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MAY 27 1999

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0775-99

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF RESPONSES TO THE OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON OPERABLE UNIT 4 ECOLOGICAL RESEARCH GRANT SUPPLEMENTAL PROJECTS

Enclosed for your review are responses to the Ohio Environmental Protection Agency's (OEPA) comments on the following Operable Unit 4 (OU4) Ecological Research Grant Supplemental Projects:

- Identification and Control of Invasive Plant Species
- Prairie Grass Establishment Study 1999 Annual Report
- Experimental Design for the Area 8, Phase I (A8PI) Revegetation Research Plots.

The revised A8PI Experimental Design and Invasive Plant Species Annual Report are also enclosed.

Please contact Kathleen Nickel at (513) 648-3166 or Robert Janke at (513) 648-3124 if you have any questions or comments regarding these documents.

Sincerely,

Johnny Reising

FEMP:Nickel

Johnny W. Reising
Fernald Remedial Action
Project Manager

Enclosures

cc w/enclosures:
G. Jablonowski, USEPA-V, SRF-5J
R. Beaumier, TPSS/DERR, OEPA-Columbus
T. Schneider, OEPA-Dayton (three copies of enclosures)
F. Bell, ATSDR
M. Schupe, HSI GeoTrans
R. Vandegrift, ODH
F. Barker, Tetra Tech
AR Coordinator, FDF/78

cc w/o enclosures:
N. Hallein, EM-42/CLOV
R. J. Janke, OH/FEMP
K. Nickel, OH/FEMP
A. Tanner, OH/FEMP
D. Carr, FDF/52-2
J. Chiou, FDF/52-0
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RESPONSES TO THE OEPA COMMENTS ON THE PRAIRIE GRASS ESTABLISHMENT STUDY 1998 ANNUAL REPORT, OPERABLE UNIT 4 SUPPLEMENTAL PROJECT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Commenting Organization: Ohio EPA — Commentor: OFFO
Section #: — Pg #: 5 — Line #: — Code: C
Original Comment #: 1

Comment: The statement regarding availability of workers when the window of opportunity exists is an excellent observation. As we progress with the planting projects at Fernald the importance of this one issue becomes painfully obvious. These projects are dependent on the whims of Mother Nature, not the contract workers. Provisions need to be made to assure that windows of opportunity are not missed in the future.

Response: DOE agrees with the observation in the comment. The workforce supporting the projects ongoing this spring have been consistent and supportive of required schedules. DOE will work with FDF to ensure that adequate workforce is available on all restoration projects.

Action: None required.

Commenting Organization: Ohio EPA — Commentor: DSW
Section #: — Pg #: 6 — Line #: — Code: C
Original Comment #: 2

Comment: As in Comment #1 above, keeping workers and equipment available to seize the windows of opportunity is important so that advisers and supervisors are free to advise and supervise.

Response: DOE agrees with the observation and will strive to maintain the appropriate workforce on all restoration projects.

Action: None required.

Commenting Organization: Ohio EPA — Commentor: OFFO
Section #: — Pg #: 6 — Line #: — Code: C
Original Comment #: 3

Comment: The lessons learned section is very beneficial addition to the report. The section provides lessons that can should be applied in future restoration projects. Ohio EPA would recommend similar additions to reports from the other research projects.

Response: DOE agrees with the comment provided. DOE will request that the next submittal of reports on the research projects contains a lessons learned section.

Action: Lessons learned section will be added to annual reports on the research projects.

Commenting Organization: Ohio EPA Commentor: DSW
Section #: Pg #: 6 Line #: Code: C
Original Comment #: 4

Comment: It is not clear how the statement that a cover crop of oats would be beneficial could be made based on the results presented. No evidence exists to support this since there was no cover crop of oats due to clogging of the Truax during seeding of the oats.

Response: A cover crop of oats was planned as part of the Spring 1998 seeding on the prairie plots. A malfunction of the seeder prevented the oats from being planted properly. To suppress weeds and prairie shading for prairie grasses, a cover crop of oats will be seeded in the Spring of 1999, due to the predominance of weed germination in the test plots.

Action: Seed plots with a cover crop of oats in the spring of 1999.

Commenting Organization: Ohio EPA Commentor: DSW
Section #: General Pg #: Line #: Code: C
Original Comment #: 5

Comment: There was such a dramatic difference between these plots and the prairie grasses planted at the bioengineering project. Can any conclusions be drawn about the differences seen (e.g., different planting densities, watering, timing, soil nutrients, etc).

Response: The difference in prairie grass germination appears to be the result of moisture retention capacity in the soil resulting in decreased germination in the prairie plots. The wood chip amendment applied to the prairie plots also resulted in a lower level of germination due to the thickness of the application. Finally, the straw that was applied to the prairie plots contained high weed seed content providing increased competition in the prairie plots.

Action: None required.

RESPONSES TO THE OEPA COMMENTS ON THE EXPERIMENTAL DESIGN FOR THE AREA 8, PHASE I REVEGETATION RESEARCH PLOTS, OPERABLE UNIT 4 SUPPLEMENTAL PROJECT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Commenting Organization: Ohio EPA Commentor: DSW
Section #: Pg #: Line #: 1st paragraph Code: E
Original Comment #: 1
Comment: The plots are referred to by number (e.g., Plot No. 3) and are shown in Figure 1 as 1, 2, and 3, but are referred to in Table 1 as Plot A, B, and C. These should be labeled in a consistent manner.

Response: Agreed.

Action: Revise Table 1 accordingly.

Commenting Organization: Ohio EPA Commentor: DSW
Section #: Pg #: 2 Line #: 1st paragraph Code: C
Original Comment #: 2
Comment: The description of the reference plots is given as "even aged in origin and low in diversity." This description appears to fit a disturbed area. It seems unwise to use a disturbed area as a reference. It would appear useful to use a stable, mature area as a reference. This appears to be a serious flaw.

Response: The original locations for reference plots were within the native forest east of Paddys Run in Area 1, Phase III. Once it was revealed that the area was currently leased for dairy cow grazing, an alternate on-site location was sought. The use of on-property reference plots was important to take advantage of similar ecological conditions and to avoid lengthy property access processes. After walking down several areas, the researchers agreed on the current locations immediately north and east of A8PI. The reference sites chosen were ideal in the sense that they were immediately adjacent to the planting location. However, the woodlots were younger than the original location (40-50 years old vs. >100 years old). More recently, the reference sites might also be influenced by deer browsing pressure. Once these factors were considered, the investigators used the reference sites as a template for spatial structure only. Other on-property flora lists and field observations were used to determine the species mix. The total number of species for the study was restricted by statistical considerations and the availability of both seedlings and saplings of the same species.

Action: None taken.

Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: 1 Line #: 2nd paragraph Code: C
Original Comment #: 3
Comment: None of the species identified in the reference plots were green ash although blue ash was listed as one of the more dominant species. The range of blue ash is much more limited than that of green ash and it is found, like the chinquapin oak, in the limestone soils of

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southwest Ohio. Ohio EPA believes it would have been most appropriate to utilize blue ash rather than green ash in the research plots. In future restoration work, Ohio EPA expects a more diverse and appropriate list of trees to be utilized for reforestation work. Developing reference lists from undisturbed areas including the Hamilton County Parks, conservation easement area or even a review of original land survey data would have provided a better species list for restoration. At the March 11, 1999 Natural Resource Working Group meeting, Ohio EPA provided a list of tree species obtained from the 1818 Crosby Township land survey. We would expect to use this and other information sources for determining species lists for future restoration projects.

Response: There are several reasons why green ash was selected for use in this study. Field observations and flora lists from many areas on the property indicate that green ash occurs frequently while blue ash are rare. Green ash trees are robust trees that can withstand wide variations in soil type and soil moisture. An additional consideration was availability - blue ash trees are not commercially available in both the sapling and seedling sizes needed for this project. Future restoration will consider additional sources of information.

Action: None taken.

Commenting Organization: Ohio EPA Commentor: DSW
Section #: Pg #: 2 Line #: 3rd paragraph Code: C
Original Comment #: 4

Comment: Placing tubes on half the seedlings in a plot may act to protect the seedlings in the same plot without the tubes. These unusual objects may deter herbivory in their vicinity. It may be better to have an entire plot with seedlings in tubes and one without.

Response: The results from a recent in depth research project indicate that animals are often attracted into an area by unusual objects (Shea, K.L., E.E. Stange, 1998, "Effects of Deer Browsing, Fabric Mats, and Tree Shelters on *Quercus rubra* Seedlings," *Restoration Ecology*, Vol. 6, No. 1, pp. 29-34). It is doubtful that the presence of the tree tubes would deter the deer from entering the various plots. However, in order to better define the effectiveness of several herbivore control techniques, DOE is proposing a modified research design. For each of the four plots that receive 600 seedlings, tree tubes will be installed on a third of the seedlings (200). The second third of seedlings will be sprayed with a commercial deer repellent. The last set of 200 seedlings will not be protected as a control. This approach provides four replicate comparisons of tree tubes and deer spray and allows for statistical comparisons of the two approaches.

Action: Revise page 1 last paragraph to state the following:

> "The effectiveness of several types of deer control techniques will be investigated in each plot with seedlings. One third of the seedlings from each plot (200) will be placed inside of a tree tube to determine if survival is enhanced. The second third of seedlings will be sprayed with a commercial deer repellent. The last set of 200 seedlings in each plot will not be protected as a control. Because of the immediate protection from browsing animals, increased humidity and carbon dioxide levels, we will most likely see reduced mortality and increased growth rates when compared to seedlings without tubes. However, the use of tubes quadruples the cost of planting seedlings because of increased materials and labor.

Part of the econometric aspect of this study is to evaluate cost versus performance in order to make recommendations for future restoration efforts at FEMP."

Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Table 2 Pg #: Line #: Code:
Original Comment #: 5

Comment: The number of seedlings and saplings utilized as well as plot design have changed substantially from the original work plan approved in June 1998. The Experimental Design needs to include a discussion of these changes and their basis.

Response: The total number of seedlings and saplings has not changed significantly since the original work plan was approved in June 1998. Changes to the experimental design based on the reference plot data were discussed at length in the February 1999 report. A comparison of the original proposal to the experimental design will be added.

Action: Add the following text to page 1 after the first paragraph:

"The original work plan proposed two plots of 500 seedlings, two plots of 250 seedlings and 50 saplings, and two plots of 500 seedlings and 100 saplings. These total to 2,500 seedlings and 300 saplings. As a result of the reference plot data, the planting mix was altered to include two plots of 100 saplings, two plots of 50 saplings and 600 seedlings, and two plots of 600 seedlings only. This totals 300 saplings and 2,400 seedlings, 100 less than the original work plan. This revised design is discussed in more detail below."

RESPONSES TO THE OEPA COMMENTS ON THE IDENTIFICATION AND CONTROL OF INVASIVE PLANT SPECIES 1998 ANNUAL REPORT, OPERABLE UNIT 4 SUPPLEMENTAL PROJECT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Commenting Organization: Ohio EPA — Commentor: OFFO
Section #: General — Pg #: — Line #: — Code:
Original Comment #: 1

Comment: The report provides additional basis for Ohio EPA's continued position that cattle grazing in the Northern Woodlot is degrading the system by impacting both plant communities and soil erosion. The report provides one more reason for DOE to use all possible means to terminate grazing in the Northern Woodlot at the earliest possible time. Continued grazing only increases the amount of money and time restoration of this area will require.

Response: Agree.

Action: DOE has recently held discussions with Mr. Carl Summe (the owner of the cattle) about phasing out grazing on FEMP property. Under the proposed agreement, all grazing in Area 8, Phase II and the Northern Woodlot would end by October 1, 1999. Allowing grazing to continue through the summer is important to the interests of Mr. Summe. Also under the agreement, grazing in the southern portion of Area 8, Phase III would end on October 1, 2001, and grazing in the northern portion of Area 8, Phase III would end on October 1, 2003.

Commenting Organization: Ohio EPA — Commentor: OFFO
Section #: Purpose and Scope — Pg #: 2 — Line #: — Code:
Original Comment #: 2

Comment: The first bullet under this heading is to "identify all plant species present in the North Woodlot..." and that Phase I calls for a detailed floristic inventory. Then on page five, last paragraph, they say that non-vascular plants were not included. Ohio EPA has concerns that it is not likely that all plant species could have been accounted for in the referenced field visits. The May 1999 Work Plan for Ecological Research Grants states "A floristic analysis will be performed in May, June and August of 1998 to provide an enumeration of dominant plant species in the 100 acre Northern Woodlot." This appears to more appropriately describe the floristic analysis completed.

Response: The intent of the floristic analysis (or a "flora") is to identify all vascular plant species. Non-vascular plants were not included since they are not relevant to invasive species identification and control. The researcher is confident that nearly all vascular plants will be accounted for after several more visits during the 1999 growing season.

Action: The referenced sentences will be modified to clarify the intent of this study as follows: First paragraph, first sentence will read, "The purpose of this research is to 1) identify all *vascular* plant species present in the Northern Woodlot..." The first sentence of the third paragraph will be read, "Phase I calls for a detailed floristic inventory *of vascular plants*."

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Commenting Organization: Ohio EPA Commentor: DSW
Section #: Floristic Analysis Pg #: 5 Line #: 2nd paragraph Code: C
Original Comment #: 3
Comment: There are additional resources for native plants in Ohio and Ohio EPA would like to see more justification for the use of Gleason and Cronquist as the sole source of "indigenous vs. non-indigenous" plants.

Response: When conducting a flora, a primary source must be designated as an absolute taxonomic authority so there is a base reference for the nomenclature. The Gleason and Cronquist book was selected as the primary source since it is highly regarded in the botany community and is considered to be the "bible" of floras. The researcher feels that this is the best source for distinguishing indigenous vs. non-indigenous plants. A secondary source (The Flora of Ohio, four volumes) was used in the event that a clear identification/distinction could not be made from Gleason and Cronquist.

Action: None.

Commenting Organization: Ohio EPA Commentor: DSW
Section #: Floristic Analysis Pg #: 5 Line #: 2nd paragraph Code: E
Original Comment #: 4
Comment: "clasify" is spelled "classify."

Response: Agree.

Action: The spelling error will be corrected.

Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Floristic Analysis Pg #: 5 Line #: 3rd paragraph Code: C
Original Comment #: 5
Comment: The researcher appears to reach the conclusion that the low abundance of "lower" vascular plants may be attributable to site pollution. Ohio EPA is highly skeptical of any suggestion that pollution impacts to plants are occurring in the northern woodlot. That area is presumed to be low in any kind of "industrial pollution" and attention should be directed towards other possible causes of the lower than expected frequency of ferns. For example, the literature review by Dr. Carolyn Keiffer states that ferns are an important source of food for deer. Impacts of grazing (cattle and deer) and land management are more likely causes of low abundance than site related pollution. The apparent default to "industrial pollution" does not lend much credibility to the project.

Response: This statement is not a conclusion, but rather speculation by the researcher about the reason for the low abundance of the "lower" vascular plants (i.e., ferns). The term "industrial pollution" was a general term, not specifically meaning pollution associated with the site. Past research has demonstrated that ferns are very sensitive to industrial pollutants. For instance, a recent study found that a 50 percent increase in ground ozone resulted in more than a 50 percent decrease in fern spore germination (Bosley, A. *et al.* 1998). Given the elevated ground ozone in the Cincinnati area, this is a potential explanation. Also, while northern woodlot is relatively unimpacted by process-related contamination compared to other parts of the site, there is still above-background contamination present. The effects of slightly elevated radionuclide concentrations on

ferns is unknown, but could also exhibit a similar effect and contribute to the reduced fern population. Both of these ideas about the low abundance of ferns are strictly speculative, and would need to be evaluated further.

With regard to the grazing explanation, the researcher is skeptical about the statement that ferns are an important source for deer. In fact, ferns are known to be toxic to vertebrates after the fiddlehead stage, and therefore, are not subject to high deer or cow browsing pressure.

Action: The text will be revised to read as follows:

> "It is possible that regional industrial pollution may contribute to the low abundance of ferns, as ferns are know to be quite sensitive to pollution. For example, recent literature states that a 50 percent increase in ground ozone resulted in more than a 50 percent decrease in fern spore germination (Bosley, A. *et al.* 1998). The Cincinnati area does have elevated ground ozone levels, though this idea would need to be evaluated further."

The Bosley *et al.* reference will also be to be added to the References section of the Annual Report.