

# Fountain Darter (*Etheostoma fonticola*) HACCP Plan

(Hazard Analysis and Critical Control Point)

## Uvalde National Fish Hatchery Fountain Darter Refugium

1. Activity Description
2. Potential Hazards
3. Flow Diagram
4. Hazard Analysis Worksheet
5. HACCP Plan Form

### HACCP Step 1 - Activity Description

Facility: Uvalde National Fish Hatchery	Site: Fountain Darter Holding House
Project Coordinator: Ron Twibell	Activity: Threatened & Endangered Species Recovery
Site Manager: Jae Ahn	
Address: 754 County Road 203 Uvalde, TX 78801	
Phone: 830-278-2419	

<p><b>Project Description</b> i.e. Who; What; Where; When; How; Why</p>
<p>Uvalde National Fish Hatchery has the responsibility of maintaining two standing stocks of fountain darters as described by the San Marcos/Comal/Edwards Aquifer Rare, Threatened, and Endangered Species Contingency Plan. All fountain darters will be maintained in two closed recirculating systems constructed in the fountain darter holding house at Uvalde NFH. A total of 100 pair of fountain darters originating from the Comal River will be housed in 20 labeled aquaria of one of the recirculating systems and 100 pair of fountain darters from the San Marcos River will be maintained in 20 labeled aquaria of the remaining recirculating system. The project is ongoing.</p>

## HACCP Step 2 - Identify Potential Hazards

(to be transferred to column 2 of HACCP Step 4 - Hazard Analysis Worksheet)

<b>Hazards: Species Which May Potentially Be Moved/Introduced</b>
<b>Vertebrates:</b> List Species/Types: armored catfishes, mosquito fish, various aquarium fishes, tadpoles
<b>Invertebrates:</b> List Species/Types: crayfish, <i>Melanoides tuberculata</i> , <i>Thiara granifera</i>
<b>Plants:</b> List Species/Types: Hydrilla, Hygrophila, water hyacinth Comments:
<b>Other Biologics</b> (e.g. disease, pathogen, parasite): List Species/Types: various parasites Comments
<b>Others</b> (e.g. construction materials, etc.): List Other Hazards: N/A Comments:

### HACCP Step 3 - Flow Diagram

Flow Diagram Outlining Sequential Tasks to Complete Activity/Project Described in HACCP Step 1 - Activity Description (to be transferred to column 1 of the HACCP Step 4 - Hazard Analysis Worksheet)

<b>Step 1</b>	fountain darters are collected as needed for the San Marcos National Fish Hatchery & Technology Center (SMNFHTC) and Uvalde National Fish Hatchery (UNFH) refugia
<b>Step 2</b>	fountain darters are transported in coolers filled with river water to the SMNFHTC holding house
<b>Step 3</b>	fountain darters are treated for external parasites for one hour then placed in recirculating system
<b>Step 4</b>	Transport coolers, dip nets, and other equipment are inspected and ANS manually removed. All equipment is then disinfected in roccal solution.
<b>Step 5</b>	quarantined fountain darters and tanks are observed for at least two weeks and inspected for signs of disease and ANS, respectively
<b>Step 6</b>	fountain darters are transported in coolers filled with SMNFHTC water to Uvalde NFH fountain darter refugium
<b>Step 7</b>	quarantined fountain darters are observed daily for a minimum of two weeks for signs of disease
<b>Step 8</b>	transport equipment (coolers, dip nets) is disinfected in quaternary ammonium chloride solution

## 4. Hazard Analysis Worksheet

1 Tasks (from HACCP Step 3 - Flow Diagram)	(2) Potential hazards identified in HACCP Step 2	(3) Are any potential hazards probable? (Yes/No)	(4) Justify evaluation for column 3.	(5) What control measures can be applied to prevent undesirable results?	(6) Is this task a critical control point? (Yes/No)
1) fountain darters are collected as needed for SMNFHTC and UNFH	Vertebrates: armored catfishes, mosquito fish, various aquarium- trade fishes, tadpoles	yes	ANS are present in San Marcos and Comal Rivers	manually remove visible ANS from collection at site	yes
	Invertebrates: <i>Melanoïdes tuberculata</i> , <i>Thiara granifera</i> , crayfish, various parasites	yes	ANS are present in San Marcos and Comal Rivers	manually remove visible ANS from collection at site	yes
	Plants: Hydrilla, Hygrophila, water hyacinth	yes	ANS are present in San Marcos and Comal Rivers	manually remove visible ANS from collection at site	yes
	Others: N/A	N/A	N/A	N/A	N/A
2) fountain darters are transported in coolers filled with river water to the SMNFHTC holding house	Vertebrates: armored catfishes, mosquito fish, various aquarium- trade fishes, tadpoles	no	Vertebrates should be easily detected and removed from collection in step 1	ANS control occurs in step 1	no
	Invertebrates: <i>Melanoïdes tuberculata</i> , <i>Thiara granifera</i> , crayfish, various parasites	yes	ANS may be transferred from net into quarantine tank	reinspect collection and remove any visible ANS	no
	Plants: Hydrilla, Hygrophila, water hyacinth	yes	ANS may be transferred from net into quarantine tank	reinspect collection and remove any visible ANS	no
	Others: N/A	N/A	N/A	N/A	N/A

1 Tasks (from HACCP Step 3 - Flow Diagram)	(2) Potential hazards identified in HACCP Step 2	(3) Are any potential hazards probable? (Yes/No)	(4) Justify evaluation for column 3.	(5) What control measures can be applied to prevent undesirable results?	(6) Is this task a critical control point? (Yes/No)
3) fountain darters are treated for external parasites for one hour then placed in recirculating system	Vertebrates: armored catfishes, mosquito fish, various aquarium-trade fishes, tadpoles	no	ANS not present	ANS control completed	no
	Invertebrates: <i>Melanoides tuberculata</i> , <i>Thiara granifera</i> , crayfish, various parasites	yes	ANS may be present in transport coolers	parasite treatment should kill all external and free parasites	yes
	Plant: Hydrilla, Hygrophila, water hyacinth	no	ANS not present	ANS control occurs in step 1	no
	Others: N/A	N/A	N/A	N/A	N/A
4) transport coolers, dip nets, and other equipment are inspected and ANS manually removed. All equipment is then disinfected in roccal solution	Vertebrates: armored catfishes, mosquito fish, various aquarium-trade fishes, tadpoles	yes	ANS may be present in nets and other equipment	roccal dip	yes
	Invertebrates: <i>Melanoides tuberculata</i> , <i>Thiara granifera</i> , crayfish, various parasites	yes	ANS may be present in nets and other equipment	roccal dip	yes
	Plants: Hydrilla, Hygrophila, water hyacinth	yes	ANS may be present in nets and other equipment	roccal dip	yes
	Others: N/A	N/A	N/A	N/A	N/A
5) quarantined fountain darters and tanks are observed for a minimum of two weeks and inspected for signs of disease and ANS, respectively	Vertebrates: armored catfishes, mosquito fish, various aquarium-trade fishes, tadpoles	no	Control of ANS hazard completed	N/A	no
	Invertebrates: <i>Melanoides tuberculata</i> , <i>Thiara granifera</i> , crayfish, various parasites	yes	Pathogenic organisms may be present	Send sample of fish to Pinetop FHC and/or retreat as needed	yes

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	Plants: Hydrilla, Hygrophila, water hyacinth	no	Control of ANS hazard completed	none	no
	Others: N/A	N/A	N/A	N/A	N/A
6) fountain darters are transported in coolers filled with SMNFHTC water to Uvalde NFH fountain darter refugium	Vertebrates: armored catfishes, mosquito fish, various aquarium- trade fishes, tadpoles	no	ANS control complete	none	no
	Invertebrates: <i>Melanoides tuberculata</i> , <i>Thiara granifera</i> , crayfish, various parasites	yes	fish may harbor residual disease organisms	none	no
	Plants: Hydrilla, Hygrophila, water hyacinth	no	ANS control complete	none	no
	Others: N/A	N/A	N/A	N/A	N/A
7) quarantined fountain darters are observed daily for a minimum of two weeks for signs of disease	Vertebrates: armored catfishes, mosquito fish, various aquarium- trade fishes, tadpoles	No	ANS control complete	none	no
	Invertebrates: <i>Melanoides tuberculata</i> , <i>Thiara granifera</i> , crayfish, various parasites	Yes	fish may harbor residual disease organisms	fish are closely observed for signs of disease and fish samples are sent to Pinetop FHC if necessary	yes
	Plants: Hydrilla, Hygrophila, water hyacinth	No	ANS control complete	none	No
	Other: N/A	N/A	N/A	N/A	N/A

1 Tasks (from HACCP Step 3 - Flow Diagram)	(2) Potential hazards identified in HACCP Step 2	(3) Are any potential hazards probable? (Yes/No)	(4) Justify evaluation for column 3.	(5) What control measures can be applied to prevent undesirable results?	(6) Is this task a critical control point? (Yes/No)
8) transport equipment (coolers, dip nets) is disinfected in quaternary ammonium solution	Vertebrates: armored catfishes, mosquito fish, various aquarium- trade fishes, tadpoles	No	ANS control complete	none	no
	Invertebrates: <i>Melanoides tuberculata</i> , <i>Thiara granifera</i> , crayfish, various parasites	Yes	equipment may harbor residual disease organisms and parasites	equipment is disinfected in quaternary ammonium chloride solution	yes
	Plants: Hydrilla, Hygrophila, water hyacinth	No	ANS control complete	none	no
	Others: N/A	N/A	N/A	N/A	No

## HACCP Step 5 - HACCP Plan Form

### Section 1.01 HACCP Plan Form

(all CCP s or yes answers from column 6 of HACCP Step 4 - Hazard Analysis Worksheet)

Critical Control Point (CCP)	Significant Hazard(s)	Article III. Limits for Each Control Measure	Article II. Monitoring				Evaluation & Corrective Actions(s) (if needed)	(9) Records	(10) Verification
			What	How	Frequency	Who			
fountain darters are collected as needed for SMNFHTC and UNFH	Vertebrates, invertebrates plants, pathogenic organisms	inspect nets, waders, and transport coolers for all visible ANS	presence of ANS hazards	visual inspection of equipment	before, during and after use of equipment	hatchery and field personnel	re-inspect equipment and remove any remaining ANS prior to leaving collection site	record control measures on collection data sheets	Hatchery Manager to review records and ensure that control measures are completed
fountain darters are treated for external parasites for one hour then placed in recirculating system	parasites and pathogenic organisms	treat darters in transport coolers with 200 mg/l formalin solution	presence of ANS hazards	formalin treatment	upon returning from field	hatchery personnel	treat with formalin	record control measures on collection data sheet	Hatchery Manager to review records and ensure that control measures are completed

transport coolers, dip nets, and other equipment are inspected and ANS manually removed. All equipment is then disinfected in roccal solution	vertebrates invertebrates plants	manually remove visible ANS hazards and treat equipment with roccal bath	presence of ANS hazards	clean equipment and dip in roccal bath	upon returning from field	hatchery personnel	clean equipment and dip in roccal bath	record control measures on collection data sheets	Hatchery Manager to review records and ensure that control measures are completed
quarantined fountain darters and tanks are observed for a minimum of two weeks	pathogenic organisms and external parasites	quarantine fish for two weeks	presence of ANS hazards	observe quarantined darters for signs of disease	daily for a period of two weeks	hatchery personnel	if signs of disease are observed, send sample of fish to Pinetop FHC for testing and/or retreat fish	record control measures on collection data sheet	Hatchery Manager to review record and ensure control measures are completed
transport equipment (coolers, dip nets) is disinfected in quaternary ammonium chloride solution	pathogenic organisms and external parasites	treat equipment in quaternary ammonium chloride solution	presence of ANS hazards	treat equipment in quaternary ammonium chloride solution	upon arrival at Uvalde NFH	hatchery personnel	additional ammonium chloride solution treatments	record control measures on fountain darter data log	Hatchery Manager to review record and ensure control measures are completed