugar beets poses risks to the livelihood of organic and conventional farmers as well as the environment. The potential for APHIS to reduce these significant impacts by adopting one or more of these ignored alternatives must be fully and meaningfully analyzed. APHIS's nominal (and illusory) consideration of *some* alternatives does not satisfy NEPA.

V. APHIS'S EXPECTATION THAT NO GENE FLOW WILL OCCUR IS CONTRARY TO RECORD EVIDENCE AND CONTRARY TO APHIS'S EXPERIENCE.

The DEIS's discussion of transgenic contamination fails to consider several important factors that APHIS has been confronted with time and again. Additionally, the DEIS lacks any meaningful discussion of the consequences of transgenic contamination.

Contamination Is Likely

The DEIS fails to objectively evaluate the likelihood of environmental and intertwined economic harm from transgenic contamination, as Congress intended and as NEPA mandates. As comments to this docket will show, transgenic contamination is likely and will happen by a variety of means if APHIS deregulates RRSB. Transgenic contamination occurs through a variety of pathways. Pollination of non-genetically engineered plants by genetically engineered plants, mixing of genetically engineered seed with non-genetically engineered seed, improper seed cleaning or equipment cleaning, weather events, and human error all lead to transgenic contamination.

As noted above, APHIS's analysis of gene flow and contamination ignores *Sugar Beets I* and *II* evidence documenting extensive contamination in the Willamette Valley at distances far greater than 4 miles. This evidence demonstrates, *inter alia*, that not only is contamination through gene transfer possible, but that within three years of RRSB commercialization, contamination had begun. The DEIS's omission of any discussion of this vital evidence from *Sugar Beets I* and *II* renders APHIS's conclusions about gene flow and transgenic contamination arbitrary and capricious.

Several recent reports further call into question APHIS's conclusion that transgenic contamination is "not expected." For example, A 2008 Government Accountability Office (GAO) study analyzed several major transgenic contamination incidents from the past decade,

[55] Center for Food Safety, *Monsanto vs. U.S. Farmers* (2005), *available at* http://www.centerforfoodsafety.org/campaign/genetically-engineered-food/crops/other-resources/monsanto-vs-u-s-farmers-report/.

noting the billions of dollars in economic damages associated with them. After reviewing both APHIS's and the industry's capacity for oversight, the GAO concluded that "the ease with which genetic material from crops can be spread makes future releases likely."[56] In the Union of Concerned Scientist ("UCS") report, "Gone to Seed," UCS found that about 50% or more of the certified non-GE corn, canola, and soybean seed has been contaminated with transgenes.[57] The level of contamination was typically 0.05%-1.0%, far greater than the minimum levels that can be detected. "Gone to Seed" demonstrated the frequency and levels of contamination of soybean seed was found to be about as high as for corn. Soybeans are largely self-pollinating (do not pollinate other soybean flowers very often), while corn is highly out-crossing. Therefore, the contamination of soybean seed is likely to be largely from causes other than cross-pollination. Such causes could include seed mixing or human error, and suggests that these sources may be at least as important as cross-pollination.

Another report, "A Growing Concern: Protecting the Food Supply in an Era of Pharmaceutical and Industrial Crops," Union of Concerned Scientists (UCS) analyzed whether GE pharmaceutical-producing crops could be kept out of food. This report demonstrates how difficult this is, even for pharmaceutical crops that would be grown on small acreage and under stringent confinement, to avoid contaminating food. The authors of this report examined confinement methods, such as field separation, cleaning of farm equipment, segregation of seed, and others, and found that it would still be difficult to ensure the absence of contamination.[58] The experts felt that contamination might be prevented by taking heroic means, such as geographical isolation from food crops. UCS concluded that even though it may be theoretically possible to prevent or mitigate contamination, it would not be economically feasible.

The DEIS does not address concerns articulated in these materials or explained why they should not alter the agency's conclusions.

Mitigation Will Not Be Successful at Preventing Contamination

APHIS's reliance on voluntary industry stewardship to conclude that any contamination would be mitigated is arbitrary, capricious, and contrary to record evidence before the agency. Under APHIS's Preferred Alternative, the job of preventing gene flow falls to the actors least likely to take those precautions, namely those who do not care if contamination occurs. A full analysis of the likelihood that such practices will in fact be used is lacking. What little analysis APHIS does provide reveals the agency's reliance on voluntary measures to be wholly misplaced.[59] After adopting a similar strategy to control glyphosate-tolerant weeds, APHIS admits that in some areas 13% of growers are not following best management practices.[60] The DEIS acknowledges

[56] Government Accountability Office, GENETICALLY ENGINEERED CROPS: Agencies Are Proposing Changes to Improve Oversight, but Could Take Additional Steps to Enhance Coordination and Monitoring, *available at* http://www.gao.gov/new.items/d0960.pdf

[57] M. Mellon and J. Rissler, Gone to Seed: Transgenic Contaminants in the Traditional Seed Supply, Union of Concerned Scientists, 2004.

[58] David Andow, et al., A Growing Concern: Protecting the Food Supply in an Era of Pharmaceutical and Industrial Crops Union of Concerned Scientists, December 2004.

[59] *See, e.g.*, Johnson et al. (2009).

[60] DEIS at 201

that non-adherence to best management practices is a "mechanism that could contribute to the unintended dispersal and movement of sugar beet seed."[61] In the face of these and other similar admissions in the DEIS, the DEIS lacks a rational connection between APHIS's conclusion that transgenic contamination is not likely to occur and the facts before the agency.
Moreover, by now it is clear that usual practices and policy—now given APHIS's imprimatur—will not prevent contamination. Most of the voluntary industry practices that APHIS claims will prevent transgenic contamination are the same practices that were in place when the *Sugar Beets I* court determined that contamination was likely.[62] The DEIS fails to acknowledge that (1) consistent compliance with industry stewardship/best management practices is unlikely, and (2) that even when in compliance, contamination occurs. APHIS's conclusion that transgenic contamination is not likely to occur is flatly contrary to the record evidence, and is therefore arbitrary and capricious. Transgenic contamination occurs with mandatory gene isolation measures in place, equivalent to those proposed in Alternative 3,[63] and will obviously be more prevalent with full deregulation. As will likelihood of contamination through human error, e.g., through composting and exchanging seeds.

APHIS's experience with other GE crops likewise belies the agency's faith that contamination can be prevented, rendering those conclusions in the DEIS arbitrary and capricious. As recounted by the GAO report and other documents in this record, as well as judicial decisions, previous contamination incidents have occurred during the experimental field trial stage, when APHIS's control and oversight over the GE crop was much greater than what APHIS proposes in this DEIS. The clear pattern that emerges from these incidents demonstrates that no matter what conditions APHIS believes are sufficient to prevent contamination, it is only a matter of time before they fail.

StarLink corn was grown for only three years, from 1998 to 2000, on at most 341,000 acres, or 0.43% of total U.S. corn acreage (year 2000).[64] Despite the limited acreage planted to StarLink, and the conditions attaching to its cultivation, testing initiated by public interest groups and subsequently conducted by the U.S. Food and Drug Administration (FDA) found that over 300 corn products in grocery stores around the country were contaminated with StarLink. The USDA found StarLink contaminating 9-22% of grain samples.[65]

The extent of this contamination is startling when one considers that StarLink never represented more than 0.43% of U.S. corn acreage. While post-harvest mixing was responsible for much of the contamination, there is also abundant evidence that popcorn, sweet corn, white corn and seed

[61] DEIS. at 205.
[62] *See Sugar Beets I*, 2009 WL 3047227, at *9 (N.D. Cal. Sept. 21, 2009).
[63] *See, e.g.*, discussion of contamination in US FWS Draft Biological Opinion, Roundup Ready Bentgrass, July 2009.
[64] SAP StarLink (2001). "Assessment of Additional Scientific Information Concerning StarLink Corn," FIFRA Scientific Advisory Panel to the EPA, SAP Report No. 2001-09, from meeting on July 17/18, 2001.
[65] Shadid, A. "Genetically engineered corn appears in one-tenth of grain tests," Boston Globe, May 3, 2001. Shadid, A. "Testing shows unapproved, altered corn more prevalent than thought," Boston Globe, May 17, 2001.

corn stocks were also contaminated with StarLink.[66] These latter findings strongly suggest that StarLink pollen blown by the wind fertilized conventional corn, despite the 660-foot border strip requirement. In fact, the a USDA-sponsored testing program for seed companies that had never been licensed to grow StarLink found that nearly one-fourth of these seed firms (71 of 288) had some corn lines that tested positive for StarLink. USDA had to buy back nearly 450,000 units of StarLink-contaminated seed corn at a cost of several million dollars to prevent further spread of StarLink in future years. Tainted seed dated anywhere from production year 1997 to 2001.[67]

As recently as November 2010, contamination stemming from a 2005 field trial of Roundup Ready bentgrass was discovered four miles from the field trial location. Five years later, bentgrass contamination is widespread, covering an estimated 27 square miles although the crop has never been deregulated. Public disclosure of this contamination event occurred only because an APHIS official was forced to acknowledge it under cross-examination, in the *Sugar Beets II* evidentiary hearing.[68]

In 2006, contamination from a genetically engineered variety of rice grown under limited acreage field trial permits destroyed the export market for rice. Courts have subsequently found the crop's developer negligent in every bellwether case, with total damages estimated at a billion dollars.[69] Most of these cases were eventually settled 750 million dollars.[70]

Notably, all of these episodes took place on very limited acreage with mandatory gene flow prevention measures in place, which logically create less of a risk of contamination than unregulated commercial production on vast areas that would be allowed by APHIS's Preferred Alternative of full deregulation. And in each previous incident, as here, there were mitigation measures in place that APHIS (or EPA in the case of StarLink) claimed were sufficient to prevent contamination. In light of these repeated failures, APHIS's assurances in its DEIS that the likelihood of transgenic contamination is "extremely low"[71] or that "no gene flow can occur"[72] render the document arbitrary, capricious, and a violation of NEPA.

CFS has repeatedly put this evidence before APHIS, and does so again here. APHIS's failure to acknowledge in the Final EIS that significant transgenic contamination is likely—industry best management practices and other mitigation notwithstanding—would be arbitrary, capricious, and a violation of NEPA.

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[66] USDA News Release (2001). "USDA purchases Cry9C affected corn seed from seed companies," June 15, 2001. Formerly accessible at: www.usda.gov/news/releases/2001/06/0101.htm; Hovey, A (2001). "StarLink protein found in other crops," Lincoln Star Journal, March 29, 2001.

[67] Freese, B. (2001). "The StarLink Affair," Friends of the Earth, July 2001, p. 12.

[68] Transcript of Proceedings at 21-34, *Ctr. for Food Safety v. Vilsack*, No. C 10-04038 JSW (2010) (Dkt. No. 199).

[69] *See, e.g.*, In re Genetically Modified Rice Litigation, 666 F. Supp. 2d 1004 (E.D. Mo. Oct. 9, 2009); In re Genetically Modified Rice Litigation, 2009 WL 4801399 (E.D. Mo. Dec. 9, 2009).

[70] Andrew Harris and David Beasley, Bayer Agrees to Pay $750 Million to End Lawsuits over Gene-Modified Rice, BLOOMBERG NEWS, available at http://www.bloomberg.com/news/2011-07-01/bayer-to-pay-750-million-to-end-lawsuits-over-genetically-modified-rice.html

[71] *See, e.g.*, DEIS at 223.

[72] *E.g.* DEIS at Table 2-1; *see also id.* at viii ("No gene flow is expected to occur").

Contamination and Its Intertwined Socioeconomic Effects is a Significant Impact

Transgenic contamination is a multifaceted harm, with a significant environmental as well as intertwined socioeconomic impact on farmers and the public. As several Courts have held: "the potential elimination of farmer's choice to grow non-genetically engineered crops, or a consumer's choice to eat non-genetically engineered food, and an action that potentially eliminates or reduces the availability of a particular plant has a significant effect on the human environment."[73] Further, "Once the gene transmission occurs and a farmer's seed crop is contaminated with the Roundup Ready gene, there is no way for the farmer to remove the gene from the crop or control its further spread."[74] Despite documented incidents of RRSB contamination, APHIS nevertheless concludes that granting nonregulated status to RRSB will not have significant impact on the human environment. This conclusion is contrary to the facts before the agency, and therefore violates NEPA.

APHIS's DEIS is deficient because it completely fails to consider and analyze an important aspect of the deregulation decision: the socioeconomic impacts on persons other than agricultural producers. Contamination will not only cost farmers their right to sow the crops of their choice, but also will deprive consumers of the right to feed their families non-GE food. The *Sugar Beets I* court, which ordered APHIS to prepare this EIS, expressly found that these were both cognizable harms pursuant to NEPA in its underlying order.[75]

APHIS's failure to analyze the full spectrum of socioeconomic impacts, including impacts on persons who are not agricultural producers, violates NEPA.

VI. THE DEIS'S ANALYSIS OF THE IMPACTS ON MINORITIES, PARTICULARLY OF FARM WORKERS, IS ARBITRARY AND CAPRICIOUS.

APHIS's analysis of the various alternatives' impacts on minorities fails to consider several significant factors. APHIS correctly notes that, when evaluating the impact that the alternatives will have on minorities, the main minority population to consider consists of farm workers.[76] However, the DEIS's analysis of the impacts that increasing reliance on Roundup Ready crop systems will have on farm workers contradicts itself. APHIS claims that there will be no differences between the alternatives when it comes to impacts on minorities,[77] yet concludes elsewhere that adoption of RRSB will result in fewer health impacts on farm workers.[78]

APHIS's analysis of the impacts on farm workers also treats changes in the size of the work force inconsistently without explaining why. APHIS concludes that fewer farm workers resulting from less need for hand-weeding is a positive impact because fewer farm workers

[73] *Sugar Beets I*, 2009 WL 3047227, at *9 (N.D. Cal. Sept. 21, 2009).
[74] 2007 WL 518624, at *5.
[75] *Sugar Beets I*, 2009 WL 3047227, at *9 (N.D. Cal. Sept. 21, 2009).
[76] DEIS at 311.
[77] DEIS at 586.
[78] DEIS at 630-31, 636.

means fewer health impacts stemming from exposure to pesticides.[79] When it comes to beet factory workers, however, APHIS concludes that having fewer workers is a negative impact because it represents a loss of economic activity.[80] APHIS reaches this conclusion despite its admission that beet factory work is dangerous relative to other jobs and results in injuries.[81] The DEIS lacks any corresponding socioeconomic analysis of the impact of lost farm worker jobs, such as the number of jobs lost, the economic value of that lost income, and which minorities would be disproportionately affected. APHIS's failure to analyze the full socioeconomic effects on minorities, particularly farm worker populations, is arbitrary, capricious, and contrary to the mandates of NEPA.

VII. APHIS DOES NOT ASSESS THE MEDIUM- TO LONG-TERM ADVERSE IMPACTS OF RRSB IN FOSTERING GLYPHOSATE-RESISTANT WEEDS, NOR PROPOSE ANY MEASURES TO MITIGATE THEM

The DEIS Does Not Adequately Assess the Adverse Impacts of Glyphosate-Resistant Weeds

APHIS repeatedly touts short-term benefits of RRSB in terms of effective weed control, displacement of more toxic herbicides with glyphosate, and reduced tillage leading to less soil erosion. To the extent such benefits exist, there is no projection of the period of time these benefits might accrue; nor of the countervailing factors that reduce, eliminate, and/or reverse those benefits, or the time frames over which *they* act. Importantly, APHIS proposes no alternative that would preserve the touted benefits indefinitely by eliminating or mitigating the countervailing factors. These are serious deficiencies in the DEIS that must be remedied.

Relying on the best herbicide to kill the weeds in one's field, however, is paradoxically a sub-optimal approach. While it provides the greatest short-term benefit, it triggers countervailing costs that in the medium- to longer-term can rapidly exceed the short-term gains. This is due to the phenomenon of pesticide resistance. Resistance occurs when there is: 1) Near total reliance on pesticidal means of pest control; and 2) Overreliance on one or a few pesticide(s).

As a result, weed resistance to glyphosate is growing exponentially, in tandem with weed control costs, as discussed further in CFS Science Comments submitted separately. The benefits of cheap and effective weed control that accrued over the first few years of use are being replaced for ever more growers by increasingly expensive and environmentally damaging weed control methods entailed by glyphosate-resistant weeds. These medium- to longer-term costs are exceeding the short-term benefits in ever more areas of the country, leaving farmers, the environment, and public health in the red.

Throughout the DEIS, APHIS tallies only the putative short-term benefits of the RRSB system, excluding entirely the longer-term costs of glyphosate resistance to which it is already contributing. APHIS makes only passing reference to the fact that glyphosate-resistant weeds will be a "substantial issue of concern," failing to include a quantitative analysis of the long-term

[79] *Id.*
[80] *Id.* at 636.
[81] *Id.* at 384.

effects of each alternative on weed resistance.[82] APHIS must broaden its time horizon at least ten years into the future, assess these countervailing costs, and set them off against any short-term benefits. NEPA requires that both short and long-term effects be considered to determine if a particular action will have a significant impact.[83]

For example, any decrease in the overall biological impacts of herbicide use associated in the short-term with RRSB must be counterbalanced by projected impacts of herbicidal responses to glyphosate-resistant weeds in the longer term. A similar assessment should be carried out for weed control costs, tillage/soil erosion, and productivity of sugar beets (since glyphosate-resistant weeds are more likely to adversely impact yields, because more difficult to control). Adverse impacts on crops grown in rotation with RRSB must also be assessed. While such projections are necessarily imprecise, there are good data to aid in this process that are more fully discussed in CFS science comments.

In conducting this assessment, weed susceptibility to glyphosate should be regarded as the resource to be conserved. If glyphosate offers the benefits claimed for it by APHIS, and conventional sugar beet herbicides are as toxic as APHIS says, then loss of glyphosate's benefits is contrary to the interests of agriculture, while conserving them fosters those interests. The EPA has taken a similar approach to that recommended here with the insect-resistant Bt crops under its jurisdiction. EPA regards Bt toxins as less toxic than chemical insecticides, and therefore regulates to preserve their efficacy and forestall the increased use of chemical insecticides that would be entailed by evolution of Bt resistance in insects. The longer-term environmental benefit of conserving insect susceptibility to Bt toxins is "paid" for by modest restraints on the use of Bt crops in the short-term, via mandated "refuge" of non-Bt crops that forestall insect pest resistance to Bt toxins. APHIS should formulate an alternative that similarly places reasonable restraints on RRSB cultivation. [84]

Resistance is not, as APHIS has it, an inevitability – an "unavoidable impact."[85] To the extent that it is likely in APHIS's three alternatives, this merely underscores the need for APHIS to formulate another alternative with conditions designed to prevent weed resistance.

The DEIS Has no Meaningful Measures to Mitigate or Prevent Glyphosate-Resistant Weeds

APHIS's reliance on industry best practices, including Monsanto's Technology Use Guide (TUG), to mitigate the evolution and adverse environmental impacts of glyphosate-resistant weeds is arbitrary and capricious and fails to satisfy APHIS's statutory duty to "[protect] [] the agriculture, environment, and economy of the United States."[86] First, Monsanto's TUG recommendations are themselves grossly inadequate and in some respects counterproductive.[87]

[82] DEIS at 635.
[83] 40 CFR 1508.27(a).
[84] 40 CFR 1508.20(b) (mitigation includes "minimizing impacts by limiting the degree or magnitude of the action and its implementation).
[85] EIS at 632.
[86] 7 U.S.C. § 7701(1).
[87] *See* CFS Science Comments.

APHIS elsewhere concedes that Monsanto's endorsement of rotations from RRSB to other Roundup Ready crops as a supposed weed resistance management practice is misguided and actually promotes rather than prevents the evolution of glyphosate-resistant weeds.[88] Second, to the extent the TUG recommendations have any value, the DEIS incorrectly assumes that farmers regularly observe them, despite no evidence to this effect, and considerable evidence against this assumption (see below). There is no evidence that Monsanto enforces TUG provisions and the DEIS' claim that Monsanto's voluntary stewardship measures will forestall the emergence of glyphosate-resistant weeds lacks any merit.

Voluntary stewardship measures to mitigate weed resistance, whether proffered by industry or public sector agronomists, have been a dismal failure. Hard, empirical data demonstrate conclusively that weeds are continuing to rapidly evolve resistance to glyphosate.[89] This would not be occurring if stewardship measures were effective. In other words, the failure of voluntary stewardship is demonstrated by the continuing rapid spread of the problem stewardship is meant to mitigate.

CFS discussed Johnson et al (2009) in comments on the USDA's draft EA for RRSB partial deregulation, yet this study, despite its independence and quality is not discussed or cited in the draft EIS. CFS also extensively discussed the efforts of Monsanto and its academic associates (including Robert Wilson, who is heavily cited by APHIS in the EIS) to mislead farmers into growing Roundup Ready crops and using glyphosate continuously, year after year, practices that even APHIS now admits promote the rapid evolution of glyphosate-resistant weeds.[90] APHIS also failed to respond to this evidence and discussion in the EIS.

For the reasons explained above, APHIS failed to consider the medium- to long-term effects the deregulation of RRSB will have in promoting glyphosate-resistant weeds and associated adverse impacts, nor proposed effective prevention or mitigation measures.[91]

VIII. THE DEIS' ANALYSIS OF CUMULATIVE IMPACTS IS INADEQUATE.

The DEIS must fully consider the cumulative impacts from past, present, and future foreseeable actions by APHIS or other agencies, including but not limited to future market introductions of GE crops. This is required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-08) as part of the EIS process. 40 CFR 1508.7 defines "cumulative impact" as:

> [T]he impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

[88] FONSI for RRSB Partial Deregulation petition [proper reference please] at 82: "APHIS does not agree with the notion that farmers should rotate from RRSB to another Roundup Ready crop, which invites excessive reliance on glyphosate, potentially throughout a three to five year crop rotation."
[89] *See* CFS science comments, submitted by B. Freese on December 13, 2011.
[90] FONSI for the petition for partial deregulation of RRSB, p. 82. [Andrew, please replace with formal citation.]
[91] *Geertson Seed Farms v. Johanns*, 2007 WL 518624, at *10 (N.D. Cal. Feb. 13, 2007).

> Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Consideration of cumulative impacts requires "some quantified or detailed information; ... [g]eneral statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided."[92]
APHIS improperly narrowed the scope of its cumulative impacts in several ways.
First, APHIS does not attempt to set temporal boundaries for its analysis because "the actual timeframes for many of the reasonably foreseeable future actions are not definitively known."[93] Yet lack of definite knowledge about the future is unavoidable; far from being a justification for ignoring future actions and impacts, it is one of the very reasons NEPA demands a cumulative impacts analysis in the first place. APHIS does not mention much less set a temporal boundary in the past, yet past actions and events are important in their own rights and are one obvious source of guidance in projecting future developments. Two critically important developments that APHIS fails to assess, quantitatively over time, are the history of commercial RR crop cultivation, which stretches back to 1996, and the dissemination of glyphosate-resistant weeds by RR crop systems, which dates back to the year 2000. Inability to make precise quantitative predictions is unavoidable in forecasting of this sort, and must not be used a pretext to avoid quantitative analysis altogether.[94]

Second, APHIS's default assumption is that cumulative effects from full deregulation of RRSB will be additive,[95] when in fact some important effects are synergistic with past actions. As discussed further in CFS science comments, the cumulative effects of RRSB cultivation on evolution of glyphosate-resistant weeds are synergistic with, rather than additive to, the effects of pre-existing RR crop systems, at least in some areas and situations (e.g. where RRSB is rotated with other RR crops, which occurs on half of total sugar beet acreage[96]). APHIS's bare mention of the potential for cumulative effects of RRSB cultivation to increase nonlinearly with respect to evolution of glyphosate-resistant weeds[97] is not an analysis, much less a quantitative one, but merely the starting point for such an analysis.[98] APHIS's quantification of RR crop acreage at the county level[99] is a helpful start, but is unmatched by any corresponding assessment of the relevant effects, increasing acreage infested by GR weeds and responses to those weeds.

Statements to the effect that "no glyphosate-resistant weeds have been attributed to the production of H7-1 sugar beets"[100] are misguided, especially in the common situation where

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[92] *Kern v. BLM*, 284 F.3d 1062, 1075 (9th Cir. 2002)
[93] DEIS at 645.
[94] *Selkirk Conservation Alliance v. Forsgren*, 336 F.3d 944 (9th Cir. 2003) (Agency cannot "shirk [its responsibility] under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiries'")
[95] DEIS at 646.
[96] DEIS at 121-123, Table 3-6.
[97] DEIS at 661.
[98] *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1312 (1990) ("NEPA requires that where several actions have a cumulative or synergistic environmental effect, this consequence must be considered in an EIS.").
[99] DEIS at 646-661.
[100] DEIS at 539.

RRSB is grown in rotation with one or more other RR crops.[101] Because glyphosate resistance takes several years to evolve, glyphosate use with each of the RR crops in the rotation contributes to the selection pressure that triggers the evolution of the GR weed. Hence, it will in most cases never be possible to attribute the GR weed to the production of any single RR crop in a field where several are grown in rotation. This does not mean, and cannot be used as a pretext to assert, that RRSB is not contributing to the evolution of GR weeds. Further, a glyphosate-resistant waterhemp has recently been confirmed in hundreds of North Dakota fields covering thousands of acres planted to corn, soybeans and sugarbeets,[102] likely a result of continuous glyphosate selection pressure acting on rotations involving two or three RR versions of each crop.

Third, APHIS fails to provide any structured assessment of the cumulative effects of glyphosate-resistance in weeds in combination with pre-existing resistances to other herbicides. In general, the adverse effects of acquisition of glyphosate resistance would increase disproportionately with the number of pre-existing resistances in the pertinent weed population, a synergistic cumulative effect in NEPA terms.[103] Cumulative effects increase disproportionately as progressively more resistances shrink the universe of control options to the least desirable herbicide(s) – least desirable because, for instance, more expensive, more toxic, less effective, more time-consuming, more soil-eroding, etc. Synergism is at play in another sense: As the universe of effective herbicides diminishes with accumulation of resistances, more selection pressure will be exerted on weed populations to evolve resistance to the few remaining effective options than would be the case if a larger array of herbicidal alternatives were in play. Hence, as a general rule, each resistance a weed population acquires sets the stage for more rapid evolution of resistance to the remaining effective mode(s) of action.

The DEIS emphasizes the prevalence of sugar beet weeds resistant to non-glyphosate herbicides, but purely to stress the short-term benefits of RRSB-associated glyphosate use in controlling them.[104] APHIS provides no analysis of the medium- to long-term impacts of glyphosate-resistance, particularly when already resistant weeds acquire additional resistance to glyphosate. Instead, APHIS merely acknowledges that use of non-glyphosate herbicides and tillage "may" increase "if" GR weeds become more prevalent due to RRSB cultivation,[105] APHIS's hypothetical response disregards facts in the record, and is thus arbitrary and capricious.

Regarding already-resistant weeds and their potential to acquire additional resistance to glyphosate, APHIS dismisses concerns as a matter of luck.[106] However, the accumulation of

[101] RRSB is grown in rotation with other RR crops in three of the four leading sugar beet production states of Minnesota, North Dakota and Michigan, while it is only grown in consecutive seasons in limited areas of lower production (e.g. Wyoming) where disease pressure is low.
[102] http://www.weedscience.org/Case/Case.asp?ResistID=5575.
[103] Besides the number of resistances, the nature of the particular herbicides to which a weed evolves resistance must also be considered. Resistance to an herbicide that is more important or less toxic (e.g. glyphosate) has greater impacts than resistance to a less used or less impactful herbicide.
[104] DEIS at 536-537.
[105] DEIS at 646-647.
[106] DEIS at 247: After noting the existence of a wild oat population resistant to four different classes of herbicide, APHIS states: "Fortunately, wild oat has not ***yet*** developed resistance to glyphosate…." (emphasis added).

resistances to different herbicide modes of action is clearly a very significant cumulative effect, in that it can transform a troublesome weed into a noxious weed, which can have numerous adverse impacts on the interests of agriculture, natural resources, and the environment. In Illinois, agronomists warn that if already quad-resistant waterhemp acquires resistance to the sole remaining post-emergence herbicide that can control it (glufosinate), which they think likely, growing soybeans may become "impractical" in some Midwestern fields.[107] Palmer amaranth resistant to glyphosate and often to ALS inhibitors is wreaking havoc in the South, and a glyphosate-resistant population has recently been confirmed in Michigan.

Glyphosate-resistant common ragweed is spreading exponentially in the sugarbeet growing counties of Minnesota and North Dakota. Since "[t]he majority of common ragweed populations in ND and MN contain some frequency of biotypes resistant to ALS-inhibiting herbicides,"[108] many of these GR weeds will have dual resistance, leaving just one effective herbicide option – clopyralid (Stinger) – to control glyphosate-resistant ragweed in sugar beets.[109] Acquisition of resistance to that last herbicide could have serious socioeconomic impacts, as growers' fields become overrun with weeds unamenable to control, drastically reducing yields, making harvest difficult or uneconomic, and perhaps even putting farmers out of business. Andrew Kniss's admonition in his USDA NIFA research proposal, warned that RRSB will likely lead to "near total reliance on" glyphosate, which in turn "will almost surely lead to glyphosate resistant weeds," *leaving growers with "few acceptable management options."*[110] (This statement is directly contrary to Mr. Kniss's declaration that APHIS relies on so heavily, See CFS Science Comments for further discussion and documentation).

This assessment must consider not only the effects of herbicide-resistant weeds in fields while they are planted to sugar beets, but also when rotation crops are grown on the same fields. The adverse effects of weed resistance on neighboring growers via dispersal of resistant weeds must also be considered.

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[107] Tranel, P.J. et al (2010). "Herbicide resistances in *Amaranthus tuberculatus*: A call for new options," Journal of Agricultural and Food Chemistry, DOI:10.1021/jf103797n: "Herbicide resistance in *A. tuberculatus* appears to be on the threshold of becoming an unmanageable problem in soybean. … Furthermore, on the basis of *A. tuberculatus's* history, there is no reason to expect it will not evolve resistance to glufosinate if this herbicide is widely used. If this happens, and no new soybean postemergence herbicides are commercialized, soybean production may not be practical in many Midwest U.S. fields."

[108] NDSU (2011). North Dakota Weed Control Guide: Common Ragweed – Weed of the Year, North Dakota State University, p. 133. See http://www.ag.ndsu.edu/weeds/weed-control-guides/nd-weed-control-guide-1/ and http://www.ag.ndsu.edu/weeds/weed-control-guides/nd-weed-control-guide-1/wcg-files/18.4-Corw.pdf.

[109] NDSU (2011), op. cit.; Stachler, Luecke & Fisher (2011). "Common ragweed in glyphosate-resistant sugarbeet," Weed Science Society of America, Abstract No. 253. http://wssaabstracts.com/public/4/abstract-253.html.

[110] Kniss, A.R. et al (2010). "A novel application of the herbicide ethofumesate to increase and prolong the effectiveness of glyphosate resistant technology in sugarbeet," USDA National Institute of Food and Agriculture grant report, Project No. WYO-427-08. In supporting materials as Kniss et al 2010.

Seed Market Concentration

The DEIS does not analyze seed market concentration. Yet, research and development suffer from seed market concentration, in that fewer crop varieties are offered to farmers.[111] Seed companies have aggressively undermined independent researchers' ability to fully investigate their patented crops' performance.[112] Seed companies often want the right to approve all publications, which researchers find unreasonable. This chills research on the performance and potential adverse impacts of GE crops.

The privatization and concentration of the world's seed supply is a serious and continuously evolving problem, compounded with each new GE crop deregulation.b "It is estimated that the top ten seed corporations around the globe hold 49-51% of the commercial seed market, and the top ten agro-chemicals control 84% of the agrochemicals market. Likewise, all genetically modified (GM) seeds are bio-patented by multinational corporations and 13 commercial corporations own 80% of the GM food market."[113] As the practical options become limited to varieties patented by Monsanto and the major seed companies, there are effects on the price of seed, and in this case, the price of sugar beets, the price of sugar, and the cost of groceries.

The domination of the seed industry by pesticide firms has driven the research and development agenda towards pesticide-promoting crops such as RRSB. Interestingly, KWS, Monsanto's German partner in development of RRSB, has entered into a collaboration with another pesticide company, Dow Agrosciences.[114] Dow's biggest biotech innovation is corn and soybeans genetically engineered for resistance to 2,4-D, the toxic chlorophenoxy herbicide that formed part of the Vietnam War defoliant Agent Orange. Dow is heavily marketing its 2,4-D-resistant crops as the false "solution" to glyphosate-resistant weeds. The evidence that RRSB, after just three years of widespread commercialization, is contributing to the glyphosate-resistant weed epidemic in North Dakota and Minnesota, suggests the likelihood that sugar beets resistant to other herbicides will be developed as pesticide-promoting "fixes" to glyphosate-resistant weeds. KWS's collaboration with Dow may well give birth to 2,4-D-resistant sugar beets, offered as the false "solution" to GR weeds in sugar beets tomorrow as it is being marketed for imminent use in soybeans and corn today.

In the longer term, price increases associated with biotech seed, coupled with dramatic increases in herbicide use and costs to combat multiple herbicide-resistant weeds, could well endanger the

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[111] Fernandez-Cornejo, J. and D. Schimmelpfennig (2004). "Have Seed Industry Changes Affected Research Effort?" USDA's Economic Research Service, Amber Waves, February 2004, pp. 14-19. http://www.ers.usda.gov/AmberWaves/February04/Features/HaveSeed.htm.

[112] *Sugar Beets I*, Huber Decl., ¶¶ 17-18 (April 13, 2010); Emily Waltz, *Under Wraps*, 27 Nature Biotechnology 880, 882 (2009).

[113] Yamuna Ghale and Bishnu Raj Upreti, Concentration and Monopolisation of Seed Market: Impact on Food Security and Farmer's Rights in Mountains, *available at* http://docs.google.com/viewer?a=v&q=cache%3A3CPrhC0TuVIJ%3Awww.mtnforum.org%2Frs%2Fol%2Fcounter_docdown.cfm%3FfID%3D2056.pdf+seed+market+concentration&hl=en&gl=us&sig=AHIEtbTwpX0MzR5HZZ8CUBA8qoWofinQvw&pli=1.

[114] Dow (2010). "Dow AgroSciences, KWS Enter Into Agreement for Research & Product Development," *available at* http://www.dowagro.com/newsroom/corporate/2010/20100909a.htm

financial viability of sugar beet farms. Cotton farms face this exact issue are going under thanks largely to epidemic glyphosate-resistant weeds.

The Department of Justice has noticed the effects. In August of 2009, it announced that it would investigate anticompetitive conduct in the seed industry, the recent ability to patent seed having led to unprecedented seed industry concentration.[115] The commercialization of RRSB further exacerbates Monsanto's influence over seed prices and market consolidation. The general public is adversely affected, as increased seed prices are reflected in the cost of food. Concentration of the seed industry "affects virtually every farmer in the country and in a very vital way," and has drawn large crowds at unprecedented hearings scheduled by the antitrust division of the Department of Justice and USDA.[116]

For these and other reasons, the DEIS does not adequately address the cumulative impact of seed market concentration. The seed market concentration impacts of a deregulation of RRSB constitute a significant cumulative impact.

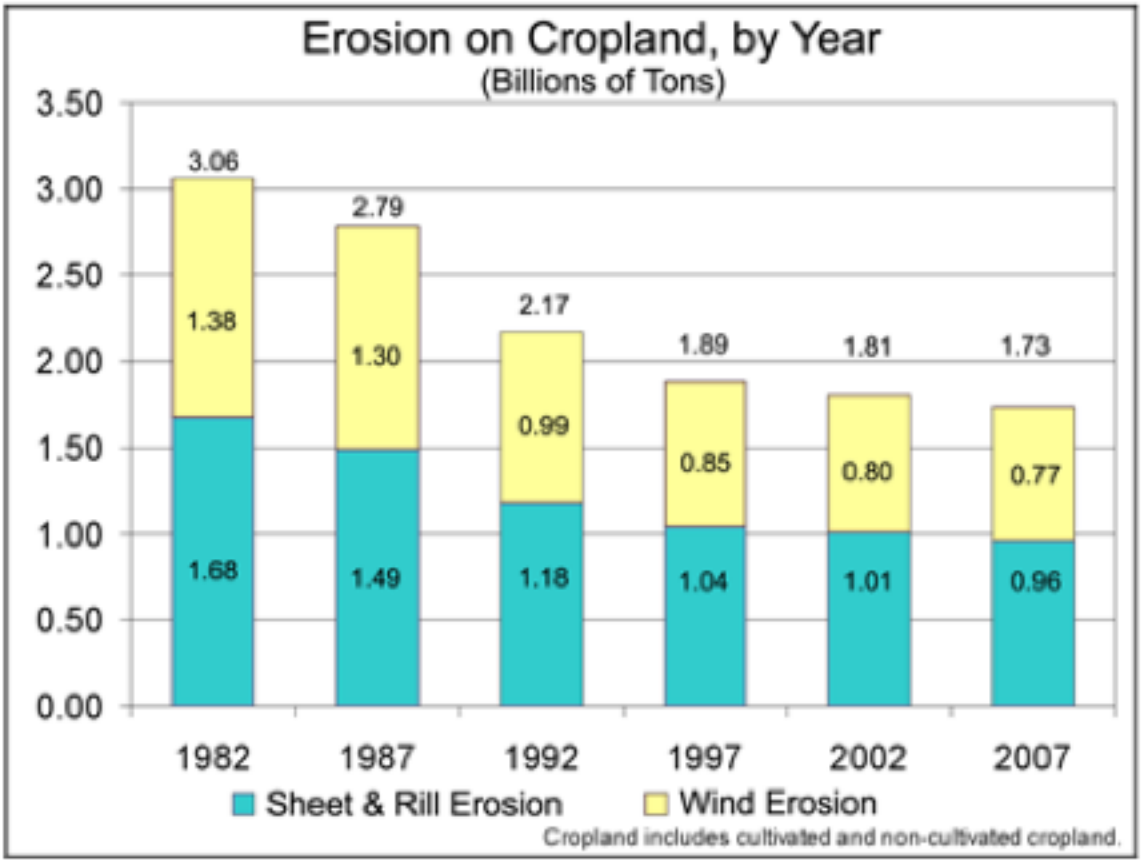
Conservation Tillage

APHIS relies heavily on the anticipated increase in conservation tillage associated with a full deregulation of RRSB as an environmental benefit relative to conventional sugar beet production. However, the DEIS itself shows that APHIS's reliance is misplaced. Even with 95 percent adoption of RRSB from 2009-2010, conservation tillage did not increase substantially. "[I]n the areas with the greatest proportion of acres dedicated to sugar beet production, conservation tillage does not appear to be used widely." (DEIS at 666). The vast majority of RRSB adoption that will occur has already occurred; APHIS's claims of increased conservation tillage and its beneficial effects on soil and air quality are contrary to the record.

APHIS already examined this question of tillage with respect to glyphosate-tolerant soybeans, and found no support for this presumption.[117] A 2010 report from the USDA's Natural Resource Conservation Service – USDA's experts on soil erosion – also argues against any meaningful effect of Roundup Ready crops in promoting conservation tillage. Below, we reproduce a graph of soil erosion on U.S. cropland based explicitly on type of tillage regime. Consistent with and extending further into the past the ERS data presented above, soil erosion (a proxy for conservation tillage) decreased dramatically in the 15 years *before* the first RR crop, RR soybeans, were introduced.[118] Interestingly, soil erosion rates level out over precisely the 1997-2007 decade that American agriculture made the massive switch to Roundup Ready soybeans, cotton and corn. This proves conclusively that the great majority of acreage converted to conservation tillage since 1982 was converted for reasons that had nothing to do with Roundup

[115] *Sugar Beets I*, Harl Decl. ¶ 5.
[116] *Rapid Rise in Seed Prices Draws U.S. Scrutiny*, N.Y.Times B1 (March 12, 1010).
[117] Fernandez-Cornejo, J. and W.D. McBride (2002). "Adoption of Bioengineered Crops," U.S. Dept. of Agriculture, Economic Research Service, Agricultural Economic Report No. 810, May 2002. *Available at* http://www.ers.usda.gov/publications/aer810/aer810.pdf.
[118] RR soybeans were actually introduced in 1996, but by 1997 only comprised 17% of national soybean acres. Thus, RR soybeans cannot have had anything but the most minor effect on the last two years of the 15-year trend from 1982 to 1997 displayed in the NRCS graph.

Ready crop systems, because RR crop systems simply did not exist when the conversions took place.



USDA NRCS (2010). "2007 National Resources Inventory: Soil Erosion on Cropland," USDA Natural Resource Conservation Service, April 2010, p. 2. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012269.pdf.

IX. APHIS FAILED TO COMPLY WITH THE ENDANGERED SPECIES ACT, BOTH PROCEDURALLY AND SUBSTANTIVELY.

To the limited extent APHIS claims to have "consulted" with the U.S. Fish and Wildlife Service (FWS), APHIS did not follow mandatory procedures under the Endangered Species Act (ESA). These failures are significant because glyphosate—directly stemming from APHIS's approval of the Roundup Ready Sugar Beet crop system -- is known to be highly toxic to several listed species that may be present where RRSB will be grown and therefore affected.

APHIS must make a written request to FWS for a list of the listed species (or species proposed to be listed) in the proposed action area that may be present.[119] This request is crucial to the ESA

[119] 16 U.S.C. § 1536(c)(1).

decision process, because only a determination by FWS "based on the best scientific and commercial data available" can decide whether or not APHIS must then prepare a biological assessment.[120] Here, Appendix F indicates that APHIS did not make any such request, much less prepare a biological assessment.

Additionally, APHIS violated Section 7(a)(2) of the ESA by failing to consult with FWS—informally or formally—about the effects of RRSB deregulation on listed species and critical habitat. Under ESA, there is only one determination that can conclude 7(a)(2) consultation: whether the proposed action is "likely to adversely affect" listed species or critical habitat. APHIS and FWS may not decline to consult, or prematurely terminate consultation, without performing any analysis at all, simply based on their (erroneous) conclusion that any adverse effects are some other agency's problem to solve.

The increase in glyphosate use resulting from full deregulation of RRSB will create direct, indirect and interrelated impacts on several endangered species. As Appendix E reveals, there are myriad plant and animal species listed as endangered or threatened where this anticipated increase in glyphosate is to occur and that therefore may be affected by the agency's action. ESA requires APHIS to solicit information about the potential adverse impacts to these species, and if they may be affected by the agency's proposed action, to consult with the expert agency, so that APHIS may then tailor its action to avoid any such harms.[121]

By failing to complete Section 7(a)(2) consultation based on an erroneous legal assumption regarding its duties under the ESA, APHIS based its analysis on factors Congress did not intend for it to consider. Deregulating RRSB without completing consultation would therefore be arbitrary, capricious, and contrary to the mandates of the ESA.

[120] *Id.*

[121] For further comments on the risk of adverse impacts to endangered species, see separately submitted CFS Science Comments by Martha Crouch.

CONCLUSION

For the above reasons, the reasons given in CFS's separately submitted organizational comments, and additionally based on the body of evidence submitted in this administrative record, CFS requests that APHIS comply with the legal mandates of the National Environmental Policy Act, the Endangered Species Act, the Administrative Procedure Act and the Plant Protection Act, as well as Judge White's order requiring this agency action. In order to do so, USDA must:

Overhaul the structure, process and substance of its proposed NEPA compliance to properly analyze and disclose the impacts of potential deregulation;

Overhaul the structure and process of its proposed ESA process to properly assess the full direct and indirect impacts of the crop system and to consult with expert agencies;

Make findings under its PPA statutory authority, based on sound science, regarding the impacts of the RRSB crop system on the environment and agricultural economy; and

Comply with the APA to avoid taking action that is arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with the law.

Submitted by,

Center for Food Safety