

# Hazard Analysis Critical Control Point Planning for Juvenile Mitten Crab Monitoring in the Sacramento - San Joaquin Rivers Delta

U.S. Fish and Wildlife Service  
Stockton Fish and Wildlife Office

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## HACCP Step 1 – Activity Description

<b>Activity Description</b>	
Facility: Stockton, FRO	Site: Sacramento - San Joaquin Rivers Delta
Project Coordinator: David Bergendorf	Activity/Management Objective:  -Monitoring age 0+ (juvenile) mitten crab presence in Sacramento - San Joaquin Rivers Delta waterways without acting as a new pathway for the spread of non-native invasive species.
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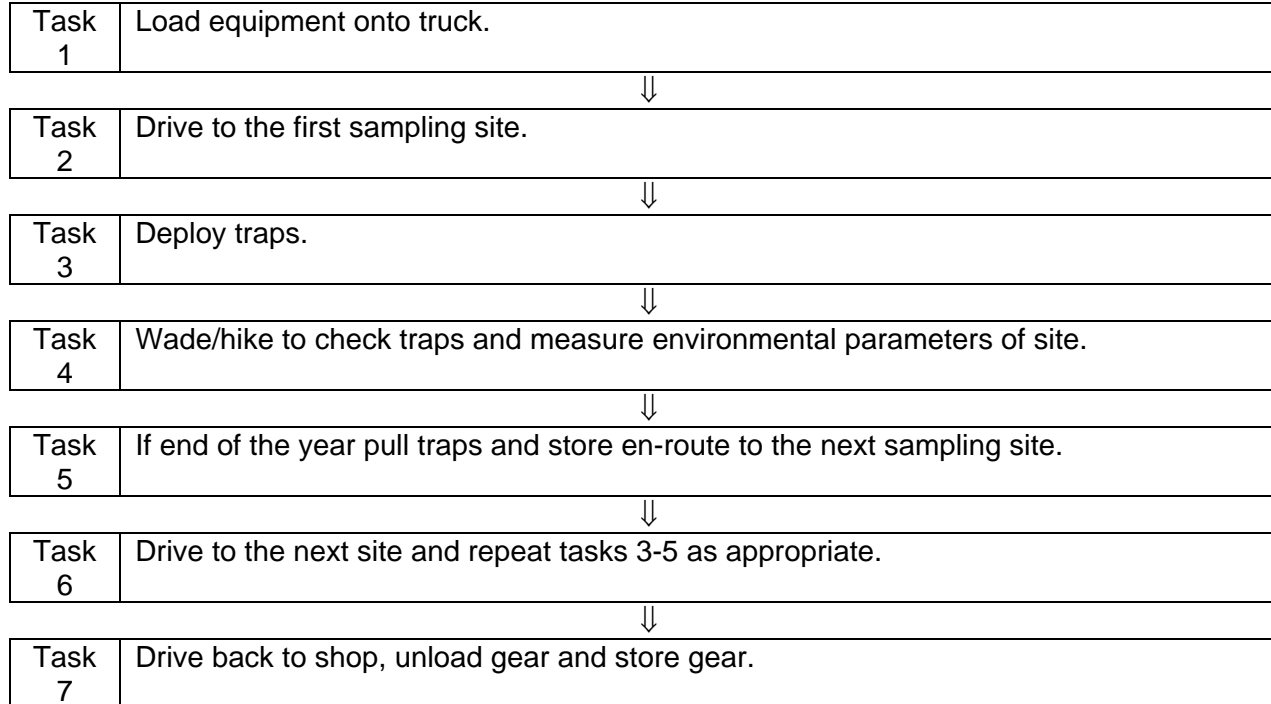
<b>Project Description</b> i.e. Who; What; Where; When; How; Why
<p><b>Who:</b> Aquatic nuisance species program assistant and a field assistant.</p> <p><b>What:</b> Deploying and checking mitten crab traps (crab condos) and measuring local environmental parameters.</p> <p><b>Where:</b> Ten Sacramento River and surrounding tributary sites and Ten San Joaquin River and surrounding tributary sites.</p> <p><b>When:</b> The sampling season extends from April 1 through October 31 each year. During the sampling season; 4 days/month (2 days in the Sacramento portion and 2 days in the San Joaquin portion of the sampling area).</p> <p><b>How:</b> Drive to sites (may involve wading), pull traps out of the water and check for mitten crabs, measure environmental parameters drive to the next site and repeat.</p> <p><b>Why:</b> Juvenile mitten crab presence in the Sacramento - San Joaquin Rivers Delta is a data gap in implementing the National Management Plan for the Genus <i>Eriocheir</i> (Mitten Crabs).</p>

## HACCP Step 2 – Identify Potential Hazards

<b>Hazards: Species or Contaminants Which May Potentially Be Moved/Introduced</b>
<b>Vertebrates:</b> bullfrog tadpoles ( <i>Rana catesbeiana</i> ), catfish (any sp.), bluegill ( <i>Lepomis macrochirus</i> ), gobies (any sp.), sculpin (any sp.), shiners (any sp.), snakes, rodents
<b>Invertebrates:</b> NZMS, mitten crabs ( <i>Eriocheir sinensis</i> ), crayfish (any sp.), Asian clam ( <i>Corbicula fluminea</i> ), aquatic insects (any), glass shrimp ( <i>Palaemonetes kadiakensis</i> ), exotic snails (any), non-native mosquitoes
<b>Plants:</b> <u>Aquatic:</u> mosquito fern ( <i>Azolla sp.</i> ), Elodea ( <i>Egeria densa</i> ), yellow flag iris ( <i>Iris pseudacorus</i> ), scarlet wisteria ( <i>Sesbania punicea</i> ), water hyacinth ( <i>Eichhornia crassipes</i> ), Eurasian watermilfoil ( <i>Myriophyllum spicatum</i> ), parrotfeather ( <i>Myriophyllum aquaticum</i> ), other aquatic plants. <u>Terrestrial:</u> broadleaved pepperweed ( <i>Lepidium latifolium</i> ), giant Arundo ( <i>Arundo donax</i> ), Ludwigia ( <i>Ludwigia grandiflora</i> ) purple loosestrife ( <i>Lythrum salicaria</i> ), yellow star thistle ( <i>Centaurea solstitialis</i> ), cockle burs ( <i>Xanthium sp.</i> ), other terrestrial weeds.
<b>Other Biologics (e.g. genetics, disease, pathogen, parasite, or non-pathogens):</b> Whirling disease (WD) , anchor worm ( <i>Lernea sp.</i> ), Asian lung fluke ( <i>Paragonimus westermani</i> , LF), sudden oak death fungus ( <i>Phytophthora ramorum</i> , SOD), other fungus/bacteria
<b>Others (non-biological contaminants e.g. pesticide residue, oil products or harborage via packing or construction materials, etc.):</b> Oil products, pesticide residue, general garbage, sewage, trap parts, sunscreen, hand sanitizer

### HACCP Step 3 – Flow Diagram

Flow Diagram Outlining Sequential Tasks to Complete Activity/Project



### HACCP Step 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 significant ? (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)
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Task 1 Load equipment in to a truck.	Vertebrates Rodents	no	Ubiquitous	n/a	no
	Invertebrates NZMS, others	no	No known populations of NZMS at sampling sites, others not high risk	Visual inspection of gear	no
	Plants Terrestrial weed seeds	no	Ubiquitous	Visual inspect and remove weed seeds from gear	no
	Others Biologics Unknown	no	Truck is a bad environment for survival of aquatic biologics.	n/a	no
	Others Oil, garbage, residue	yes	Oil or garbage could come from truck	Inspect, remove garbage, take non-leaky truck	yes

Task 2 Drive to the first sampling site and park truck.	Vertebrates None	no	Nothing is likely to be on board	n/a	no
	Invertebrates NN mosquitoes	no	Ubiquitous	n/a	no
	Plants Weed seeds	no	Weeds with small seeds are ubiquitous	n/a	no
	Others Biologics Unknown	no	Unlikely to pick up additional biologics en-route	n/a	no
	Others Oil, residue	yes	May not have been option of leak free truck	Park as far from stream edge as possible	no

### HACCP Step 4 - Hazard Analysis Worksheet (continued)

1 Tasks (from HACCP Step 3 - Flow Diagram)	2 Potential hazards identified in HACCP Step 2	3 Are any potential hazards significant ? (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)
Task 3 Deploy traps (hike/wade to site, pound stake into ground, tie off traps, place traps in water).	Vertebrates none	no	n/a	n/a	n/a
	Invertebrates NZMS, others	no	No known populations of NZMS at sampling sites, others not high risk	Visual inspect gear, brush off mud	no
	Plants Weed seeds	no	Small seeded weeds are ubiquitous	n/a	no
	Others Biologics Unknown	no	Probably can not survive on gear	unknown	no
	Others Garbage (trap parts)	yes	Trap parts may not be secured	Physically inspect trap and secure parts as necessary	yes
Task 4 Check traps and measure environmental parameters (hike/wade to trap, check traps for organisms, kill MCs if caught, release other organisms).	Vertebrates none	n/a	n/a	n/a	n/a
	Invertebrates NZMS, aquatic insects, snails, Asian clams	No	No known populations of NZMS at sampling sites, others not high risk	Avoid sampling sites with NZMS, visual inspect and remove other large inverts	no
	Plants Asexually reproducing aquatic plants, terrestrial weed seeds	Yes	Small fragments can start a new infestation, large seeded terrestrial plants could be spread	Visual inspection and removal, brush off waders	yes
	Others Biologics <i>Phytophthora</i> (SOD), Lung fluke, WD	No	No known populations of SOD/LF at sample sites, WD ubiquitous	Brush mud off gear	no
	Others none	n/a	n/a	n/a	n/a

### HACCP Step 4 - Hazard Analysis Worksheet (continued)

1 Tasks (from HACCP Step 3 - Flow Diagram)	2 Potential hazards identified in HACCP Step 2	3 Are any potential hazards significant ? (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)
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Task 5 If it is the end of the sampling year, then pull traps and store en-route to the next sampling site.	Vertebrates Fish, herps	No	Aquatic sp. unlikely to survive transport	Visual inspection and removal	no
	Invertebrates NZMS, etc.	no	No known populations of NZMS at sampling sites, others not high risk	Clean off with local water (best as possible)	no
	Plants Asexually reproducing aquatic plants, terrestrial weeds	Yes	Asexual parts could be transported to a new site, large seeds could be transported	Visual inspection of traps/gear removal of plant parts/seeds	yes
	Others Biologics SOD, lung fluke, WD unknown	no	No known populations of SOD/LF at sample sites, WD ubiquitous	Brush mud off gear	no
	Others Trap parts	Yes	Parts could have dislodged	Visual inspection and clean-up as necessary	yes

Task 6 Drive to the next site and repeat tasks 3-5 as appropriate.	Vertebrates none	n/a	n/a	n/a	n/a
	Invertebrates Mosquitoes	No	Ubiquitous	n/a	n/a
	Plants Weed seeds	No	Already controlled at task 4	n/a	n/a
	Others Biologics none	No	Traveling on well traveled highways/roads	n/a	n/a
	Others Oil, residue	No	Already controlled if possible during task 1	n/a	n/a

### HACCP Step 4 - Hazard Analysis Worksheet (continued)

<b>1</b> Tasks (from HACCP Step 3 - Flow Diagram)	<b>2</b> Potential hazards identified in HACCP Step 2	<b>3</b> Are any potential hazards significant ? (yes/no)	<b>4</b> Justify evaluation for column 3	<b>5</b> What control measures can be applied to prevent undesirable results?	<b>6</b> Is this task a critical control point? (yes/no)
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Task 7 Drive back to shop, unload gear, wash and dry gear and store gear.	Vertebrates None	No	Already addressed in task 5	n/a	n/a
	Invertebrates NZMS, others?	No	No known populations of NZMS at sampling sites, others not high risk	Dry gear in sun for several days	No
	Plants None	No	Already cleaned before leaving site	n/a	n/a
	Others Biologics Whirling disease, bacteria, fungus, SOD	No	Parking lot/warehouse not hospitable to these other biologics	n/a	n/a
	Others Oil, sewage, residues, garbage	No	Ubiquitous	Clean truck at carwash	No



