GE
159 Plastics Avenue
Pittsfield, MA 01201
USA

December 15, 2006

Mr. Dean Tagliaferro
EPA Project Coordinator
US Environmental Protection Agency
c/o Weston Solutions, Inc.
One Lyman Street
Pittsfield, MA 01201

Re: GE-Piitsfield/Housatonic River Site
Upper ½-Mile Reach of the Housatonic River (GECD800)
Trip Report - Summer 2006 Inspection of Restored Bank Vegetation, Aquatic Habitat Structures, and Armor Stone

Dear Mr. Tagliaferro:

Enclosed is a memorandum providing a report on the Summer 2006 inspection of restored bank vegetation on the banks of the Upper ½-Mile Reach of the Housatonic River, as well as the 2006 inspection of the aquatic habitat structures and the armor stone layer within the Upper ½-Mile Reach of the River.

Please call me with any questions.

Yours truly,

Andrew T. Silfer /dmn

Andrew T. Silfer, P.E.
GE Project Coordinator

TLC/dmn
Attachment

cc: Susan Steenstrup, MDEP
Jane Rothchild, MDEP (without attachments)
Anna Symington, MDEP (without attachments)
Holly Inglis, EPA
Tim Conway, EPA
Rose Howell, EPA
K.C. Mitkevicius, USACE
R. Goff, USACE
Dale Young MA EOEA
Nancy Harper, MA AG (without attachments)
Linda Palmieri, Weston
Mayor James Ruberto, City of Pittsfield
Michael Carroll, GE (without attachments)
Rod McLaren, GE (without attachments)

James Bieke, Goodwin Procter
Mark Gravelding, BBL
Todd Cridge, BBL
Public Information Repositories
GE Internal Repositories

MEMORANDUM

TO: Andrew Silfer, P.E.
General Electric

FM: Charles R. Harman, P.W.S.
AMEC Earth & Environmental

CC: Todd Cridge
Mark Gravelding, P.E.
Blasland, Bouck & Lee, Inc.

SUBJ: Trip Report;
Summer 2006 Monitoring Visit
Upper ½-Mile Reach of the Housatonic River
Pittsfield, Massachusetts

DATE: December 15, 2006

This document reports the results of the summer 2006 Restored Bank Vegetation Inspection of select areas of the Upper ½-Mile Reach of the Housatonic River. This inspection was performed on August 24, 2006 and included planting areas 4B, 6, 7, 8, 8A, 9, 9A, 10, 11, and 11A. Additionally, this document reports the results of the 2006 Aquatic Habitat Enhancement Structures and Armor Storm Layer Inspection, which was performed on August 23, 2006.

As outlined in Section 9.2 of the *Removal Action Work Plan – Upper ½ Mile Reach of Housatonic River* (Work Plan; BBL, 1999), habitat restoration activities were implemented in those areas where bank soils were excavated as part of the Upper ½-Mile Reach Removal Action and in areas that were cleared to allow access for the removal activities.

As part of the habitat restoration process specified in Section 11.6.2 of the Work Plan, GE agreed to monitor the restored areas to ensure the success and biological integrity of the intended vegetative community. For each specific planting area, the monitoring program was required to consist of two visits during each of the first three years after planting (one in the late spring and one in the summer), and an annual visit during the fifth year and seventh year after planting (to be conducted in summer). Complete details of the monitoring program can be found in the Work Plan. The restored bank vegetation inspection conducted on August 24, 2006 constituted the required 5th-year inspection of the vegetation placed in planting areas 4B, 6, 7, 8, 8A, 9, 9A, 10, 11, and 11A. These activities were also intended to constitute the required 3rd-year inspection of the vegetation placed in planting areas 13, 15, and 16; however, as discussed below, these areas were not inspected due to the remedial activities at the Newell Street Area II parking lot.

In addition to the vegetative survey, annual monitoring inspections are required for 5 years to visually assess the condition of the aquatic habitat structures that were placed within the Upper

½-Mile Reach of the River and to evaluate the armor stone layer placed within that reach for evidence of erosion. The inspection conducted on August 23, 2006 of the aquatic habitat enhancement structures and armor stone constituted the 4th year of required inspections of these items.

2006 Inspection Results for Aquatic Habitat Enhancement Structures and Armor Stone

On August 23, 2006, an inspection was conducted of the aquatic habitat enhancement structures and armor stone that have been placed in the Upper ½-Mile Reach as part of the remediation and restoration of that reach. Charles Harman of AMEC conducted this inspection on behalf of GE and Michael Chelminski was present on behalf of the Natural Resource Trustees. The following observations were made during this visit:

1. At the time of inspection, water in the channel was at a seasonably low level allowing for observation of the aquatic habitat structures. As recorded by the United States Geological Survey (USGS) flow gauge located in Coltsville, MA (USGS 0119700 East Branch Housatonic River), flow in the river on August 23, 2006 was approximately 38 cubic feet per second.

2. In general, those aquatic habitat enhancement structures that were visible appeared to be providing good cover and habitat. These structures appeared to be structurally stable, creating variations in water velocity and flow patterns, as evidenced by the presence of scour and depositional areas in the sediment surrounding the structures. The development of these variations in sediment elevation and the creation of flow changes in the water column appear to be providing good habitat for fish and aquatic invertebrates.

3. There did not appear to be any evidence of erosion of the armor stone layer.

Photographs and notes regarding the condition of the aquatic habitat enhancement structures and armor stone layer are presented in Attachment A.

2006 Inspection Results for Restored Bank Vegetation

On August 24, 2006, an inspection was conducted of the restored vegetation on the banks of the Upper ½-Mile Reach. Charles Harman of AMEC conducted the vegetative inspection on behalf of GE and Todd Chadwell of Woodlot Alternatives was present on behalf of the Natural Resource Trustees. Chris Frank of C. L. Frank & Associates accompanied the streambank monitoring party as the certified arborist. A description of the 2006 monitoring visit and the observations made during this visit is presented below:

1. In accordance with the monitoring schedule, planting areas 4B, 6, 7, 8, 8A, 9, 9A, 10, 11 and 11A were quantitatively monitored during this event. Note that as proposed in the 2005 Annual Monitoring Report, 2006 was the first year that a modified monitoring program has been employed in assessing the success of individual

planting areas. As fully described in the 2005 Annual Monitoring Report, the modified program includes the use of smaller sub-plots in specific planting areas to allow for a more focused assessment of representative portions of selected planting areas. During the 2006 monitoring visit, such sub-plots were used in planting areas 4B and 10 for the assessment of canopy, understory, herbaceous groundcover, and invasive species performance standards.

2. As discussed in the 2005 Annual Monitoring Report, planting areas 13, 15, and 16 were scheduled to be reinspected in 2006, as previous inspections were impacted by, or could not be performed because of, remedial activities in the Newell Street Area II parking lot. At the time of inspection, restoration activities in these planting areas had not been fully completed and/or planted species had not yet had time for full establishment. As such, the inspection of these areas was not performed. These areas will be reexamined in 2007.

3. The weather during the monitoring visit was clear and warm, with the temperature at approximately 70° F at the beginning of the inspection. Similar to the inspections in 2004 and 2005, water levels in the river were generally below the red-osier band.

4. Planting area 4B was visited for the first time since August 2004. This area showed significant vegetative growth for all vegetative components of the restoration. Though growth was excellent, the understory species did not meet the performance standard, with a variation of 13 shrubs less than the standard. (The corrective action for this variation is discussed below.) All other components of the vegetative community (e.g. canopy, red-osier dogwood, herbaceous coverage, and invasive species) met their performance standards.

5. Planting area 10 was also visited for the first time since August 2004. This area met the performance standard for canopy species, though it did not meet the performance standard for understory specimens, with a variation of 1 shrub less than the standard. (The corrective action for this variation is discussed below.) All other components of the vegetative community (e.g. herbaceous coverage and invasive species) met their performance standards.

6. Planting areas 6, 6A, 7 and 8A were visited for the first time since August 2004. These areas met the performance standard for canopy specimens. No understory patches were planted in these areas. All other components of the vegetative community (e.g. red-osier dogwood, herbaceous coverage, and invasive species) met their performance standards.

7. Planting areas 8, 9, 9A, 11, 11A were also visited for the first time since August 2004. These areas met the performance criteria for canopy and for red-osier dogwood. However, the understory species were below the performance standard, with a variation of 24 shrubs less than the standard. It appears that the recent Newell Street Area II parking lot construction resulted in a narrowing of the riparian area and a corresponding loss of a portion of the shrub patch. (The corrective action for this

variation is discussed below.) While a grape vine patch was initially planned for planting area 9A in the fall of 2005, it was not planted due to lack of available stock. However, a sufficient number of wild grapes have colonized across this combination of planting areas to meet the performance standard. All other components of the vegetative community (e.g. herbaceous coverage and invasive species) met their performance standards.

8. Protective screens were placed around the canopy specimens in the fall of 2001. These screens continue to provide good protection from herbivorous animals.

9. Invasive control activities are still ongoing and are being performed along the banks of the entire Upper ½-Mile Reach.

The specific results of the monitoring visit are presented in the attached tables. Photographs of the vegetative communities observed during the monitoring visit can be found in Attachment B.

The next monitoring visit is scheduled for August 2007. Planting areas to be monitored include 1, 2, 3, 4A, 5, 12, 13, 14, 15, 16, and 17. In accordance with the monitoring schedule, the August 2007 monitoring visit will be the last planned monitoring visit for planting areas 1, 2, 3, 4A, and 5.

CORRECTIVE ACTIONS

The results of the monitoring visit indicated that there were three planting areas that did not meet the performance standards with respect to shrub specimens. As such, corrective actions were required to bring up the plant numbers. As discussed above and summarized in the table below, planting area 4B was missing 13 shrub specimens; planting area 10 was missing 1 shrub; and combined planting areas 8, 9, 9A, 11, 11A were missing 24 shrubs.

To meet the performance standards, the following numbers of shrubs were installed by C. L. Frank and Associates on November 14, 2006:

Planting Area	Replacement Number
4B	13 shrub specimens
10	1 shrub specimen
8, 9, 9A, 11, 11A	24 shrub specimens

All such plantings were performed in accordance with the practices set forth in the Work Plan. The shrub plantings were divided equally between the four shrub species used on-site – specifically, northern arrowwood (*Viburnum dentatum*), silky dogwood (*Cornus amomum*), winterberry (*Ilex verticillata*), and choke-cherry (*Prunus virginiana*), depending upon species availability.

TABLE 1
CANOPY MONITORING RESULTS

SUMMER 2006 RESTORED BANK VEGETATION INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Date	Area	Date Planted	Quantity Required	Target Performance Standard	Monitoring Count - Live Specimens			Dead	Variance
					Non-stressed	Stressed	Total		
8/24/2006	4B[1]	June 01	256	205	295	0	295	0	+90
	10[2]	Oct 01	126	101	126	0	126	0	+25
	6, 6A, 7, 8A	June/Oct 01	113	90	91	0	91	0	+1
	8, 9, 9A, 11, 11A	Oct 01	95	76	85	2	85	0	+9

[1] – Monitoring was conducted using the modifications to the protocol and was based on sampling of three monitoring plots; Monitoring plots accounted for 22% of Area 4B.
[2] – Monitoring was conducted using the modifications to the protocol and was based on sampling of three monitoring plots; Monitoring plots accounted for 27% of Area 10.

TABLE 2
UNDERSTORY MONITORING RESULTS

SUMMER 2006 RESTORED BANK VEGETATION INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Date	Area	Date Planted	Quantity Required	Target Performance Standard	Monitoring Count - Live Specimens			Dead	Variance
					Non-stressed	Stressed	Total		
8/24/2006	4B[1]	June 01	219	175	162	0	162	0	-13
	10[2]	Oct 01	73	58	57	0	57	0	-1
	6, 6A, 7, 8A	June/Oct 01	--	--	--	--	--	--	--
	8, 9, 9A, 11, 11A	Oct 01	73	58	34	0	34	0	-24

[1] – Monitoring was conducted using the modifications to the protocol and was based on sampling of three monitoring plots; Monitoring plots accounted for 22% of Area 4B.
[2] – Monitoring was conducted using the modifications to the protocol and was based on sampling of three monitoring plots; Monitoring plots accounted for 27% of Area 10 and 50% of the shrub plot.

TABLE 3
RED-OSIER DOGWOOD MONITORING RESULTS

SUMMER 2006 RESTORED BANK VEGETATION INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Date	Area	Date Planted	Quantity Required	Target Performance Standard	Monitoring Count		Comments
					Gaps in Dogwood Line, Missing Plants	Meets target performance standard, <4 foot on center	
8/24/2006	4B	June 01	134	107	---	None missing	Meets performance standard
	10	Oct 01	---	---	---	--	---
	6, 6A, 7, 8A	June/Oct 01	89	71	---	None missing	Meets performance standard
	8, 9, 9A, 11, 11A	Oct 01	82	66	---	None missing	Meets performance standard

TABLE 4
GRAPEVINE MONITORING RESULTS

SUMMER 2005 RESTORED BANK VEGETATION INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Date	Area	Date Planted	Quantity Required	Target Performance Standard	Monitoring Count - Live Specimens			Dead	Wild Grapes or Grape Patches	Comments
					Non-stressed	Stressed	Total Vines			
8/24/2006	4B	June 01	22	18	10	0	10	0	40+	The number of planted grapes plus the number of individual native grape plants noted in this planting area meet the performance criteria.
	8, 9, 9A, 11, 11A	--	22	18	0	0	0	0	40+	The number of individual native grape plants noted in this planting area meet the performance criteria, without the aid of supplemental planting.

Notes on Herbaceous Coverage Surveys:

a. Due to limitations in stock, area 9A has not been planted with grape vine as scheduled. However, based on comments made by the trustees on the 2003, Upper ½ Mile Monitoring Results Report, this area will be monitored for natural regeneration of grape vines.

TABLE 5
HERBACEOUS GROUNDCOVER MONITORING RESULTS

SUMMER 2006 RESTORED BANK VEGETATION INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Date	Area	Date Planted	Target Performance Standard (Cover)	General Monitoring Results (Total Percent Herbaceous Coverage)	Meets Performance Standard (Yes/No)	Comments
8/24/ 2006	4B[1]	June 01	100%	Plot 1 ~100% coverage Plot 2 ~100% coverage Plot 3 ~100% coverage	Yes	Herbaceous cover has closed in, except to a minor extent under canopy specimens (which is allowed under Monitoring Plan). Meets performance standard. No areas outside of the monitoring plots were missing herbaceous cover
	10[2]	Oct 01	100%	Plot 1 ~100% coverage Plot 2 ~100% coverage	Yes	Herbaceous cover has closed in, except to a minor extent under canopy specimens (which is allowed under Monitoring Plan). Meets performance standard. No areas outside of the monitoring plots were missing herbaceous cover
	6, 6A, 7, 8A	June/ Oct 01	100%	First 100' ~90% coverage Second 100' ~95% coverage Third 100' ~95% coverage	Yes	Herbaceous cover has closed in, except to a minor extent under canopy specimens (which is allowed under Monitoring Plan). Meets performance standard.
	8, 9, 9A, 11, 11A	Oct 01	100%	First 100' ~95% coverage Second 100' ~90% coverage Third 100' ~95% coverage Fourth 100' ~95% coverage	Yes	Herbaceous cover has closed in, except to a minor extent under canopy specimens (which is allowed under Monitoring Plan). Meets performance standard.

[1] – Monitoring was conducted using the modifications to the protocol and was based on sampling of three monitoring plots; Monitoring plots accounted for 22% of Area 4B.
[2] – Monitoring was conducted using the modifications to the protocol and was based on sampling of three monitoring plots; Monitoring plots accounted for 27% of Area 10.

TABLE 6
INVASIVE SPECIES MONITORING RESULTS

SUMMER 2006 RESTORED BANK VEGETATION INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Date	Area	Date Planted	Target Performance Standard (Invasive Species)	Monitoring Results (Percent Invasive Species)	Meets Performance Objectives (Yes/No)	Primary Observed Invasive Species
8/24/2006	4B[1]	June 01	< 5%	Plot 1 <5% Plot 2 <5% Plot 3 <5%	Yes	Purple loosestrife; no significant invasive species presence outside of the monitoring plots
	10[2]	Oct 01	< 5%	Plot 1 <5% Plot 2 <5%	Yes	Purple loosestrife; no significant invasive species presence outside of the monitoring plots
	6, 6A, 7, 8A	June/ Oct 01	< 5%	First 100' <5% Second 100' <5% Third 100' <5%	Yes	Purple loosestrife, bittersweet
	8, 9, 9A, 11, 11A	Oct 01	< 5%	First 100' <5% Second 100' <5% Third 100' <5%	Yes	Purple loosestrife, bittersweet

[1] – Monitoring was conducted using the modifications to the protocol and was based on sampling of three monitoring plots; Monitoring plots accounted for 22% of Area 4B.
[2] – Monitoring was conducted using the modifications to the protocol and was based on sampling of three monitoring plots; Monitoring plots accounted for 27% of Area 10.

ATTACHMENT A
AQUATIC STRUCTURES/ARMOR STONE MONITORING DATA SHEETS

2006 AQUATIC HABITAT ENHANCEMENT STRUCTURE INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Monitoring Date: 8/23/2006

Persons Conducting the Monitoring: Chuck Harman (AMEC) and Mike Chelminski (Woodlot Alternatives)

Daily Stream Flow at Time of Monitoring (Based on USGS Station Coltsville, MA): 38 cfs

General River Stage/Depth Observations: River stage appears to be seasonably low; the majority of the habitat structures were exposed for observation

General Weather Observations: Skies were clear with temps in the 80's

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
B	1. Single wing deflector	 1. Structures appear stable. 2. Structure induced variations in flow patterns observed in areas immediately downstream of the deflector. 3. Numerous benthic invertebrates were observed on stone pulled up from around the deflector.

ATTACHMENT A
AQUATIC STRUCTURES/ARMOR STONE MONITORING DATA SHEETS

2006 AQUATIC HABITAT ENHANCEMENT STRUCTURE INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
C	1. Boulders 2. Island	  1. Structures appear stable. 2. Structure induced variations in flow patterns observed in areas immediately downstream of the island. 3. The island appears well vegetated with wetland herbaceous species and cottonwood seedlings. 4. Boulders near island appear to be creating scour holes in the immediate area; good cover.

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GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
D	1. Boulders	 1. Structures were functional and appear to be providing variation in habitat. 2. Numerous benthic invertebrates observed on stone pulled up in the area.
G1	1. Boulder Cluster	 1. Structures were functional and appear to be providing variation in habitat. 2. Numerous benthic invertebrates observed on stone pulled up in the area.

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UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
G2/F2	1. W-weir	  1. Much of the weir appears to be buried in soft silt/sand; above-grade portion of structure appears to offer good cover for aquatic organisms

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GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
G3	1. Three-boulder cluster	1. Structure appeared stable. 2. Structure was functional and appears to be providing variation in habitat.

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2006 AQUATIC HABITAT ENHANCEMENT STRUCTURE INSPECTION
UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
F3	1. Three-boulder cluster 2. Two-boulder cluster 3. Three-boulder cluster	  1. All structures in this cell appear stable. 2. Structures appear to be providing diversity in habitat.

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UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
H1	1. Boulder cluster	1. Structure is stable and appears to be providing diversity in habitat. 2. Structure induced variations in velocity and flow patterns appear to be producing variations in stream bottom topography; good habitat.
I1/J1	1. Rock weir	 1. Structure is stable and appears to be providing diversity in habitat. 2. Structure induced variations in velocity and flow patterns appear to be producing variations in stream bottom topography; good habitat.
H2	1. Single boulder	1. Structure is stable and appears to be providing diversity in habitat. 2. Structure induced variations in velocity and flow patterns appear to be producing variations in stream bottom topography; good habitat.

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UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
J1	1. Two-boulder cluster 2. Three-boulder cluster 3. Single-boulder	 1. Structure is stable and appears to be providing diversity in habitat. 2. Structure induced variations in velocity and flow patterns appear to be producing variations in stream bottom topography; good habitat. 3. Boulders observed as being used as perches for feeding birds
J2	1. "J"- boulder formation	 1. Structure is stable and appears to be providing diversity in habitat. 2. Structure induced variations in velocity and flow patterns appear to be producing variations in stream bottom topography; good habitat.

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UPPER ½ MILE REACH OF THE HOUSATONIC RIVER
GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
I3	1. Single-wing deflector	 1. Structure is stable and appears to be providing diversity in habitat. 2. Structure induced variations in velocity and flow patterns appear to be producing variations in stream bottom topography; good habitat.
I3/J3	1. Vortex rock weir	 1. Structure is stable and appears to be providing diversity in habitat. 2. Structure induced variations in velocity and flow patterns appear to be producing variations in stream bottom topography; good habitat.

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GENERAL ELECTRIC CORPORATION – PITTSFIELD, MASSACHUSETTS

Cell	Aquatic Structures	Armor Stone Condition/General Biological Observations
J3	1. Boulder cluster 2. Three-boulder cluster 3. Three-boulder cluster	 1. Structure is stable and appears to be providing diversity in habitat. 2. Structure induced variations in velocity and flow patterns appear to be producing variations in stream bottom topography; good habitat.

Photograph 1: Planting Area 4B

Photograph 2: Planting Area 4B; Note fruit of northern arrowwood

Photograph 3: Planting Area 10

Photograph 4: Planting Area 10

Photograph 5: Planting Area 6, 6A, 7, 8A

Photograph 6: Planting Area 6, 6A, 7, 8A

Photograph 7: Planting Area 8, 9, 9A, 11, 11A

Photograph 8: Planting Area 8, 9, 9A, 11, 11A