Site: Centredale
Break: 3.7
Other: 27807

IDENTIFICATION OF PREFERRED TARGET SPECIES AND THE CONTINGENCY PLAN TO SUPPORT THE HUMAN HEALTH BIOTA CONSUMPTION AND ECOLOGICAL RISK EVALUATIONS

Submitted to

Department of the Army
U.S. Army Corps of Engineers
New England Division

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Delivery Order No. 0059

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SDMS DocID 27807

QUALITY ASSURANCE STATEMENT

Subcontractor: Harding ESE, Inc.

Delivery Order Title: Centredale / Woonasquatucket River

Delivery Order No.: 0059

Description of audit and review activities:

For the Centredale Manor Restoration Site, Harding ESE performed activities to assist in identifying the preferred and alternative biota species to be targeted during field sampling activities in the Woonasquatucket River for the human health and ecological risk evaluations.

Description of outstanding issues or deficiencies which may affect data quality:

None identified.

M J Murphy
Signature of QA Officer

6/8/2001
Date

Subcontractor Project Leader

6/8/2001
Date

1.0 PURPOSE

In accordance with the Workplan (dated March 16, 2001), Harding ESE has completed the biota consumption information task (Task 18) to support human health and ecological risk evaluations for the Centredale Manor Restoration Site (that includes a reach of the Woonasquatucket River) in North Providence, Rhode Island. The specific purpose of this task was to identify species potentially caught and eaten from the River, as well as consumption patterns, populations, locations, and food preparation methods for biota. Harding ESE targeted information for freshwater water bodies in Rhode Island, Connecticut, other New England states.

Information gathered during implementation of Task 18 was used to finalize the three target species for the human health biota consumption and ecological risk assessments and to provide the basis for development of a contingency plan should the preferred target species not be available in the field. The preferred target species and the contingency plan are presented in this report. Much of the specific information collected regarding consumption patterns, populations, angling locations, and food preparation methods will be used in the exposure assessment for the upcoming human health biota consumption risk assessment, but will not be the focus here.

2.0 METHODOLOGY

Identification of species of biota consumed and consumption patterns were based on the most reliable local information. The three primary methods of information gathering for this task included: personal contact to experts at state agencies (focusing on Rhode Island, but also including the other New England states); an internet search; and a library search. All conversations with representatives of local agencies were documented. Information obtained from the internet and library searches was reviewed for relevance. Relevant information was studied and then summarized.

3.0 SUMMARY OF INFORMATION

Information was obtained from a variety of agencies (including U.S. Fish and Wildlife [offices in RI, CT, and NH], RI Division of Fish and Wildlife, USEPA Region I, Audubon Society of Rhode Island, and Rhode Island Department of Health) as well as from university professors and authors, including Dr. Nancy Balcom of the Marine Sciences and Technology Center at the University of Connecticut, Nancy Connelly (Cornell University professor and author), Caroline Carp (Brown University professor), and Ellen S. Ebert (author). The contacted individuals provided information about fish species likely to be present in the Woonasquatucket River and those that we may want to consider as target species for the human health and ecological risk evaluations. Phone contacts provided little information regarding potential consumption patterns, angling populations, and food preparation methods associated with biota that may be caught and consumed from the Woonasquatucket River area. See Table 1 for a summary of the species information obtained.

Harding ESE conducted internet and library searches to help identify consumption patterns, species caught and eaten, potentially exposed populations, angling locations, and food preparation methods for biota in the Woonasquatucket River. None of the reports or studies obtained were specific to the Woonasquatucket River, but all those studied and summarized were based on similar waterbodies in the

New England area believed to be reasonable representatives of the Woonasquatucket River. Table 1 provides a summary of pertinent biota consumption information obtained from the literature.

4.0 IDENTIFICATION OF PREFERRED TARGET SPECIES AND THE CONTINGENCY PLAN

The species information obtained from contacts and literature was used to finalize the three preferred target species for the human health and ecological risk assessments for the Centredale Site and to provide the basis for development of a contingency plan should the preferred target species not be available in the field. The specific species collected for tissue analysis to support the human health and ecological risk assessments were based on human consumption patterns, potential availability of species in the collection areas, and the need to represent different trophic levels in the ecological risk assessment. Analytical results for these three species will be used to estimate exposures in both the human health and ecological risk assessments.

The objectives of the ecological risk assessment require representatives of both piscivorous (i.e., feeds on other fish) and demersal (bottom-feeding) categories be included in the sampling program. The target predatory fish species was identified as largemouth bass. The target demersal species was identified as white sucker. A hierarchical order of preferred species for each of these categories is as follows:

Piscivorous/Predatory	Demersal
largemouth bass	**white sucker**
smallmouth bass	brown bullhead
yellow perch	common carp
white perch	white catfish
bluegill sunfish	yellow bullhead
pumpkinseed sunfish	

The third target species, focused on meeting requirements for the human health biota consumption assessment, is the American eel, with the snapping turtle as the potential alternate species.

The "preferred" species will be targeted during field activities. When field activities are implemented, if the target species are not sufficiently available, identified "alternative" species will be selected based on the actual availability of species observed in the river. The contingency plan will be implemented in the field during the fish survey/collection activities to adjust one or more of the target species if one or more of the target species are not present in sufficient quantity in the collection areas. For purposes of the upcoming biota sampling efforts in the Allendale and Lymansville reaches, the preferred target species and contingency plan for each three groups are shown conceptually in Figures 1 through 3.

LITERATURE REFERENCES

Balcom, Nancy, Constance Capacchione, and Diane Wright Hirsch, 1999. Quantification of Fish and Seafood Consumption Rates for Connecticut. January 22.

Barry, T.A., C.M. Capacchione, H. Hsu, J. Vu. 1993. Subsistence Fishing in Connecticut. The Impact on Southeast Asians. Yale University School of Medicine; Dept. of Epidemiology & Public Health. May.

Connelly, N.A., B.A. Knuth, and T.L. Brown, 1996. Sportfish Consumption Patterns of Lake Ontario Anglers and the Relationship to Health Advisories. North American Journal of Fisheries Management, Volume 16.

Ebert, Ellen S. 1991. Creel Survey for the West Branch of the Penobscot River. November 22.

Ebert, E.S., N.W. Harrington, K.J. Boyle, J.W. Knight, R.E. Keenan. 1993. Estimating Consumption of Freshwater Fish among Maine Anglers. North American Journal of Fisheries Management.

Ebert, E.S., P.S. Price, R.E. Keenan, 1994. Selection of Fish Consumption Estimates for Use in the Regulatory Process. Journal of Exposure Analysis and Environmental Epidemiology, Vol. 4, No. 3.

Ebert, E.S., 1996. Fish Consumption and Human Health: Developing Partnerships Between Risk Assessors and Resource Managers. American Fisheries Society Symposium 16.

Ebert, E.S., S.H. Su, T.J. Barry, M.N. Gray, N.W. Harrington, 1996. Estimated Rates of Fish Consumption By Anglers Participating in the Connecticut Housatonic River Creel Survey. North American Journal of Fisheries Management, Volume 16.

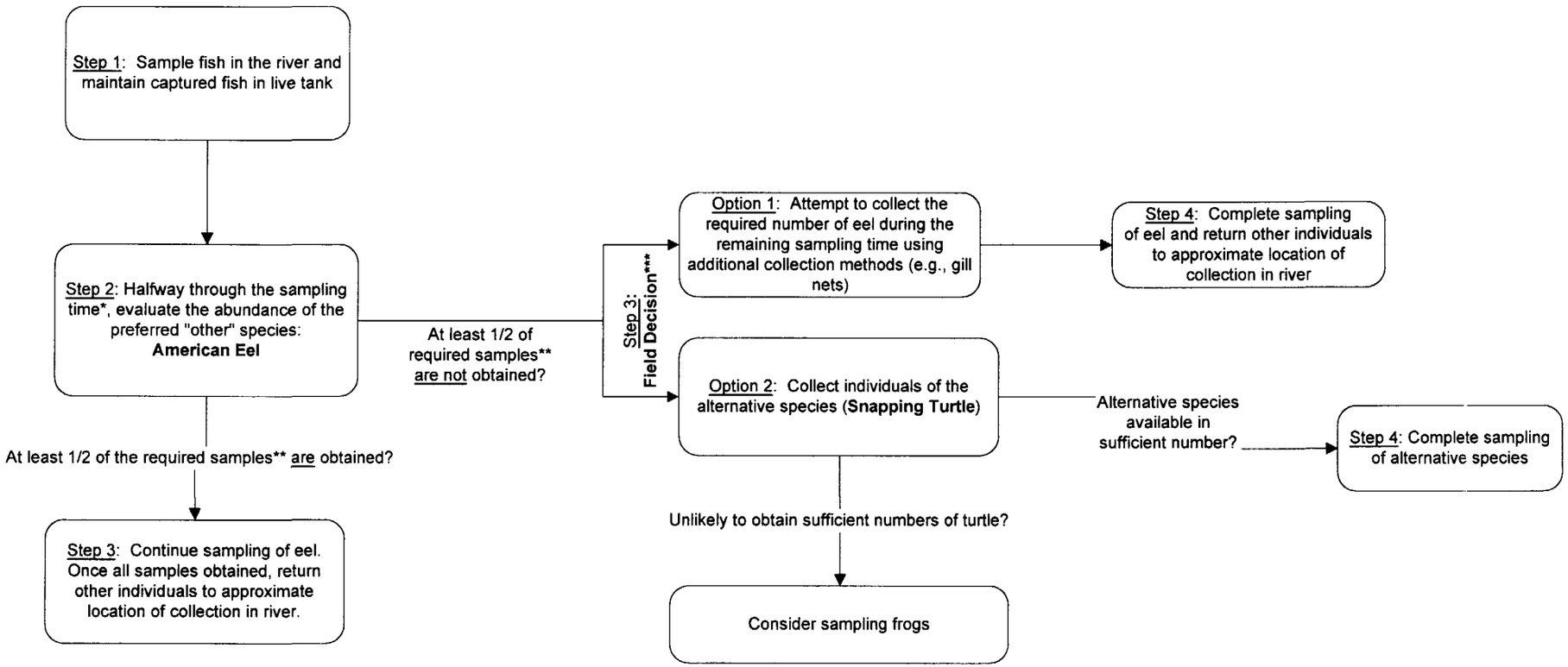
Lee, Siemay, 1995. Are Turner Reservoir Fish Safe to Eat? A Risk Assessment of Rhode Island Southeast Asian American Fishers (thesis).

FIGURE 3

PREFERRED TARGET SPECIES AND CONTINGENCY PLAN: OTHER SPECIES
In Support of the Biota Sampling Effort for the Human and Ecological Risk Assessments

Centredale Manor Restoration Project Site
North Providence, Rhode Island

Onset of Fish Sampling at Allendale or Lymansville Reach:



* For Allendale, Lymansville, Assapumpsett, and Greystone Mill Pond, sampling time for each is **2 days**; for Manton and Dyerville, sampling time is **1 day**.

** For Allendale, Lymansville, Assapumpsett, and Greystone Mill Pond, 10 samples (where sample = 120 grams tissue) are required.
For Manton and Dyerville combined, 3 samples (where sample = 120 grams tissue) are required.

The minimum size limit for American eel is six inches (measured from the tip of the snout to the end of the tail).

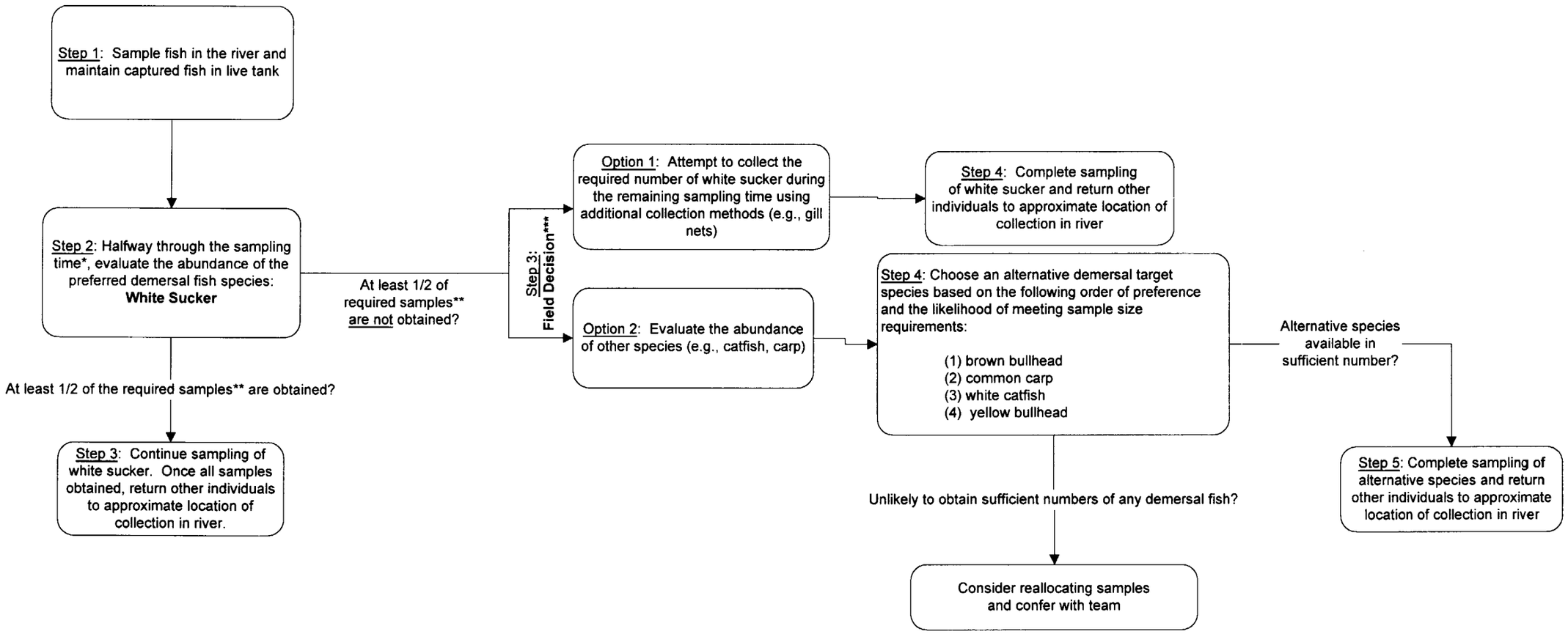
*** Field decision will be based on recommendations of subcontractor and consultation with project team members.

FIGURE 2

PREFERRED TARGET SPECIES AND CONTINGENCY PLAN: DEMERSAL FISH SPECIES
In Support of the Biota Sampling Effort for the Human and Ecological Risk Assessments

Centredale Manor Restoration Project Site
North Providence, Rhode Island

Onset of Fish Sampling at Allendale or Lymansville Reach:



* For Allendale, Lymansville, Assapumpsett, and Greystone Mill Pond, sampling time for each is **2 days**; for Manton and Dyerville, sampling time is **1 day**.

** For Allendale, Lymansville, Assapumpsett, and Greystone Mill Pond, 10 samples (where sample = 120 grams tissue) are required.
For Manton and Dyerville combined, 3 samples (where sample = 120 grams tissue) are required.
The minimum size limits for the target and alternative demersal species listed above are not provided in Rhode Island Fishing Regulations (RIDEM, 2000).

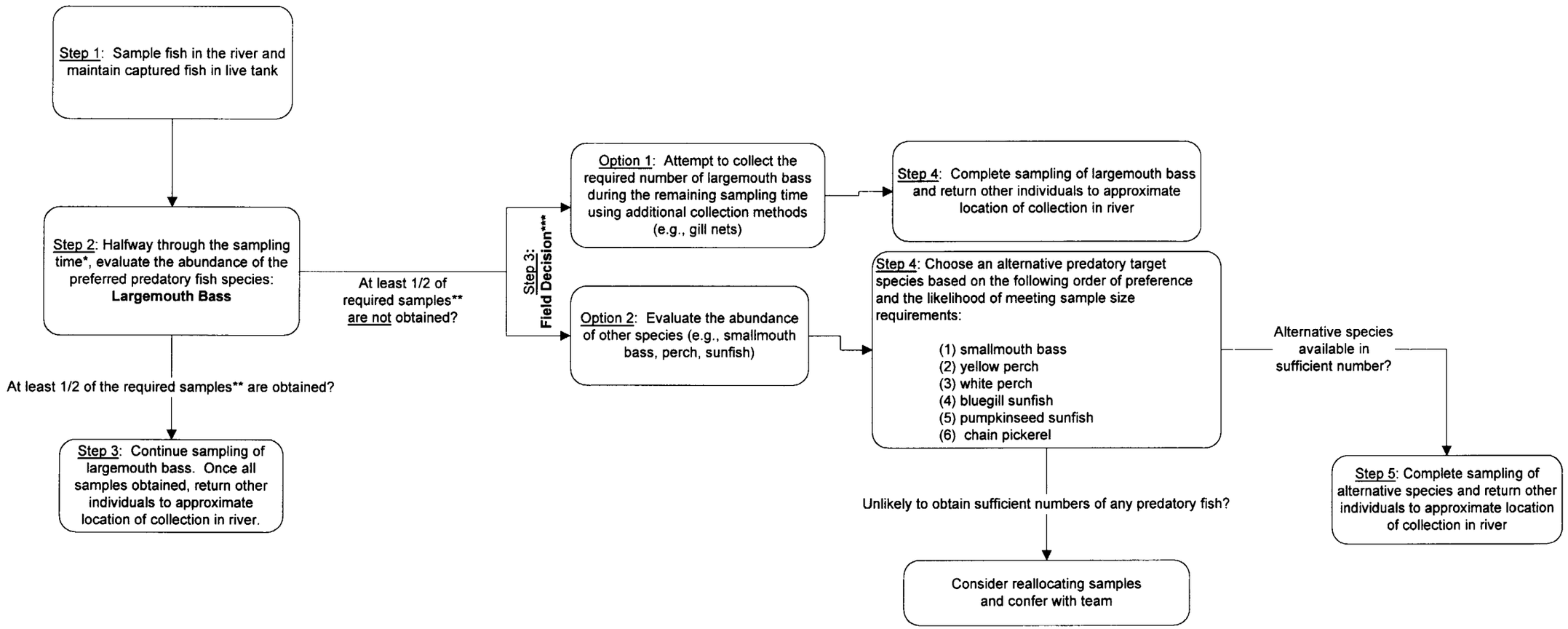
*** Field decision will be based on recommendations of subcontractor and consultation with project team members.

FIGURE 1

PREFERRED TARGET SPECIES AND CONTINGENCY PLAN: PREDATORY FISH SPECIES
In Support of the Biota Sampling Effort for the Human and Ecological Risk Assessments

Centredale Manor Restoration Project Site
North Providence, Rhode Island

Onset of Fish Sampling at Allendale or Lymansville Reach:



* For Allendale, Lymansville, Assapumpsett, and Greystone Mill Pond, sampling time for each is **2 days**; for Manton and Dyerville, sampling time is **1 day**.

** For Allendale, Lymansville, Assapumpsett, and Greystone Mill Pond, 10 samples (where sample = 120 grams tissue) are required.
For Manton and Dyerville combined, 3 samples (where sample = 120 grams tissue) are required.
The minimum size limit for largemouth and smallmouth bass is 12 inches (measured from the tip of the snout to the end of the tail). Limits for the other alternative species are not provided in Rhode Island Fishing Regulations (RIDEM, 2000).

*** Field decision will be based on recommendations of subcontractor and consultation with project team members.

TABLE 1

SUMMARY OF BIOTA CONSUMPTION INFORMATION
In Support of the Biota Sampling Effort for the Human Health and Ecological Risk Evaluations

Centredale Manor Restoration Project Site
North Providence, Rhode Island

					Consumption Patterns					
Source	***Angler Population Focus***	***Key Factors or Assumptions Made by Author(s)***	***Freshwater Species Recommended/ Most Likely Present***	***Freshwater Species Mentioned/ Species to Consider***	***Fish Parts Consumed***	***Frequency of Fishing Trips***	***Consumption Rate Range (g/person-day)***	***Consumption Rate Mean (g/person-day)***	***Consumption Rate Median (g/person-day)***	***Meal Size (g/meal)***
*Telephone Conversations **										
Caroline Carp - Brown University Professor	Sports	-	-	LMB, WP, YP	-	-	-	-	-	-
Alan Libby - RI Division of Fish and Wildlife	-	-	BB, CP, LMB	SF, WP, YP, YB, WC	-	-	-	-	-	-
Peter Angelone - Lafayette Fish Hatchery	-	-	BB, CC, LMB, YP, WP	-	-	-	-	-	-	-
Robert Vanderslice - RI Department of Health	-	-	LMB, SF, AE	Turtle	-	-	-	-	-	-
Eugenia Marks - Audubon Society of RI	-	-	AE, SF, WS, bass, pickerel, perch	Turtle	-	-	-	-	-	-
Alfred Basile - USEPA Region I	-	-	LMB, BB	SMB, CP, YP, WS, CC, AE	-	-	-	-	-	-
Drew Major - USFWS NE Field Office (NH)	-	-	WS, LMB, YP	CC	-	-	-	-	-	-
Ken Munney - USFWS NE Field Office (NH)	-	-	BB, CP, LMB, SF	WS, FF	-	-	-	-	-	-
Literature										
Siemay Lee, 1995	Subsistence (SEAA)	(1) Saltwater fish consumption rates similar to that of freshwater fish. (2) Most sport anglers do not consume their catch; subsistence anglers regularly consume their catch. (3) Cooking does not change the amount of contaminant ingested. (4) Anglers consume the same amount of fish all year round.	LMB, WP	CP, BB, SF	Flesh: all SEAA anglers Skin: 50% of Cambodian; 100% of Hmong; 60% of Laotian Organs: 20% of Cambodian and Laotian	-	Cambodian: 2.03 - 340.8 Hmong: 30.3 - 113 Laotian: 6.09 - 24.3	-	-	-
Balcom et al., 1999	9 populations assessed (incl. sport, commercial, minorities, SEAA)	(1) Focus on marine sport fishing. (2) Assumed 40% of the fish is edible meat (i.e., the fillet). (3) Cooking changes the amount of contaminant ingested. (4) 1/3 of fish/seafood meals consumed by each population were "caught".	LMB, SMB, carp, catfish, AE, WP, YP, SF	bullhead, pickerel, WS	Too much info to present here. This information is provided for the 9 populations and for 10 freshwater species.	The majority of individuals fish between 1 and 12 times per year (for freshwater and saltwater species)	Too much info to present here. This information is provided for the 9 populations and for 16 freshwater species.	Too much info to present here. This information is provided for the 9 populations and for 16 freshwater species.	-	Presented as the total for all seafood consumed (caught & bought, saltwater & freshwater)
E.S. Ebert, 1991	Sports	(1) No distinction made between adult and child consumption rates. (2) Success rate is constant for individual anglers. (3) Anglers consume the same amount of fish all year round. (4) Fishing trips taken before time of interview would continue throughout season. (5) Whole body is not consumed; edible portion was determined.	bass, perch, pickerel	-	Only "edible" portion consumed.	0.05 - 6 trips/wk	0.013 - 98	3.0 for combined reaches	0.49 for combined reaches	-
Barry et al., 1993	Subsistence (SEAA)	(1) Whole body fish consumed.	-	-	SEAAs eat eyes, skin, and organs in addition to fillets.	-	-	-	-	-
Ebert et al., 1993	Sports	(1) Edible portion of finfish = 30% (USEPA, 1989). (2) Consumption rates vary depending on how fish were shared.	-	YP, WP, BB, WS	Only "edible" portion consumed.	-	-	a) all household members share: 3.7 b) adults only share: 4.5 c) angler only consumes: 8.9	a) all household members share: 0.99 b) adults only share: 1.2 c) angler only consumes: 2.5	-
Ebert et al., 1994	Sports	(1) Estimates of water-body specific consumption from other similar waterbodies may be used as a reasonable representative of another waterbody.	-	-	-	Soldat 1970: 4.7 trips/yr & 0.7 meals/trip Honstead 1971: 14 meals/yr Turcotte 1983: no info	Soldat 1970: no info Honstead 1971: no info Turcotte 1983: no info	Soldat 1970: 1.8 Honstead 1971: 19 (if not shared); 7.7 (shared among 2.5 people) Turcotte 1983: 7.4	Soldat 1970: no info Honstead 1971: no info Turcotte 1983: no info	Soldat 1970: 202 Honstead 1971: 200 Turcotte 1983: no info
Ebert et al., 1996	Sports	(1) Assumed 40% of the fish is edible meat (i.e., the fillet). (2) Preparation method changes the amount of contaminant ingested; however, some chemicals are unaffected by cooking.	carp and suckers (known to accumulate high levels of contaminants)	-	Humans typically consume only muscle meat. Certain angler subgroups eat higher portions.	-	-	-	-	-
E.S. Ebert, 1996	Sports	(1) Only anglers living in CT, MA, and NY were included in the population. (2) Assumed that fish were harvested for consumption unless the survey indicated otherwise. (3) Assumed that the edible mass of fish kept by each interviewed angler represented the typical amount consumed by the angler's household every trip. (4) Assumed that 30% of the total mass represents the edible portion of finfish (USEPA, 1989). (5) Assumed household size of 2.59 persons (average CT household size reported in 1990 census).	bass, WP, YP	sunfish, SMB	-	10 trips/yr	-	2.6 (mean) 12 (95%ile) No evidence that any subpopulation consumed more than 100 g/day of caught fish	0.17	Total edible mass = 120 g/trip
Connelly et al., 1996	Sports	(1) Preparation methods (including fish cleaning and cooking) will affect exposure. (2) 26% of fish/seafood meals consumed by each population were "sport-caught".	-	-		-	-	95%ile: 17.9	-	232 (sport-caught)
RI Division of Fish and Wildlife fax	-	-	SF, WS, LMB, AE, TD, GS	-	-	-	-	-	-	-
USEPA, 2000	Sports	-	LMB, WS	SMB, CP, YP, WP, BB, CC	-	-	-	-	-	-

TABLE 1

SUMMARY OF BIOTA CONSUMPTION INFORMATION
In Support of the Biota Sampling Effort for the Human Health and Ecological Risk Evaluations

Centredale Manor Restoration Project Site
North Providence, Rhode Island

					Consumption Patterns					
Source	*Angler Population Focus*	*Key Factors or Assumptions Made by Author(s)*	*Freshwater Species Recommended/ Most Likely Present*	*Freshwater Species Mentioned/ Species to Consider*	*Fish Parts Consumed*	*Frequency of Fishing Trips*	*Consumption Rate Range (g/person-day)*	*Consumption Rate Mean (g/person-day)*	*Consumption Rate Median (g/person-day)*	*Meal Size (g/meal)*

Species:
AE = American eel
BB = brown bullhead
CC = common carp
CP = chain pickerel
FF = fall fish
GS = golden shiner
LMB = largemouth bass
SF = sunfish (bluegill, pumpkinseed)
SMB = smallmouth bass
TD = tessellated darter
WC = white catfish
WP = white perch
WS = white sucker
YB = yellow bullhead
YP = yellow perch

Notes:
* Additional individuals from these and other agencies were contacted, but may not have provided specific information regarding species and consumption patterns. Therefore, they are not listed in the table. The complete list of individuals contacted and summaries of discussions are provided in @.

"SEAA" - Southeast Asian Americans