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04/07/03

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF VIRGINIA
ABINGDON DIVISION

RECEIVED
2-19-03
CLERK'S OFFICE U.S. DIST. COURT
AT ROANOKE, VA.
RECEIVED
for Abingdon
JOHN F. CORCORAN, CLERK
G. Craft

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)
UNITED STATES OF AMERICA)
)
)
Plaintiff,)
)
v.)
)
CERTUS, INC.)
)
Defendant.)

Civil Action No.: 1:02CV00095

CLERK'S OFFICE U.S. DIST. COURT
AT ABINGDON, VA
FILED
APR 07 2003
JOHN F. CORCORAN, CLERK
BY: [Signature]
DEPUTY CLERK

CONSENT DECREE

I. BACKGROUND

A. Plaintiff United States of America ("Plaintiff"), on behalf of the United States Department of the Interior ("DOI"), filed a complaint in this matter on May 31, 2002 ("Complaint") against Certus, Inc. ("Settling Defendant"). In the Complaint, Plaintiff, in its capacity as a natural resource trustee, seeks to recover natural resource damages under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §§ 9601 *et seq.*, and the Clean Water Act, as amended ("CWA"), 33 U.S.C. §§ 1251 *et seq.*

B. The United States alleges in its Complaint that, on August 27, 1998, a tanker truck operated by Settling Defendant overturned and spilled approximately 1,350 gallons of Octocure 554-revised, a rubber accelerant containing one or more federally listed hazardous substances, into the Clinch River near the town of Cedar Bluff, Tazewell County, Virginia ("Release," as defined in Section IV). The United States further alleges that this release of hazardous

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substances caused injury, including death, to various natural resources within the Clinch River, including freshwater mussel species listed as endangered under the federal Endangered Species Act, 16 U.S.C. §§ 1531 *et seq.*

C. Pursuant to the National Contingency Plan, 40 C.F.R. Part 300, and Executive Order 12580, the President has delegated authority to act as Federal Trustee for natural resources injured by the Release to the Secretary of the DOI, acting through the United States Fish and Wildlife Service (“USFWS”) in this case. On behalf of the Federal Trustee, Plaintiff contends that it has a claim for natural resource damages (including recovery of natural resource damage assessment costs) against Settling Defendant.

D. DOI, through USFWS, has conducted an extensive series of natural resource damage assessment activities related to the Release, including preparation of an Initial Restoration and Compensation Determination Plan (“Initial RCDP”) for the Certus Chemical Spill, dated April 9, 2002 (Notice of Availability published in the Federal Register on May 8, 2002, 67 Fed. Reg. 30947 (2002)). Settling Defendant previously reimbursed DOI for a substantial portion of the costs associated with these assessment activities. Based on the results of these assessment activities, DOI has determined that the Release has caused injury to freshwater mussels in the Clinch River watershed and has proposed that actions, including propagation of juvenile mussels, be undertaken to restore the injured resources.

E. Pursuant to CERCLA and the Clean Water Act, the Commonwealth of Virginia also possesses authority to act as a Trustee for natural resources located within its boundaries, including natural resources injured by the Release. The Governor of Virginia has delegated this Trustee authority to the Virginia Secretary of Natural Resources (“State Trustee”). Virginia has

not joined in the United States' Complaint or otherwise brought a formal claim for natural resource damages relating to the Release, but by execution of this Consent Decree agrees to be bound by certain terms of this Consent Decree.

F. Settling Defendant denies liability to the Plaintiff and to the Commonwealth and to any other person or entity, and has filed a Motion to Dismiss the Complaint challenging Plaintiff's right to pursue the Complaint.

G. Settling Defendant certifies that it is winding up its corporate affairs for purposes of the dissolution of the corporation; that it sold its equipment and other assets for fair market value, for the benefit of its creditors; that it is not transferring any ongoing business operations to any successor entity; and that it will undertake commercially reasonable efforts to complete the dissolution process within 180 days of the Effective Date of this Consent Decree.

H. The Parties to this Consent Decree agree, and the Court by entering this Consent Decree finds, that this Consent Decree: (1) has been negotiated by the Parties in good faith; (2) will avoid prolonged and complicated litigation among the Parties; (3) will expedite the restoration and protection of natural resources allegedly injured by the release of hazardous substances; and (4) is fair, reasonable, and in the public interest.

NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§1331 and 1345, and 42 U.S.C. §§ 9607 and 9613(b). This Court also has personal jurisdiction over Settling Defendant. For purposes of this Consent Decree, Settling Defendant waives all objections and defenses that it may have to jurisdiction of the Court and to venue in this District.

Settling Defendant shall not challenge the terms of this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree.

III. PARTIES BOUND

2. This Consent Decree applies to and is binding upon the United States and the Commonwealth, and upon Settling Defendant and its successors and assigns.

3. The Parties understand that this Consent Decree is entered into by Settling Defendant as part of its effort to settle its liability and to wind up its corporate affairs. Any change in ownership or corporate status of Settling Defendant including, but not limited to, any subsequent dissolution, liquidation, reorganization, transfer of assets or of real or personal property, shall in no way alter the Settling Defendant's responsibilities or obligations under this Consent Decree.

IV. DEFINITIONS

4. Unless otherwise expressly provided herein, terms used in this Consent Decree which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever the specific terms listed below are used in this Consent Decree, the following definitions shall apply:

a. "CERCLA" means the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601 *et seq.*

b. "Clean Water Act" or "CWA" means the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§ 1251 *et seq.*

c. "Commonwealth" means the Commonwealth of Virginia.

d. "DOI" means the United States Department of the Interior and any successor departments or agencies of the United States.

e. "Effective Date" means the effective date of this Consent Decree as provided by Section XII of this Consent Decree.

f. "Federal Trustee" means the U.S. Department of the Interior, acting through the U.S. Fish and Wildlife Service.

g. "Natural Resource Damages" means any damages recoverable by the United States or the Commonwealth on behalf of the public for injury to, destruction of, or loss of natural resources as a result of the Release, including but not limited to: (i) the costs of assessing such injury, destruction, or loss; (ii) the costs of restoration or replacement of injured or lost natural resources or of acquisition of equivalent resources; (iii) the costs of planning and overseeing such restoration activities; (iv) the compensable value of lost services resulting from the injury to, destruction of, or loss of natural resources; and (v) each of the categories of recoverable damages described in 43 C.F.R. § 11.15 and applicable Commonwealth law.

h. "NRDAR Fund" means DOI's Natural Resource Damage Assessment and Restoration Fund.

i. "Parties" means the United States, the Commonwealth of Virginia, and Settling Defendant.

j. "Plaintiff" means the United States.

k. "Release" means the release of Octocure 554-revised from an overturned tanker truck into a tributary of the Clinch River in Tazewell County, Virginia, that occurred on August 27, 1998, as described more fully in the United States' Complaint in this matter.

l. "Settling Defendant" means Certus, Inc.

m. "State Trustee" means the Virginia Secretary of Natural Resources.

n. "United States" means the United States of America, including all of its departments, agencies, and instrumentalities.

V. STATEMENT OF OBJECTIVES

5. This Consent Decree is intended to provide funding for the restoration, replacement, or acquisition of the equivalent of the natural resources and services that have been injured by the Release, as further described in Paragraph 10 of this Consent Decree; to resolve the Settling Defendant's liability for Natural Resource Damages as described herein; and to avoid further transaction costs and protracted litigation.

6. By entering into this Consent Decree, Settling Defendant does not admit any issue of fact or law or liability to Plaintiff or to any other person or entity arising out of the transactions or occurrences alleged in the Complaint.

7. Through this Consent Decree, the Parties intend to settle and resolve all claims for Natural Resource Damages under applicable federal, Commonwealth and common law, except as specifically reserved in Section VIII of this Consent Decree.

VI. PAYMENTS BY SETTLING DEFENDANT

8. Payments for Natural Resource Damage Assessment Costs.

a. The Parties agree that the Settling Defendant has made payments to the NRDAR Fund, prior to the lodging of this Consent Decree, in the total amount of \$481,967.40 in reimbursement of natural resource damage assessment costs incurred by DOI with respect to the Release.

b. Within thirty (30) days of the Effective Date of this Consent Decree, Settling Defendant, through its insurer, shall make an additional payment of \$92,567.16 to the NRDAR Fund

for unreimbursed natural resource damage assessment costs incurred by DOI with respect to the Release.

9. Payments for Natural Resource Damages.

a. Within thirty (30) days of the Effective Date of this Consent Decree, Settling Defendant, through its insurer, shall make an additional payment of \$3,707,432.84 for Natural Resource Damages to the Federal and State Trustees to be deposited in a site-specific sub-account within the NRDAR Fund.

b. Late Payments.

1. Interest. In the event that Settling Defendant fails to pay the amounts due under Paragraphs 8.b. or 9.a. within the time required, interest shall accrue on the unpaid balance through the date of payment at a rate calculated pursuant to 28 U.S.C. §§ 1961.

2. Stipulated Penalties. In addition to the Interest required to be paid under the preceding Subparagraph, if any amounts to be paid under Paragraphs 8.b. or 9.a. are not paid by the required date, the Settling Defendant shall pay a stipulated penalty of \$1000 per day that such payment is late.

c. Payment Procedures.

1. Payments to NRDAR Fund. Settling Defendant shall make the payment(s) required by Paragraphs 8.b. (Assessment Costs), 9.a. (Natural Resource Damages), and 9.a.1. (Interest) by FedWire Electronics Funds Transfer to DOI's NRDAR Fund in accordance with current electronic funds transfer procedures and instructions to be provided to Settling Defendant by DOI upon lodging of the Consent Decree. The payment(s) should reference the NRDAR Account No. 14X5198 and the "Certus/Clinch River Release." Any payments received after 4:00 p.m.

Eastern Time shall be credited on the next business day.

2. Payment of Stipulated Penalties. Settling Defendant shall make the payment(s) required by Paragraph 9.b.2. (Stipulated Penalties) by certified or cashier's check(s) made payable to the "Treasurer, United States of America," and tendered to the Financial Litigation Unit of the Office of the United States Attorney for the Western District of Virginia, and shall include with payment a letter indicating that the payment is for stipulated penalties under this Consent Decree, and referencing the case name and civil action number, DOJ Case No. 90-11-2-07004, and Settling Defendant's name and address.

3. Notice of Payments. Settling Defendant shall provide notice of its payment(s) under Paragraphs 8.b. and 9 to the following persons:

Department of the Interior
U.S. Dept. of the Interior
Natural Resource Damage Assessment and Restoration Program
Attn: Bruce Nessler, Restoration Fund Manager
National Business Center/Division of Financial Management Services,
Mail Stop 1313
1849 C Street, N.W.
Washington, D.C. 20240

Marcia Gittes
Office of the Regional Solicitor
U.S. Department of the Interior
One Gateway Center, Suite 612
Newton Corner, MA 02458-2868.

U.S. Fish and Wildlife Service
John Schmerfeld
U.S. Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

U.S. Department of Justice
Section Chief
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Dept. of Justice
P.O. Box 7611
Washington, DC 20044

Commonwealth of Virginia
Director
Virginia Department of Environmental Quality
629 E. Main Street
Richmond, VA 23219

10. The monies paid by Settling Defendant pursuant to Paragraph 9.a. will be held in the NRDAR Fund sub-account for this matter, to be managed by DOI for the joint benefit and use of the Federal and State Trustees to plan, perform, monitor and oversee native, freshwater mussel restoration projects within the Clinch River watershed applying the methods identified in Alternatives 2, 3, 4, and 5 of the Initial Restoration and Compensation Determination Plan (“Initial RCDP”) for the Certus Chemical Spill, dated April 9, 2002 (relevant portions of the Initial RCDP are attached to this Consent Decree as Appendix A). The details for specific restoration projects will be contained in a Restoration Plan proposal or proposals to be developed jointly by the Federal and State Trustees. The final Restoration Plan will be implemented jointly by the Federal and State Trustees, after providing public notice, opportunity for public input, and consideration of any public comment. In consideration of the payments set forth in Paragraphs 8 and 9 of this Consent Decree, Settling Defendant will not be required to perform or otherwise participate in any natural resource restoration projects related to the impacts of the Release.

VII. COVENANTS NOT TO SUE BY THE UNITED STATES AND THE COMMONWEALTH

11. Covenants by the United States. In consideration of the payments made and to be made by Settling Defendant as set forth in this Consent Decree, and except as specifically provided by Section VIII (Reservation of Rights), the United States covenants not to sue or to take any administrative action against Settling Defendant pursuant to Section 107 of CERCLA, 42 U.S.C. § 9607, Section 311(f) of the Clean Water Act, 33 U.S.C. § 1321(f), or any other provision of federal or common law for Natural Resource Damages. This covenant not to sue shall take effect upon receipt of the Settling Defendant's payments pursuant to Paragraph 8.b. and 9.a. of this Consent Decree. This covenant not to sue is conditioned on the satisfactory performance by the Settling Defendant of its obligations under this Consent Decree.

12. Covenants by the Commonwealth. In consideration of the payments made and to be made by Settling Defendant as set forth in this Consent Decree, and except as specifically provided by Section VIII (Reservation of Rights), the Commonwealth covenants not to sue or to take any administrative action against Settling Defendant pursuant to Section 107 of CERCLA, 42 U.S.C. § 9607, Section 311(f) of the Clean Water Act, 33 U.S.C. § 1321(f), or any other provision of federal, Commonwealth or common law for Natural Resource Damages. This covenant not to sue shall take effect upon receipt of the Settling Defendant's payment pursuant to Paragraphs 8.b. and 9.a. of this Consent Decree. This covenant not to sue is conditioned on the satisfactory performance by the Settling Defendant of its obligations under this Consent Decree.

13. Covered Persons. The covenants not to sue in Paragraph 11 (Covenants by the United States) and Paragraph 12 (Covenants by the Commonwealth) extend only to the Settling Defendant and do not extend to any other person; provided, however, that those covenants not to sue (and the

reservations thereto) shall also apply to: (i) Settling Defendant's insurer, Liberty Mutual Insurance Company, and its parents, affiliates, and subsidiaries; (ii) the successors and assigns of the Settling Defendant, but only to the extent that the alleged liability of the successor or assign is based on the alleged liability of the Settling Defendant; and (iii) the owners, officers, employees, agents, and contractors of the Settling Defendant, but only to the extent that the alleged liability of the owner, officer, employee, agent, or contractor is based on said person's status as an owner, officer, employee, agent or contractor of the Settling Defendant, or as a result of conduct within the scope of such person's employment or authority.

VIII. RESERVATION OF RIGHTS

14. General Reservation of Rights by the United States and the Commonwealth. The United States and the Commonwealth reserve, and this Consent Decree is without prejudice to, all rights against the Settling Defendant and other Covered Persons (as identified in Paragraph 13) with respect to all matters not expressly included within Paragraphs 11 (Covenants by the United States) and 12 (Covenants by the Commonwealth). Notwithstanding any other provisions of this Consent Decree, the United States and the Commonwealth reserve all rights against the Settling Defendant and other Covered Persons (as identified in Paragraph 13) with respect to:

- a. claims based on a failure by the Settling Defendant to meet a requirement of this Consent Decree;
- b. claims arising from facts or circumstances unrelated to the Release; and
- c. criminal liability.

IX. COVENANTS NOT TO SUE BY SETTLING DEFENDANT

15. Settling Defendant hereby covenants not to sue and agrees not to assert any claim or cause of action against the United States and the Commonwealth, or their employees, representatives or contractors, with respect to the Release, this Consent Decree, any payments made under this Consent Decree, or any restoration projects performed or to be performed by or on behalf of the United States or the Commonwealth under this Consent Decree.

X. EFFECT OF SETTLEMENT/CONTRIBUTION PROTECTION

16. Except as provided in Paragraph 13 (Covered Persons), nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. Except as provided in Paragraph 13 (Covered Persons), each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Release against any person not a Party hereto.

17. The Parties agree, and by entering this Consent Decree this Court finds, that the Settling Defendant and other Covered Persons (as identified in Paragraph 13) are entitled, as of the effective date of this Consent Decree, to protection from contribution actions or claims as provided by Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2), or other applicable law, for "matters addressed" in this Consent Decree. The "matters addressed" in this Consent Decree are Natural Resource Damages.

18. In any subsequent administrative or judicial proceeding initiated by the United States or the Commonwealth pursuant to Section VIII of this Consent Decree, Settling Defendant shall not

assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States or the Commonwealth in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph shall affect the enforceability of the Covenants Not to Sue by the United States and the Commonwealth set forth in Section VII.

XI. PUBLIC NOTICE AND COMMENT

19. The parties to this Consent Decree acknowledge and agree that the final approval by the United States and the Commonwealth and the entry of this Consent Decree is subject to the requirement of public notice and an opportunity for public comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S. C. § 9622(d)(2), and 28 C.F.R. § 50.7.

20. The United States reserves the right to withdraw or withhold consent if comments regarding the Consent Decree disclose additional facts or considerations which indicate that this Consent Decree is inappropriate, improper, or otherwise inadequate.

21. Settling Defendant consents to the entry of this Consent Decree without further notice.

22. The entry of this Consent Decree shall constitute the Court's approval of the terms hereof. However, if for any reason this Court should decline to approve this Consent Decree in the form presented, this agreement is voidable at the sole discretion of any Party, and the terms of this Consent Decree may not be used as evidence in any litigation between the Parties or by any third party.

23. The Parties acknowledge that it may be appropriate for the United States or the Commonwealth to publicize information concerning projects to be performed under this Consent Decree or to afford opportunities for public comment in connection with the selection, planning, and/or implementation of such projects. Settling Defendant waives any objection to such notice or to any restoration project using funds provided under this Consent Decree.

XII. EFFECTIVE DATE AND RETENTION OF JURISDICTION

24. The Effective Date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court. The Court shall retain jurisdiction of this matter for the duration of the performance of the terms and provisions of this Consent Decree for the purpose of implementing and enforcing the terms and conditions of this Consent Decree.

XIII. SIGNATORIES

25. The undersigned representative of each of the Parties to this Consent Decree certifies that he or she is authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such Party to this Consent Decree.

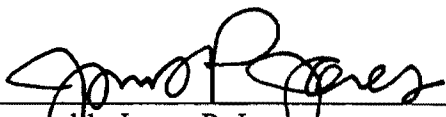
XIV. FINAL JUDGMENT

26. This Consent Decree and its appendices constitute the final, complete, and exclusive understanding among the Parties with respect to the settlement embodied in the Consent Decree. The Parties acknowledge that there are no representations, agreements, or understandings relating to the settlement other than those expressly contained in this Consent Decree.


27. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment between and among the United States, the Commonwealth and the Settling Defendant. The Court finds that there is no reason for delay and therefore enters this

judgment as a final judgment under Fed. R. Civ. P. 54 and 58, with all Parties to bear their own respective costs and attorney's fees incurred through the Effective Date.

SO ORDERED THIS 7th DAY OF April, 2003.



Honorable James P. Jones
United States District Judge


A TRUE COPY. TESTE:
JOHN F. COORCORAN, CLERK
BY: 
DEPUTY CLERK

The Undersigned Parties enter into this Consent Decree in the matter of United States v. Certus, Inc., No. 1:02CV00095 (W.D. Va.).

FOR THE UNITED STATES OF AMERICA

1.22.03


Date



THOMAS L. SANSONETTI
Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice
Washington, D.C. 20530

1-24-03

Date



A. KENT MAYO
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611

JOHN L. BROWNLEE
United States Attorney
Western District of Virginia




JULIE DUDLEY
Assistant United States Attorney
Western District of Virginia
105 Franklin Road, S.W.
Roanoke, VA 24011-2305

The Undersigned Parties enter into this Consent Decree in the matter of United States v. Certus, Inc., No. 1:02CV00095 (W.D. Va.).

FOR THE COMMONWEALTH OF VIRGINIA:


2/12/3
Date


RICK R. LINKER
Assistant Attorney General
Environmental Unit
Office of the Attorney General
900 East Main Street
Richmond, VA 23219

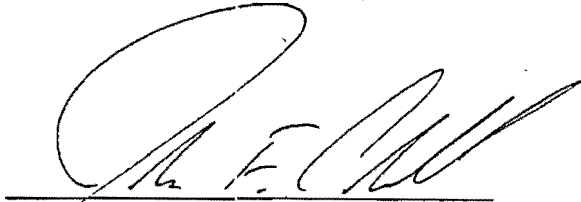
The Undersigned Parties enter into this Consent Decree in the matter of United States v. Certus, Inc., No. 1:02CV00095 (W.D. Va.).

FOR DEFENDANT CERTUS, INC.:

Date: JAN. 9, 2003


Name: Henry S. Polcelli President
Title: President
Address: 10 Janet Circle
N. Grafton, MA 01536

Date: JAN. 10, 2003


Name: JOHN F. CAHILL
Title: ATTORNEY
Address: CARTER LEHMAN + MILBURN
1401 "I" Street, N.W.
Washington DC. 20005
(202) 898-1515

APPENDIX A TO CONSENT DECREE

United States v. Certus, Inc. (W.D. Virginia, Abingdon Division)

Civil Action No. 1:02CV00095



CERTUS CHEMICAL SPILL
NATURAL RESOURCE DAMAGE ASSESSMENT

INITIAL
RESTORATION AND COMPENSATION
DETERMINATION PLAN

Prepared by:
U.S. Fish and Wildlife Service
Region 5
Virginia Field Office
Gloucester, Virginia

April 9, 2002

"Our mission is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

CERTUS CHEMICAL SPILL NRDA INITIAL RESTORATION AND COMPENSATION DETERMINATION PLAN

slow the rate of natural recovery. Also, the Mill Pond at Cedar Bluff acts as a migration barrier to mussels and host fish. Reduced upstream migration of fish and motile stages of mussels can also slow natural recovery. The wastewater treatment plant at Raven (approximately 7.7 miles downstream from where the spill occurred) uses chlorine in its secondary treatment and therefore may act as a chemical barrier to mussel migration from downstream reaches. Natural environmental perturbations such as floods and droughts will also slow natural recovery rates. In essence, the spill area was a mussel refuge in which conditions were favorable for the establishment of a diverse assemblage which was established over an unknown, but conceivably long period of time.

5.3 Alternative 2: Propagation of Federally Endangered Mussel Species

This alternative proposes to restore the federally listed mussel species within the spill zone of the upper Clinch River. The process for propagating listed and non-listed mussels has been developed and refined over the past two decades and is currently at a state where most mussel species can be propagated (O'Beirn *et al.* 1998, Henley *et al.* 2001). The process involves collecting gravid females from the wild, artificially infecting host fish with mussel larvae in the laboratory, and then collecting and holding transformed juvenile mussels. Mussels and host fish are held in the laboratory in recirculating systems for the majority of this process. Juvenile mussels are held in captivity as long as possible to improve the survival rate of the released cohort.

The environmental consequences of propagating freshwater mussels in order to restore populations are decidedly positive. Mussel propagation activities provide several benefits in addition to reestablishing extirpated populations. Propagation and release of mussels help to: 1) increase the re-colonization rates of species into suitable habitat, 2) increase the likelihood of recruitment into currently occupied habitat, 3) increase the chance of species' continued existence in currently occupied river reaches, and 4) stabilize declining populations of non-listed species which in turn may preclude the need for certain Federal listing actions.

Some uncertainty exists in the propagation of rare mussel species. The availability of gravid females may vary year to year. Rare species can be difficult to locate in general. For some species there is only a short window of a few weeks when they become gravid. The search for and availability of gravid females can be further confounded by droughts and floods. Additionally, the relative success rate of mussel releases has not been rigorously assessed. However, propagation is currently being conducted by several agencies/researchers around the country and is generally accepted as a viable solution for species restoration. A wealth of knowledge exists on the life history attributes of the mussel species that inhabit the Clinch River. Source populations and gravidity windows are also known for many species. Furthermore, a diverse community of biologists from university, state, federal, and non-governmental

CERTUS CHEMICAL SPILL NRDA INITIAL RESTORATION AND COMPENSATION DETERMINATION PLAN

organizations are working together to conserve this important natural resource and are available to assist in a variety of ways.

Mussel restoration projects must be monitored during and beyond the propagation phase to document that the mussels reach sexual maturation and to document recruitment—an important indicator of a successful restoration. Monitoring is also needed to ensure that augmented individuals within a population reach ages similar to those lost during the spill. Mortality, recovery, and fitness indicators (growth and fecundity) may also be monitored for each species. Predator control at augmentation sites will also be a necessary restoration component.

Results of the aging study indicate that the weighted average maximum age of the three endangered species injured by the spill is 19 years. The FWS has added 4 years (20%) to this number to account for variables that could inhibit workers' ability to propagate a sufficient number of mussels in a given year. These variables include drought, flood, an inability to find gravid females, and possible loss of cultured organisms (fish and/or mussels) that could be caused by a variety of factors. Therefore, 23 years is considered to be a reasonable estimate of the number of years that propagation must be accomplished in order to return the endangered mussel populations to baseline conditions.

5.4 Alternative 3: Propagation of the Entire Mussel Assemblage within the Spill Zone

This alternative takes into consideration the interdependence that exists between all the mussel species that were killed by the spill and recognizes them as a single mussel assemblage. Several thousand individuals, of at least 13 species of non-listed mussels (including one federal candidate species) were also killed as a result of the August 1998 release. Since both the listed and non-listed species of mussels form an important segment of the ecosystem, this alternative proposes to restore both the listed and non-listed mussel species within the spill zone of the upper Clinch River. Monitoring and predator control efforts will also be required under this alternative.

It is important to replace the extirpated mussel assemblage with one consisting of similar species, size classes, age classes, and genetic make-up because this unique assemblage provides services that cannot be provided by a less diverse assemblage. Older and large mussels produce more offspring and do so over a long period of time. The reproductive output of this segment of the mussel assemblage will have a profound influence on the stability and rate of growth of the mussel community as a whole over time. It is generally accepted that communities that are diverse in terms of interspecific and intraspecific genetic make-up (i.e. genetic variance within and among species) are better buffered against environmental instability thus increasing the probability of the survival of the community (Tillman and Downing 1994, Tillman *et al.* 1996). Mussels also improve the water quality of a stream through their filter feeding activity. Again, it is important to have large mussels within the assemblage as their filtering and water-clarifying

**CERTUS CHEMICAL SPILL NRDA
INITIAL RESTORATION AND COMPENSATION DETERMINATION PLAN**

capacity is concomitantly greater than that of juvenile mussels. Mussel assemblages serve to stabilize river and stream bottoms and add to the general biotic integrity and diversity of the river system. The habitat heterogeneity is thus enhanced by a mussel assemblage of diverse age and size class make-up. The relic shells of the entire mussel assemblage provide important substrate and refugia for mussel host fish eggs and also provide habitat for insect larvae that comprise mussel host fish prey base. By restoring the entire assemblage, non-listed mussels will serve to reduce predation on the endangered mussels. The replaced mussel assemblage will again provide vital aquatic ecosystem functions such as nutrient cycling, the conversion of food resources into forms readily assimilated by other organisms, and long-term storage and release of important elements such as calcium, phosphorous, and nitrogen (Nedeau *et al.* 2000).

5.5 Alternative 4: Propagation of Entire Mussel Assemblage Within the Spill Zone and Off-Site Area(s)

This alternative includes the mussel propagation goals of Alternative 3 and additionally provides for the release of propagated species into predetermined areas outside of the spill zone within the Clinch River watershed. This alternative provides an additional tool for use in ensuring that propagated mussels are replaced into the broader watershed in areas where these species already occur. Increasing the number and location of augmentation areas beyond the footprint of the spill will enable restoration biologists to reduce the risk of losing propagated mussels to potential natural and human perturbations. Pressures on freshwater mussels are varied and diverse. Mussels are generally susceptible to water quality degradation, droughts, flooding events, spill events, agricultural and urban runoff, and natural predation. Alternative 4 provides a hedging strategy that does not put all of the propagated mussels in one "basket." Three other mussel augmentation sites on the Clinch River have been identified in a planning document of the VDGIF (Woodfin 2000).

The trade-off that must be considered under this alternative is that gains in terms of safety/protection by spreading out propagated mussels comes at the price of possibly increasing the time it would likely take for the extirpated mussel cohort to return to its pre-spill size and age structure and to provide baseline ecological services.

5.6 Alternative 5: Combination of Mussel Propagation, Mussel Translocation, Habitat Protection, and Community Outreach

This alternative seeks to combine certain habitat protection and community outreach goals with some of the mussel propagation goals of Alternative 3. Translocation of some non-listed mussel species is considered here as an option to facilitate mussel assemblage restoration.

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5.6.1 Mussel Translocation Component

Adults of several species of non-listed mussels may be opportunistically translocated from other areas within the Clinch River to the spill area to facilitate restoration of the mussel assemblage. Mussel translocation by itself is not considered to be a viable option for mussel restoration as it does not produce a net gain in mussels in the river. However, translocation of some non-listed mussel species could potentially enhance the rate at which mussel restoration takes place by setting up conditions that are supportive of a stable mussel assemblage (see Section 4.4). Several issues must be considered in a restoration plan before any mussel translocation could take place. Surveys would be required to identify appropriate source populations. These surveys must include baseline information such as size/age structure and sex ratios to assess possible impacts of removing adult mussels (Pinder 2002). Some work may be required to address concerns about the genetic relatedness, or lack thereof, of certain source populations and mussel populations within the Upper Clinch watershed. The VDGIF has indicated they will require that mussels removed from one part of the river to restore another must be "back-propagated" so that no net loss of mussels occurs. Mussel translocation projects have met with mixed success (Sheehan *et al.* 1989, Cope and Waller 1995), therefore, a translocation plan would have to be developed that includes protocols for yearly monitoring to detect potential problems and provide assurance that those issues would be rectified. It is likely that several years of translocation efforts would be necessary for each species that meets predetermined criteria for translocation.

5.6.2 Habitat Protection/Restoration Component

The selection of any form of habitat protection and/or agriculture/forest best management practice (BMP) implementation as a viable alternative must be based upon the supposition that mussel restoration is occurring, at some level, within the spill zone on the Clinch River. Implementation of non-point runoff control BMPs within the Clinch River watershed can include specific activities such as erecting livestock exclusion fencing, installing alternative watering sources, planting stream-side buffer vegetation, stabilizing eroding stream banks, and sedimentation control structures.

The spill-impacted area of the Clinch River lies within Tazewell County, Virginia and is encompassed by two separate Hydrologic Units (HU); P02 (Upper Clinch River) and HU P03 (Clinch River/Indian Creek), which are 37,914 and 41,531 square acres in area respectively (Virginia Hydrologic Unit Atlas, 1995³). Habitat protection activities selected under this

³ The Virginia Hydrologic Unit Atlas is a collection of maps which depict the hydrologic unit system of Virginia. The maps, like the atlas itself, are an end-product of the effort by the USDA National Resources Conservation Service (NRCS) and the Commonwealth of Virginia to develop a detailed hydrologic and resource inventory. The Atlas was last revised in November, 1995. Further information can be obtained by contacting the USDA, NRCS office at 1606 Santa Rosa Road, Suite 209, Richmond, VA 23229-5014 or (804) 287-1691.

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alternative would likely take place within one or both of these HUs.

Figure 5.1 Clinch River Hydrologic Units Affected by the Chemical Spill

