RESPONSIVENESS SUMMARY FOR THE STUDY PLAN FOR MINK INJURY DETERMINATION

INVESTIGATION OF MINK ABUNDANCE AND DENSITY RELATIVE TO POLYCHLORINATED BIPHENYL CONTAMINATION WITHIN THE HUDSON RIVER DRAINAGE

HUDSON RIVER NATURAL RESOURCE DAMAGE ASSESSMENT

HUDSON RIVER NATURAL RESOURCE TRUSTEES

STATE OF NEW YORK

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RESPONSIVENESS SUMMARY FOR THE STUDY PLAN FOR MINK INJURY DETERMINATION—INVESTIGATION OF MINK ABUNDANCE AND DENSITY RELATIVE TO POLYCHLORINATED BIPHENYL CONTAMINATION WITHIN THE HUDSON RIVER DRAINAGE

This *Responsiveness Summary for the Study Plan for Mink Injury Determination, Investigation of Mink Abundance and Density Relative to Polychlorinated Biphenyl Contamination within the Hudson River Drainage,* was prepared by the Hudson River Natural Resource Trustees (Trustees) -- New York State, the U.S. Department of Commerce, and the U.S. Department of the Interior. The Trustees are conducting a Natural Resource Damage Assessment (NRDA) for the Hudson River. This Responsiveness Summary provides Trustee agency responses to public comments on and questions about the Trustees' *Study Plan for Mink Injury Determination, Investigation of Mink Abundance and Density Relative to Polychlorinated Biphenyl Contamination within the Hudson River Drainage,* dated March 19, 2012, released by the Trustees for public review and comment.

INTRODUCTION

Pursuant to the Hudson River Natural Resource Damage Assessment (NRDA) Plan (Hudson River Natural Resource Trustees 2002), the Trustees developed a *Study Plan for Mink Injury Determination, Investigation of Mink Abundance and Density Relative to Polychlorinated Biphenyl Contamination within the Hudson River Drainage, Draft for Public Review and Comment* (Draft 2012 Mink Study Plan) (Hudson River Natural Resource Trustees 2012a), and engaged in public review of that Draft 2012 Mink Study Plan.

On March 19, 2012, the Draft 2012 Mink Study Plan was released by the Trustees to the public. In that Draft 2012 Mink Study Plan, the Trustees asked the public and the party(ies) responsible for the contamination to review the Draft 2012 Mink Study Plan and provide feedback on the proposed approach. The Draft 2012 Mink Study Plan noted that the Trustees sought public input to help them in planning and conducting an assessment that is scientifically valid, cost effective, and that incorporates a broad array of perspectives. Peer review of the Draft 2012 Mink Study Plan was conducted concurrent with the public review and comment period.

Availability of the Draft 2012 Mink Study Plan was announced by the Trustees on the Hudson River NRDA web site maintained by the U.S. Fish and Wildlife Service (FWS), with a request that comments be submitted by April 18, 2012, providing a full 30-day public review period.

All comments received on the Draft 2012 Mink Study Plan, as part of the peer and public review process, were considered. The Trustees appreciate the input represented by these comments and the effort by commentors to provide this level of review. The Trustees evaluated peer and public comments and, where warranted, incorporated these comments in the Draft 2012 Mink Study Plan to produce the *Study Plan for Mink Injury Determination, Investigation of Mink Abundance and Density Relative to Polychlorinated Biphenyl Contamination within the Hudson River Drainage, Final, Public Release Version,* dated June 2012 (Final 2012 Mink Study Plan) (Hudson River Natural Resource Trustees 2012b).

PUBLIC COMMENTS RECEIVED

One letter from the public was received in response to the Draft 2012 Mink Study Plan: a letter from The General Electric Company (GE), the Potentially Responsible Party, dated April 18, 2012. No other comments were received from the public.

Text excerpted from the GE comment letter is provided below, along with the Trustee response (in italicized text) to comments.

Accordingly, this Responsiveness Summary documents comments that were received, that those comments were considered by the Trustees, and how the Trustees addressed those comments.

COMMENTS IN LETTER FROM GENERAL ELECTRIC, DATED APRIL 18, 2012

General Comment:

- The 2012 Mink Study Plan provides a general overview of the trustees' mink abundance and density study design to be conducted as a continuation of their mink injury assessment efforts. However, similar to previous study plans released for review and comment by the trustees, the 2012 Mink Study Plan does not provide the level of detail on the work to be conducted needed to provide meaningful feedback on the Study Plan in its current form.

Trustee Response:

Regarding level of detail, the Trustees determined that the level of specificity in the Draft 2012 Mink Study Plan is appropriate for the purpose for which it is intended, which is to ensure the public is apprised of work the Trustees plan to undertake. The Draft 2012 Mink Study Plan included: locations of sample areas; a description of the study design and methods; information regarding the numbers and types of samples to be collected, and analyses to be performed; and, quality assurance and quality control provisions. The level of detail in the Draft Mink 2012 Study Plan is consistent with the provisions of the U.S. Department of the Interior (DOI) Natural Resource Damage Assessment (NRDA) regulations at 43 CFR Part 11.

General Comment:

- Additionally, as detailed in our comments, the trustees reference results of prior Hudson River NRDA-related studies as a basis for conducting further mink investigations. However, the trustees have yet to make many of those results available, despite repeated requests by GE. The continued shielding of information from GE and the public by the trustees makes it impossible to be meaningfully involved in the NRDA process. Allowing for comments on work plans while refusing to provide the data and analysis upon which the plans' foundations rest does not allow GE or others to evaluate the need for such work nor to have the opportunity to suggest other approaches. GE again requests that the Hudson NRDA trustees provide all data in a timely way to GE and the public thus making the NRDA involvement process a meaningful exercise.

Trustee Response:

Regarding prior mink investigations and public release of that information, the Trustees have developed an overall public involvement program to ensure effective and informed public input throughout the damage assessment, and have implemented a number of outreach efforts including meetings with affected interest groups and organizations; posting new reports, data, and other information on Trustee internet sites; working with the local media; and, holding public availability sessions for major documents. The Trustees have consistently sought public involvement to help the Trustees plan and conduct an assessment that is scientifically valid and cost effective and that incorporates a broad array of perspectives.

In particular, for injury determination studies, the Trustees committed, in the Hudson River NRDA Plan to peer review the results of studies conducted pursuant to injury determination study plans, such as the mink feeding study initiated in 2006. The data and results of that and other studies being conducted by the Trustees will be provided to the public, including GE, only after the analyses are complete and, in accordance with the Hudson River NRDA Plan, the results have been peer reviewed. Peer review is an important procedure used by the scientific community to ensure the quality of information and to ensure that the final work product reflects sound technical information and analyses. For the Trustees to release study results that have not been peer reviewed, and thus are preliminary, would be contrary to the Information Quality Act with which the Federal Trustees must comply. Ensuring that the data are defensible and of high quality is critically important to the Trustees; such data provide a solid foundation for the Trustees' decisions.

Specific Comment:

➢ Existing mink-related data should be released. The 2012 draft Mink Study Plan makes reference to prior NRDA studies that the trustees used to guide them in designing the current study plan. However, the trustees have yet to make public mink-related data and information collected in the earlier studies, despite previous requests for that information. GE requests that the following information be provided: Results of mink trapper interviews; Findings of the expert panel assembled in 2002 to review the exposure and effects information compiled by NYSDEC for mink and otter; Congener-specific analytical results from the 1998-2000 mink study; Results of the 2000-2001 track board study; Detailed data and results of the mink feeding study initiated in 2006. The failure of the trustees to release this information makes it difficult to evaluate whether the current proposed study will advance existing knowledge of injury to mink in the Upper Hudson River and whether the study represents a reasonable incurrence of assessment costs.

Trustee Response:

Regarding each of the items requested, the Trustees offer the following:

- *Results of mink trapper interviews: These interviews were part of a pilot study to explore the potential to acquire data on take and trapping effort from recreational trappers. The New York State Department of Environmental Conservation prepared a summary of work for that pilot done in 1993-1994. That document, entitled "Factors Affecting the Distribution of Mink from Contaminated Habitats," has been released to the public. The Trustees are not releasing the information provided by the trappers as collection of that information was covered by a confidentiality agreement with the trappers (per Appendix II of the work summary).*
- *Findings of the expert panel assembled in 2002 to review the exposure and effects information compiled by NYSDEC for mink and otter: The expert panel members are consultants of the Trustees and may be witnesses in future litigation. The recommendations of these individuals are privileged, and accordingly, the Trustees are not releasing this information.*
- *Congener-specific analytical results from the 1998-2000 mink study: This study was a preliminary investigation designed to improve the Trustees' understanding of Hudson River natural resources; total PCBs are reported in Mayack & Loukmas 2001 "Progress report on Hudson River mammals: Polychlorinated biphenyl levels in mink, otter, and muskrat and trapping results for mink, the upper Hudson River drainage, 1998-2000." A Quality Assurance/ Quality Control review of the congener-specific analytical results has not yet been done by the Trustees, thus these data are not available for public release at this time.*
- *Results of the 2000-2001 track board study: This study was a preliminary investigation designed to improve the Trustees' understanding of Hudson River natural resources. Results from this preliminary investigation are being evaluated by the Trustees and are not available for public release at this time.*
- *Detailed data and results of the mink feeding study initiated in 2006: The Principal Investigators for the mink feeding study presented their results from that study at the November 2011 Society of Environmental Toxicology and Chemistry meeting. The presentations consisted of a platform entitled, "Dietary Exposure of Mink (Mustela vison) to Fish from the Upper Hudson River, New York, USA: Effects on Reproduction, Offspring Growth and Mortality," and a poster entitled, "Dietary Exposure of Mink (Mustela vison) to Fish from the Upper Hudson River, New York, USA: Organ Mass and Pathology." The two presentations are available at: http://www.fws.gov/contaminants/restorationplans/HudsonRiver/index.html. Please note that the conclusions and opinions in these presentations are those of the authors, they do not represent the official position of any of the funding agencies, the Hudson River Trustees or the United States. Further, the "Mink Injury Investigation" described in the 2006 work plan is an injury determination study. As such, the Trustees committed in the Hudson River NRDA Plan to peer review the results of such studies. As peer review of the results of the 2006 work plan has not yet been completed by the Trustees, the Trustees are not yet in a position to release those data. The data and results of work conducted pursuant to that study plan will be provided to the public, including GE, after the peer review is complete, per the Hudson River NRDA Plan.*

Specific Comment:

- The 2012 experimental protocol reflects a substantial change from the trustees' prior proposed mink study plan. In August 2010, the trustees released a draft study plan to investigate mink occupancy within the Hudson River drainage (Hudson River Natural Resource Trustees, 2010). The methods to estimate mink abundance proposed in that earlier draft included the use of digital cameras and enclosures containing track plates and scent attractants. Neither of those methods is mentioned in the 2012 draft study plan. Do the trustees still intend to utilize the methods proposed in their 2010 draft study plan? If not, what is the rationale?

Trustee Response:

The Trustees will conduct the mink field study, to be initiated in 2012, in accordance with the Final 2012 Mink Study Plan. As noted in the Draft 2012 Mink Study Plan, the Trustees had released a draft study plan entitled, "Investigation of Mink Occupancy Relative to Polychlorinated Biphenyl Contamination within the Hudson River Drainage" (Hudson River Natural Resource Trustees, 2010), dated August 2010, but following peer and public review of that plan, the Trustees determined that revisions to that plan were appropriate, resulting in the Draft 2012 Mink Study Plan being released for further peer and public review. Accordingly, the 2010 draft study plan will not be implemented.

Specific Comment:

- The Draft Study Plan lacks sufficient detail to allow for review of experimental methodology. The study plan lacks sufficient detail to allow reviewers to adequately evaluate proposed methods and to judge whether the study design is likely to be suitable for meeting study objectives. For example, the draft plan simply notes that mink identification data will be used to "estimate mink abundance and density using spatial capture-recapture (SCR) models." The type of SCR model to be used should be described because a number of types of these models have been developed, and not all are appropriate for analysis of data collected in hair-snare traps or scat samples.

Trustee Response:

The Final 2012 Mink Study Plan includes additional details and clarification beyond those provided in the Draft 2012 Mink Study Plan. The experimental design is described more fully, and a Work Plan with Standard Operating Procedures (SOPs) has been incorporated into the Final 2012 Mink Study Plan. The Final 2012 Mink Study Plan describes the Spatial Capture Recapture model, including the spatial model of the population (i.e., animal distribution) and the spatial model of the detection process (i.e., observation model), as well as all assumptions of the modeling approach and all references. All formulas are included in the Final 2012 Mink Study Plan, as is the statistical package.

- The draft plan also states that "mink scat and hair samples will be genetically analyzed using approved protocols." This statement provides insufficient information to determine whether the analyses to be employed will provide useful data. As Taberlet et al. (1999) note, choice of techniques for sample preservation, and DNA extraction and amplification (e.g., single-tube versus multiple-tube approach) are all important considerations for minimizing identification errors due to allelic dropout, false alleles, and contamination. Likewise, Goossens et al. (1998) found substantial differences in rates of genotyping errors depending on whether DNA was extracted from 1, 3, or 10 hairs of an animal. More details on sample preparation and genetic analytical techniques should be included in the draft work plan, or the approved protocols should be attached to the draft plan to permit reviewers to evaluate the adequacy of planned analytical techniques.

Trustee Response:

The Final 2012 Mink Study Plan includes additional details and clarification beyond those provided in the Draft 2012 Mink Study Plan. The genetic analyses are described in detail, including sample preservation, techniques for DNA extraction and amplification, PCR optimization, species identification and individual identification, and all appropriate references.

Specific Comments:

- Sample collection and processing methods are unclear. The draft study plan provides a brief description of the methods to be used for collecting hair and scat samples in the field. However, important details regarding sample acceptability and post-collection sample handling and processing methods are not described. There is no discussion of how samples from non-target species will be identified and eliminated from the set of samples used for genetic analysis. Previous studies have shown that rates of non-target species hair collection in snares can be considerable (Depue and Ben -David 2007; Sawaya et al. 2011), as can rates of scat detection by dogs (Long et al. 2007).
- Other sample collection issues not clearly addressed include the following. Can any individual hair snare collect hair samples from more than one mink? If so, how will hair samples be segregated for analyses to ensure that all unique individuals sampled by the hair snare are correctly enumerated and what precautions will be taken to prevent mixing samples from different individuals if >1 hair is used for genotyping? With regard to feces collection, dogs may be able to detect very old scats if a scent trail still exists; however, scats that have been in the field more than a few weeks may experience genetic degradation making them difficult to amplify (Taberlet et al. 1999). Therefore, what procedures, if any, will be used to age scats and to determine that they are suitably fresh for genetic analysis?

Trustee Response:

The Final 2012 Mink Study Plan includes additional details and clarification beyond those provided in the Draft 2012 Mink Study Plan, including additional information regarding collection of mink hair and scat samples.

Specific Comment:

- GE requests that hair and scat samples collected as part of the study be archived and made available upon request.

Trustee Response:

Scat samples not consumed in analysis will be archived by the Trustees. No hair suitable for DNA analysis will remain after samples are prepared and analyzed.

Regarding the Trustees making the archived samples available, such sharing of samples is typically done as part of assessment activities performed under a cooperative assessment agreement between the Trustees and a responsible party. The Trustees continue to extend to the responsible party the invitation for a cooperative assessment set forth in the Hudson River NRD Assessment Plan.

Specific Comments:

- Success criteria for the first year pilot study should be defined. Initial investigations proposed for 2012 appear to be designed as a trial to test field and laboratory methods. This is an appropriate first step, as information from the literature suggests that these field sampling techniques have not been previously tested for mink. However, the study plan does not provide any indication of how results from the 2012 study will be evaluated when making a decision about whether or not to proceed to the study in 2013. What criteria will be used to determine whether methods are appropriate and will be carried forward to the second year of study? Has a minimum target capture rate (i.e., number of hair or scat samples per unit effort) been established as a cut-off below which a non-invasive sampling technique will be considered ineffective? Has consideration been given to

using additional census methods in 2012, including track boards and remote cameras (as proposed in the 2010 draft study plan) to see how well these methods perform in detecting the presence of mink relative to scat and hair sampling?

Trustee Response:

The Final 2012 Mink Study Plan includes additional details and clarification beyond those provided in the Draft 2012 Mink Study Plan, including information regarding analysis of study data.

All data from the 2012 pilot season will be analyzed using the methods described in the study plan. The Trustees will not explore track boards and remote cameras because these devices will not allow identification of individuals that is required to estimate density of mink; these methods are useful only for detecting the presence of individuals. The study plan outlines additional statistical approaches that could be used if it is not possible to identify individuals from DNA collected from the non-invasive methods that will be employed.

- What pilot study evaluations of analytical techniques will be performed in 2012? Goossens et al. (1998) recommend performing pilot studies to quantify the level of genotyping errors to determine if error rates are low enough to accurately identify individual animals. Will this type of pilot study be conducted, and what is the maximum acceptable error rate?

Trustee Response:

PCR optimization and selection of loci will be achieved in a preliminary study using both high quality samples and scat/hair samples. More detail regarding this is provided in the Final 2012 Mink Study Plan.

Mink scat will be identified in the field based on size and habitat context. During the 2012 pilot study all scat samples will be confirmed as mink using the mitochondrial DNA marker. If field identification error proves low then this step may be eliminated for subsequent field seasons because species ID is also likely to be evident from microsatellite genotypes and also from the genotypes themselves. Non-mink samples will not be analyzed further.

To get complete multi-locus genotypes and assure the accuracy of recaptures a stepwise approach described by McKelvey and Schwartz (2004) will be used. More detail regarding this is provided in the Final 2012 Mink Study Plan.

Specific Comments:

- Study sites selection and reference area comparisons require additional explanation. The draft plan states that scat and hair searches will be conducted at tributary stream-road intersections (i.e., 100 m on either side of the intersection). Presumably this is to allow for ease of access by researchers and tracking dogs. However, this might conflict with the stated requirement for sampling habitats that score high in a Habitat Suitability Index (HSI). If habitats with the highest HSI scores are not adjacent to road intersections, then the study will introduce a bias by not sampling the areas where mink may be the most likely to occur and where sample collection rates may be highest. An additional bias may be introduced if mink avoid areas near roads due to the higher presence of human activity in those areas. What steps will be taken to minimize these potential biases?

- The study plan states that in the 2013 field season the highest ranking 144 sites in each watershed, as based on HSI scores, will be used for sample collection. Habitat suitability for mink will be scored on a protocol based on the HSI of Allen (1986). Allen indicates that the HSI is applicable to all inland wetland habitats of mink across their range in North America. However, when Loukmas and Halbrook (2001) performed a field validation of the HSI for riverine systems within the upper Great Lakes region they discovered that the index was poorly suited for predicting the amount of mink activity in these riverine locations. Specifically, the model failed to give an accurate value to some habitats with poorer HSI vegetative cover characteristics, but which had abundant prey items for mink. Given this potential weakness of applying the model to riverine systems, what precautions will the investigators use to ensure that potentially valuable study

locations are not rejected on the basis of a low HSI ranking? What procedures will be used to make sure that the allotment among habitats of differing quality is proportional for the Upper Hudson River and reference locations?

Trustee Response:

The Final 2012 Mink Study Plan does not entail use of any HSI. Site selection is fully described in the Final 2012 Mink Study Plan.

Specific Comment:

- Presumably, estimates of mink abundance and density for the two river systems will be adjusted based on weighted HSI scores for the various locations sampled along the Hudson and Mohawk rivers. However, this still will not account for other potential differences between the two systems that could influence patterns of mink distribution. Such factors could include potential variations in prey availability, trapping intensity, nearby land-use patterns and extent of habitat fragmentation, extent of human disturbance, presence of other chemicals, etc. In order to demonstrate causation and to meet the study objective of comparing mink abundance to PCB levels, will a formal causal analysis (e.g., U.S. EPA 2000, Suter et al. 2010) be conducted as part of this investigation to address the potential effects of other stressors on the mink populations?

Trustee Response:

The Trustees will determine causation in accordance with the DOI NRDA regulations.

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